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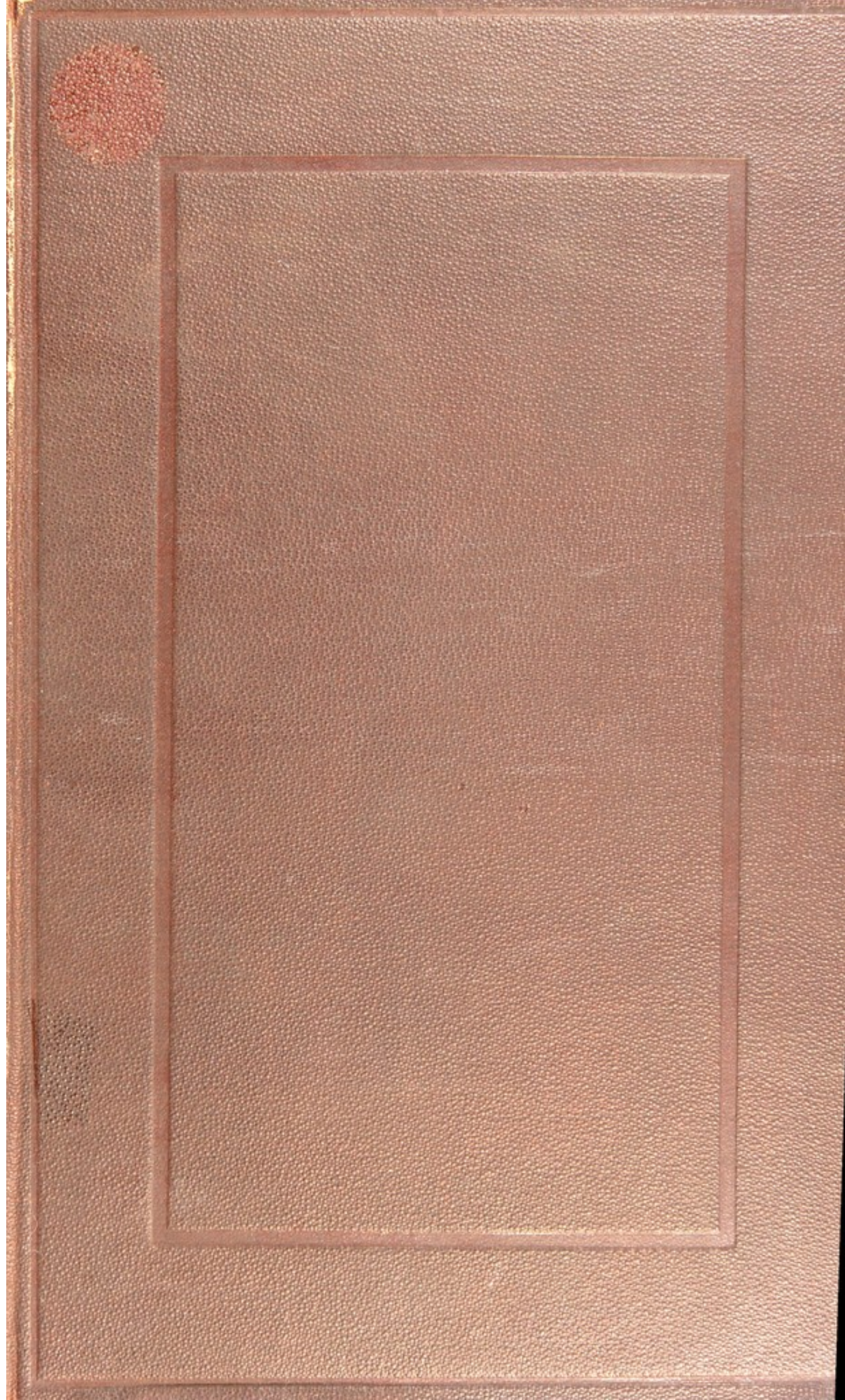
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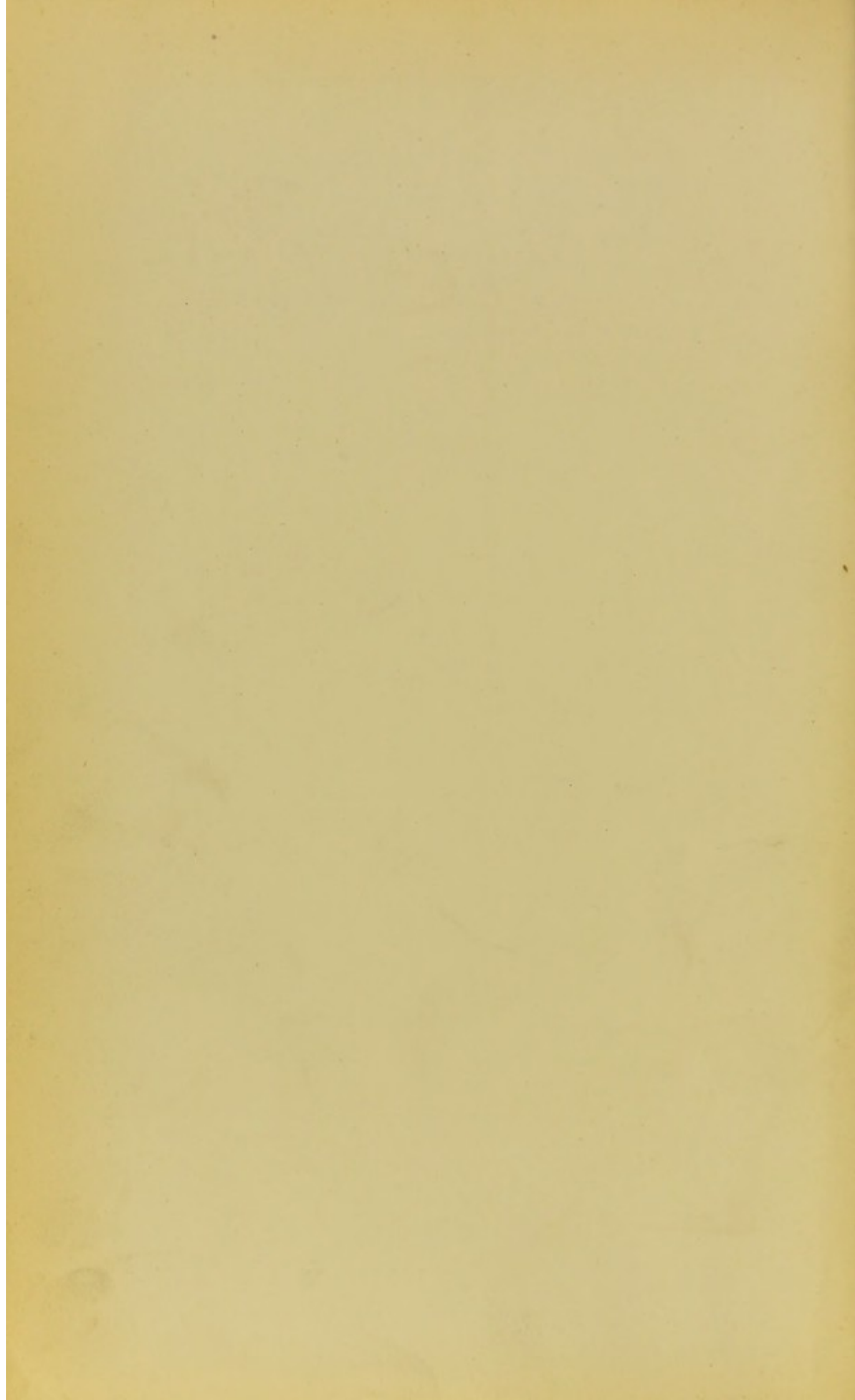


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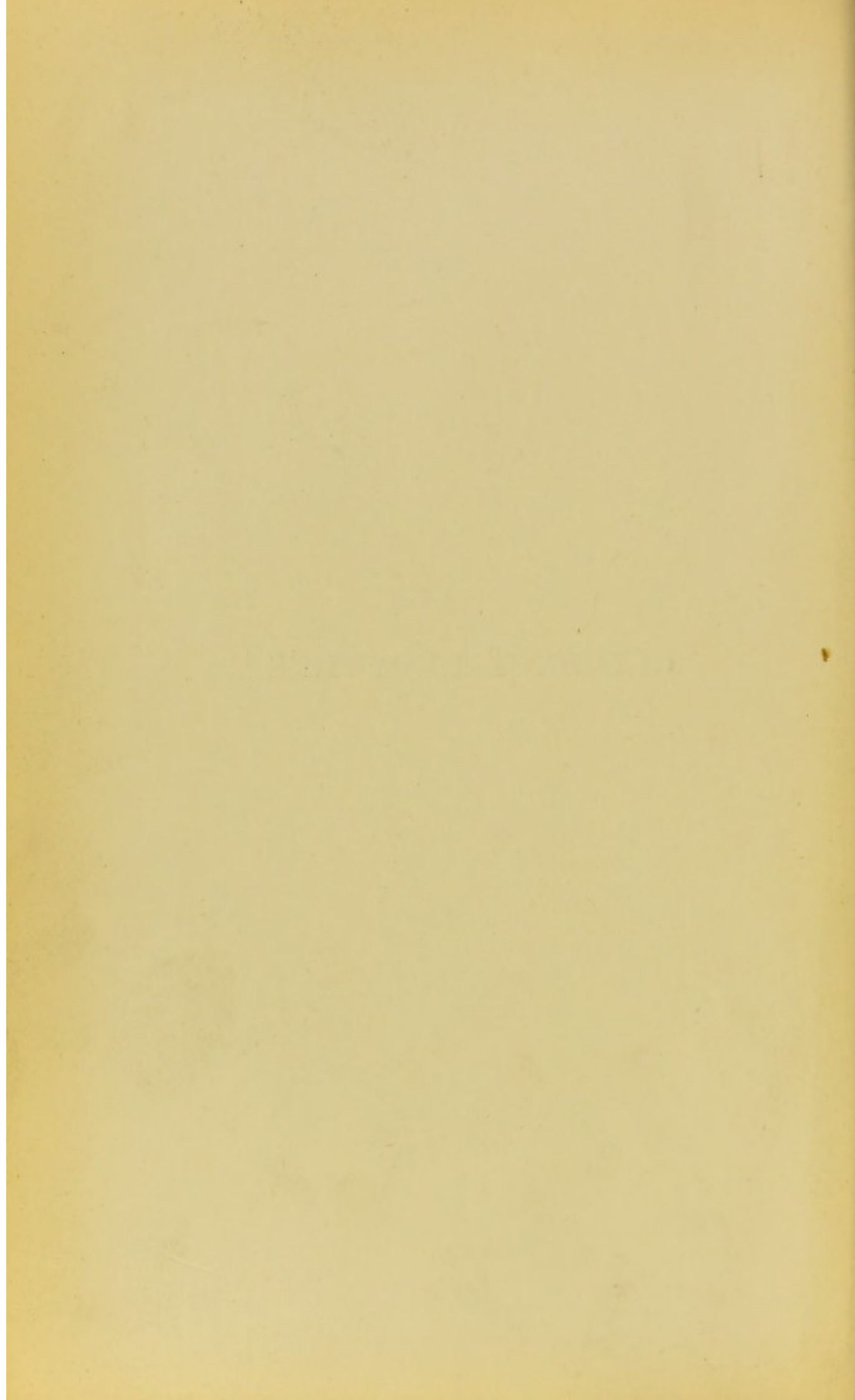
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CLINICAL LECTURES





CLINICAL LECTURES

BY

RICHARD QUAIN, F.R.S.

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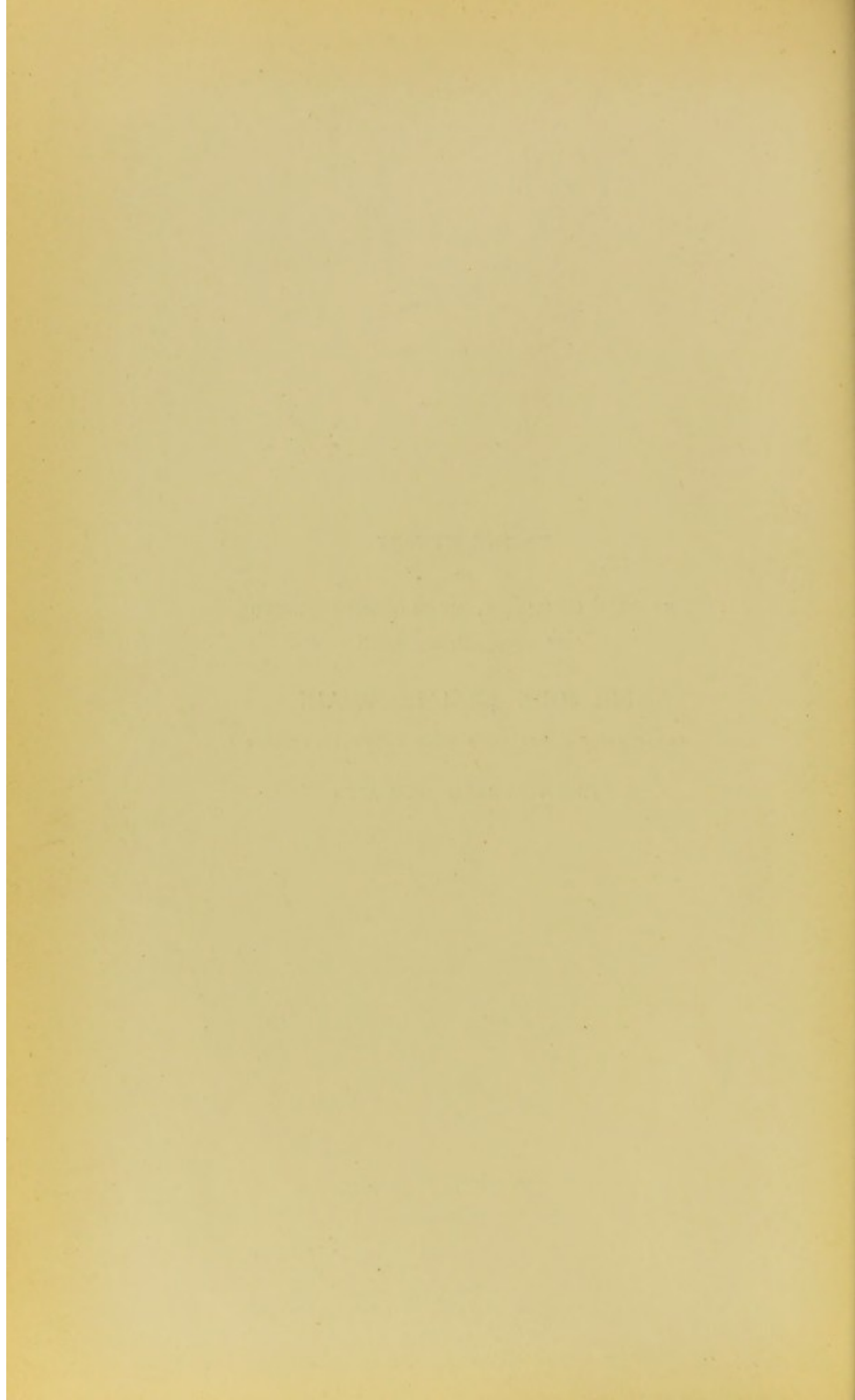
MY LIFE COMPANION, MY HONOURED FRIEND

MY BELOVED BROTHER

SIR JOHN RICHARD QUAIN

JUDGE IN HER MAJESTY'S HIGH COURT OF JUSTICE

THIS VOLUME IS DEDICATED



PREFACE.

SEVERAL OF THESE LECTURES were published in medical periodicals: some had been reported by the house-surgeon of the time. I have pleasure in recalling the names of Mr. CARVER, Mr. GEE, Mr. WINTERBOTHAM, Mr. VINCENT JACKSON. Those gentlemen have been since worthily engaged in the independent practice of the profession and in several hospitals.

After the resignation of my office in University College, I desired to prepare, for separate publication, the Lectures which had been already published, with others; and to carry out that object I obtained the assistance of my former house-surgeon, Mr. ALEXANDER BRUCE. But my friend soon was seized with illness, from which he died. It may be added that afterwards I myself learned from personal experience how long might be the time required for the restoration of health after a severe illness. These circumstances caused the delay in the publication.

In the work of publication—in passing the Lectures through the hands of the printers—I acknowledge with much satisfaction the assistance—the relief of labour—given me by two gentlemen—Mr. WAGSTAFFE, heretofore a member of the staff of St. Thomas's Hospital, whom I met when in a

foreign clime health seeking, now residing out of London ; and Dr. MONEY, who had been kindly commended to me by a Professor of University College.

To the Lectures are added lithographic copies of drawings which had been used with the objects for illustration in the lectures to the students in the hospital. In superintending the work of the lithographer, and in the details of explanation of the plates, I have received much assistance from Mr. SHATTOCK, the Conservator of the Anatomical Museum in University College.

September 1884.

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CLINICAL LECTURES.

ON SOME TUMOURS.

OSTEOID DISEASE—OSTEOID CANCER.

I PROPOSE to bring under your notice two cases of a rare form of malignant growth. It is only in late years, it may be said, starting from the observations of Müller, that the nature of the disease has been somewhat completely investigated.¹

It has been variously named. The second of the two designations I have mentioned is most appropriate for clinical or practical purposes, since it implies the 'malignant' or destructive characters of the malady. The term Cancer, however, being commonly understood out of our profession in that destructive sense, might on that account be avoided in communication with a patient, or the patient's immediate friends.

The facts in the history of the disease; the physical characters of the growth; its extension to other parts; its effects on the general system; the causes of the morbid condition—if, indeed, inquiry into the causes should be likely in any measure to attain to a useful result—these are all subjects of deep interest for investigation. To the pathologist, as such—to him who is engaged in the study of the doctrine of disease—all and each of these details are full of material for interesting and important inquiry. In clinical

¹ Müller's *Archiv*, 1843—'Ueber ossifizirende Schwämme oder Osteoid-Geschwülste.'

or practical surgery, likewise, the same details of pathology—the history of the morbid condition, demand strict attention; but all the results of such investigation must, as far as possible, be, in the surgeon's mind, brought to bear on the question as to the removal of the disease—the relief of the sufferer. In the cases we are about to review, as in all other examples of 'cancerous' or 'malignant' disease, properly so named, the removal can as yet, in most cases, be effected only by surgical operation. We shall now fix attention on the cases.

OSTEOID DISEASE OF FEMUR—OSTEOID CANCER.

Hard, Bone-like Swelling of the Knee—Rapid Increase—Amputation—Health Re-established—Active Exertion during Three Years.

Case 1.—William Allen, aged 17 (Case-book 17), admitted to hospital March 1850, is a slender, active boy. He states that he never felt any illness until the present complaint in his knee. Has not heard of any member of his family having suffered from serious illness. Remembers, however, that his father, having had the top of a finger cut off with a chaffing machine, was laid up for several months; and that his mother, having her arm broken, was confined to bed for nearly four months. The patient has been employed as errand boy to a watchmaker, and has been in the habit of walking twelve or fourteen miles a day.

History of the Disease.—Three months and a fortnight before his admission here, the boy felt a great pain strike into his left knee. It began with a slight accident. He had struck that knee against a flag-stone; but he was supposed to be suffering from growing pains. The knee kept getting larger, and, after a long day's walking, he had to go to bed exhausted. The swelling began at the inner side, and in about a week extended to the outer side also. He has the

impression that the knee was increased in size daily—visibly to himself every morning. Two months ago he took to his bed, and with medical direction underwent treatment, including the use of leeches, blisters, and fomentations. The medical management, with rest, was attended with temporary relief of pain, but was entirely without benefit as regards the removal or diminution of swelling.

When first examined in the hospital the boy was found with pale countenance and lips, tongue furred, skin cool and moist. He appeared emaciated; is said to have lost flesh lately. The swollen knee is kept half bent. There is considerable enlargement of the lower part of the thigh, with some projection above both the condyles of the femur. The outline of the patella is not distinguishable, except by the touch. The swelling is greatest at the back part and sides of the limb. It is firm to the feel, with, however, a little elasticity over the condyles; while some fluctuation is distinguished around the patella, by reason doubtless of fluid in the joint. Measurement of the limbs gives the following results: The diseased limb exceeds the sound one in circumference over the patella by three inches, and at a hand's breadth above the patella by five inches. There is a raw surface at each side of the knee, the effect of blisters. The lymphatic glands of the groin are swollen and very tender. A large artery is distinguished pulsating at the inner side of the popliteal space. Constant aching is felt about the joint, with, at short intervals, intense shooting pains. No swelling—no lump is discoverable in the abdomen anywhere. Thorax: no evidence of disease.

From the patient's extreme suffering, his quickly declining health, and the specially rapid growth of the local disease, I believed the speedy removal of the limb above any appreciable evidence of disease to be absolutely necessary. The operation would in all probability relieve the suffering, and hinder, if possible, the taint of the system from the local disease. The enlargement of the lymphatic glands I looked

on as inflammatory—in all likelihood the result of inflammation of the skin caused by the blisters applied as a remedy. The glands were smooth and acutely sensitive to the touch. Glands affected by specific disease are commonly somewhat rough as well as hard, and less tender than those in the patient. Moreover, the disease of the bone would involve rather glands deeply placed than those at the surface. My expectation was that the swelling of the glands would subside after the operation.

The Operation.—On the second day after the boy's admission to the hospital, amputation of the thigh was carried out. In the operation several ligatures were needed to restrain bleeding. Sickness and vomiting troubled the patient during two days afterwards. This distress arose, in all likelihood, from the chloroform inhaled during the operation. That is unfortunately no infrequent evil. Distressing movements of the stump occurred at the same time. This source of distress was relieved by raising the stump. There was at first much quickness of the pulse, which, however, gradually subsided. The healing process went on steadily, though rather slowly. In a fortnight after the operation, the note states the condition of the stump and of the general health to be good. The lymphatic glands had become smaller and less tender. The wound was firmly healed, and the patient left the hospital in fair health.

The *tumour*, fully double the size of a closed hand, is identified with the femur at its back part. In the recent state it was greyish in colour, and full of large blood-vessels. Throughout it is permeated with bone. The osseous structure is most abundant near the femur, while towards the circumference of the growth it appears in the form of separate spicula. The morbid growth is likewise seen in the interior of the bone. Plate I., fig. 1.

The operation having been performed in March, Allen made his appearance at the hospital in July, after a residence in a convalescent hospital. The result of examination then

was: The whole appearance and feel of the stump are healthy. The glands of the groin are natural in size. The boy has gained flesh largely; he is in vigorous health.

Afterwards the lad travelled about the country as a pedlar, retaining good health and strength for three years. His employment, and his continuance in such employment, may be taken as proof of the soundness of the stump.

To that favourable course of events must be added the sequel:—After an interval of time, the reproduction of disease in the same form in a part of the body distant from its original seat, and the fatal termination.

Second Period: Enlargement of Clavicle after Injury of Right Shoulder—Extensive Disease in Thorax—Tumour in Brain—Death.

In the second period of his suffering, which succeeded to three years of health, William Allen was not under observation in the hospital. His illness, beginning with enlargement of the clavicle of the right side (the former disease was in the left side), now soon affected his lungs, and when the malady had attained that stage of its development was irremediable by surgery, or, indeed, by art in any form. The details have been recorded by Mr. Sedgwick, under whose care the boy was at his parents' home in this neighbourhood, and continued to be to the close of his life. From Mr. Sedgwick's narrative of the case, the following outline of facts has been taken.¹

While employed in travelling about the country, Allen had his right shoulder 'wrenched' in efforts to thrust a bar of iron into a cart, and for some days he could not move the right arm without pain. After three or four weeks, he came to London to his father's residence, being still in good

¹ *British and Foreign Review*, vol. xvi, 1855.

general health; and he was employed in turning a mangle. That occupation, however, he soon gave up on account of symptoms of a lung complaint. When he coughed, the sputum was streaked with blood. The progress of the malady was rapid. The clavicle was enlarged. Serious disease of the lung was soon detected. The existence of a tumour within the thorax also became manifest. It occupied a rapidly increasing space in the cavity.

The diagnosis of the enlarged clavicle at first offered some difficulty owing to the resemblance to callus that would be consequent on fracture of the bone, which there were some grounds for suspecting from the injury of the shoulder—that injury having been the starting point of all the present illness. But the previous history of the case when in this hospital, the growing characteristics of the chest symptoms, and the rapid increase of the enlargement of the bone itself, were ere long sufficient guides to the true diagnosis.

The enlargement of the clavicular tumour was found, by measurement from time to time, to have continuously increased. During three months it was enlarged in length from three to six inches, and in breadth from two to four and a half inches. At the same time the symptoms of lung disease had become much worse. There was now no respiration audible in the left lung, and a fulness was noticed on the right side along the base of the scapula. In the third month of this illness difficulty of swallowing solid food arose, and for a time sufficient nourishment was obviously not taken, though there was no difficulty in swallowing fluids. That distress lasted five or six weeks. It then went off, however, and so completely, that a few hours before his death the boy asked for and ate meat and vegetables with relish.

Six weeks before his death the patient complained of great pain in his head at the 'vertex and forehead, with photophobia, which became so distressing that it was necessary to have the room darkened.' The pupils of the eyes, which acted readily, were a little contracted.

A month later 'a kind of sleepy feeling in the right arm, as well as curious, indescribable, premonitory feelings, sometimes lasting two or three hours, and convulsive movements of the right side occurred, beginning with the right arm, and they continued till very near the close of the patient's life. The convulsive attacks at first came on once or twice a day, but they soon increased in frequency, lasting, each attack, about two minutes. The right arm was thrust violently forwards and retracted; the movements being rapid and uncontrollable, causing great pain and leaving the patient exhausted.' 'Two days before death more severe fits came on in quick succession, affecting the whole of the right side. The face during the convulsions was drawn to the right side, and the mouth was quite twisted.'

Death occurred in seven months after the accident to the shoulder, the starting point of the second period of the disease.

Examination after Death.—Rigor mortis considerable; much emaciation; the right hand and foot œdematous. Right clavicle: About four-fifths of its length at the outer side is involved in a lumpy, bony tumour, through which the outline of the bone is traceable; its compact tissue contrasting with the porous tumour. Plate I. fig. 2.

In the thorax, on the right side, a bone-like mass encroaches on the space the lung should occupy. (For microscopic appearance, see explanation of plate.) The tumour, Plate I. fig. 3, coarsely nodulated, measures in length and breadth four inches by five, and more than two inches in thickness. It is covered by fibrous tissue; adheres to three ribs (fourth, fifth, and sixth), and to the corresponding vertebræ. When the tumour was drawn away, the bones on which it rested were bare of periosteum, but otherwise healthy. On the lower lobe of the right lung, immediately sub-pleural, are some nodulated, firm, grisly deposits, varying in size from that of a large walnut to a hazel nut. Near the base of the lung is a still larger bony tumour, measuring two and a half inches in length, an inch in breadth and in thickness. The left

lung contains in large cavities more than two pints of a greenish puriform fluid, and several smaller cavities are loaded with a cheesy matter.

Mediastinum.—The œsophagus, the aorta, the end of the trachea, and the right bronchus are embedded in a bone-like mass. The left bronchus is surrounded by diseased glands, and its interior is blocked up with cheesy cartilaginous and calcareous substance. The vena azygos contains an elongated cartilaginous substance which is loose within the vein, and is connected with a similar elongated slender mass outside it by a small thin piece passing through the wall of the vein.

Cranium.—On the upper part of the left hemisphere of the brain, close to the margin of the sulcus corresponding to the mesial part of the posterior lobe, a slight eminence was found differing in colour from the adjacent convolutions, at the same time firm and rather elastic. The surrounding brain substance being cut, a small rounded tumour was readily enucleated; nearly oval in form; size—one inch by three-quarters of an inch. The brain tissue around was yellowish and softer than natural. The tumour was closely connected with the pia mater, from which numerous small vessels were continued on its surface. It was throughout of a soft brain-like consistence and devoid of any osseous formation.

The result of the examination after death of the organs in the thorax renders the explanation of the symptoms connected with those organs, which are noted in the history of the case, sufficiently clear. Thus, the difficulty and deficiency of respiration and the hindrance to swallowing solid food are accounted for by the pressure and obstruction caused to the air tubes and the œsophagus by the products of the diseases found in connection with those organs.

Those other distressing symptoms—the convulsive movements of the *right* arm and the *right* side of the body, with the distortion of the mouth—must be assigned to the presence

of the tumour found on the vertex of the brain on the *left* hemisphere. The proof of the correctness of this statement rests on the evidence afforded by recent physiological investigation.

Thus, by experiments on some animals it has been found that the application of the stimulus of electricity to certain convolutions of the brain excites the action of special sets of muscles; notably, for our present object, those which effect extension and retraction of the arm.¹ The position assigned to the convolutions on which the application of the electric stimulus is followed by those movements of the arm in the animals, corresponds very much with the position of the tumour on the brain of the youth Allen. It should perhaps be noted that in the vascularity observed on the tumour and the altered condition of the brain immediately around it, there was evidence of excited action which might be supposed equivalent in its influence to the effect of the electrical stimulus.

Osteoid Cancer of Femur with Deposits in Iliac Glands, Femoral Vein, and Lungs. Osteoid Growths in Omentum and Diaphragm.

Case 2.—J. V., aged 55, a farmer, has always had good health and was an active man, well known in his neighbourhood for skill as a cricketer. His grandmother and his sister died of cancer. He has suffered during the last two years from a dull aching in the lower part of the right thigh, which has caused him to limp in walking. It appears that

¹ *The Functions of the Brain.* By David Ferrier, M.D., F.R.S. London, 1876. A singular case, an example of experiment on the Human Brain, may be specially noticed. The scalp and cranial bone at the vertex being removed to a large extent by ulcerating malignant disease, in a woman æt. 30, the introduction of 'needle electrodes' through the dura mater to the brain on the left side was followed by results in muscular movements on the right side which were similar to those obtained in the experiments on animals.—'Experimental Investigations into the Functions of the Human Brain,' by Robert Bartholomew, M.D., in the *American Journal of the Medical Sciences*, 1874. The case is noticed also by Dr. Ferrier.

at an early period of his suffering, though he was carefully examined by two surgeons, no swelling was discoverable, and the pain he felt was believed to be rheumatic. The only unnatural circumstance then noticed was a swelling (*œdema*) of the leg, which came on in the course of the day and subsided during the night. While in that state, happening to be in a cattle market, the man was struck upon the same limb by a sheep rushing against him. He fell, and the thigh was broken. The fracture was found to be below the middle of the femur. It was treated with a long splint, and in two months he got about with crutches, but he was unable to put more than the toes of the injured limb to the ground. At the seat of the fracture there was much thickening, which was supposed to be callus of unusual size.

Three months after the injury referred to, the man was thrown from a pony chaise, and though he pitched upon the sound side, he suffered great pain in the broken limb, which was much shaken by the fall. Pain soon subsided, but the bone that had been broken was enlarged rapidly afterwards. Leeches, iodine externally and internally, blisters, as well as other means, were used, but without benefit. The enlargement of the limb continued to make progress, and the superficial veins became swollen. The outer and larger part of the thigh was hard—bony to the feel, but the inner side was soft. This, the inner side, gradually acquired a half-fluctuating feel, and the skin over it assumed a dark dusky hue. Becoming pointed on the surface, it was punctured by the surgeon in attendance, and about two ounces of bloody fluid escaped, resulting in relief of the pain. Now, however, the man lost the ruddy complexion which was natural to him, and glands in the groin were enlarged. Such is an outline of the previous history of this patient.

On his admission to the hospital—now two years from the beginning of disease and ten months after the fracture of the thigh bone—the limb was found lying on the outer side, its size much enlarged, the cutaneous veins swollen. Over

three-fourths of the thigh there is a feel as of bony formation, but at the inner side of its lower half a large prominence is superadded to the general enlargement. This is red on the surface, and a fungus an inch in diameter projects through a breach of the skin at the most prominent part. Whilst the feel of the general enlargement is unyielding, this prominence is soft, and gives an indistinct feel of fluctuation. The inguinal glands are tender and enlarged. The whole thigh measures around from four to five inches more than the sound one. At the groin the excess of size is upwards of four inches, and there is a special fulness of small size about the blood-vessels under Poupart's ligament.

The patient's health soon failed. The fungus increased, and bled several times. He died six weeks after admission to the hospital.

*Examination after Death.*¹—There was found on the forepart of the thigh, at its upper end, a good deal of thickening and induration of the cellular membrane, extending up to the pelvis beneath the skin and between the muscles. The greater part of the thigh to its lower end was entirely diseased, forming an oblong mass with a fungous protrusion at the inner side. The mass was covered with a capsule, which was continuous with the periosteum, and closely blended with the adjacent tissues of the limb. Parts of the immediate covering were cartilaginous. The subjacent growth is seen to cover a large extent of the femur; identified with that bone at its lower end, but separated by an interval at the upper end. The morbid growth is tuberos on the surface, and bony (Plate II. fig. 1). When divided, the long growth is seen to consist of two different structures, one being porous, the other of closer texture, in appearance between ivory and chalk. It is observable in the section of the mass that the fracture of the femur is still distinct

¹ See also *Transactions of the Pathological Society of London*, vol. vi. p. 367. The morbid parts were placed before the Society, at my request, by Dr. Hillier.

(fig. 2). The upper fragment of the bone is not diseased ; its end is rounded off ; while the lower fragment is nearly altogether occupied with the morbid material, which is for the most part ossified. The outgrowing masses, projecting upwards from the lower diseased fragment, almost encircle the end of the upper fragment of the femur.

Above, and continuous with the principal morbid mass, were several light-coloured tumours, firm to the feel, and fibrous in texture. They were laid along the femur, and embedded in the soft parts, as far up as the pelvis. Immediately behind, and at the outer side of the external iliac and the common femoral blood-vessels, was a mass of lymphatic glands, enlarged and full of bony deposits. When this mass was taken up, it formed a solid thick plate three-quarters of an inch thick and two inches in breadth. The femoral vein contained a small mass, resembling those in the glands—bony like them. This substance is still seen to be connected with the vein by an elongated slip of fibrinous matter, apparently from the blood, which extends upwards and downwards, for a couple of inches each way. The vein here is contracted ; but above and below that part, the vessel is healthy, and has its natural size (Plate II. fig. 1).

In the abdomen were found two rounded tumours, about the size of walnuts, one in the omentum, the other embedded in the diaphragm, and involving nearly the whole thickness of its muscular substance. These bodies were fibrous on the outside and extensively bony in the interior.

The lungs were both studded over the whole surface with thin plates, adherent to the under surface of the pleura, of various sizes, from a line to an inch in diameter, and of various density, some bony, others fibrous. The pleura was puckered around the plates. Within the substance of the lungs were also many nearly spheroidal masses, varying in bulk from that of a filbert to that of a pea. Their structure was similar to those already described. The surrounding lung substance was sound.

Some of the facts of this case, as detailed, seem to admit of being interpreted as follows:

The pain simulating rheumatism, which arose two years before the patient came to the hospital, was due to the morbid growth in the lower end of the femur; which, as you see, no longer shows its natural cancellated appearance or the cavity of the shaft. It is nearly a solid mass. What was very naturally taken for callus was, in fact, the osteoid growth; which, springing from the previously morbid part of the bone, and projecting upwards around the upper fragment, retained it loosely in its place.

The upper fragment of the femur is neither thickened by callus nor affected with disease, the continuity of disease in the bone having been perhaps stopped by the fracture. The bone is rounded at the lower end by a process of absorption, as is common after an amputation. Small masses of the new formation were indeed connected with the periosteum of this part of the bone, but they were separated from the osseous structure with the handle of a scalpel, while two were so adherent to or connected with the surface of the bone, that a scale came off in removing the lumps.

There are several points of contact between the two cases. In both the disease was formed at the same place—the femur at the lower end of the bone. It is remarkable that the same part of the same bone is the most frequent seat of osteoid cancer. The fact is noted and supported by enumeration of cases by Sir James Paget.¹ In both the malignant disease arose without anything apparent in the condition of either to cause suspicion of lurking disease. The man was, you will remember, said to be noted in his neigh-

¹ 'Among the bones, the lower part of the femur is, with remarkable predominance, the most frequent seat of osteoid cancer. Among the twenty-seven cases of which I have seen histories or specimens, fifteen had this part for their seat; the skull, tibia, humerus, ilium, and fibula were each affected in two cases; and the ulna and metacarpus each in one case.'—*Lectures on Surgical Pathology*, revised and edited by William Turner. 4th edition, 1876.

bourhood as a 'cricketer.' You can judge what that title implies as to health and vigour. The boy walked the country many miles a day as a messenger. He had not had any previous illness. The morbid growth began in both patients after slight injury; in both, the morbid material was found in the veins; in both, the lungs became affected with the same disease; in both, the softer part of the growth seems to have been fibroid or fibro-plastic.

In the osteoid, no less than in the other forms of malignant disease which are more frequently met with, there is, we assume, a general or constitutional ailment, of which the tumour is the local manifestation; and the local growth becomes in its turn a source of added taint to the system. But what the form of the constitutional fault may be, we know not. We believe it to be contained in the blood—the source from which diseased tissue must be derived, as the healthy tissues are; yet its existence has not been demonstrated in that fluid or elsewhere. Probably the whole system is affected. Probably, too, it is not the disease itself, but the capability of taking on the peculiar form of disease under favouring or determining circumstances, that exists in the system.

A portion of the mechanism of the secondary constitutional taint is more easily ascertained. In most cases of malignant disease, the material of the disease, in some form, travels from the early formations into the blood by the lymphatics or the veins; ordinarily by the former vessels. When conveyed by the lymphatics, the morbid substance becomes evident, being perhaps filtered out in the glands. In the cases before us, and in others of the same kind, the greater part seems to have been borne into the veins and affected the lungs, in which is the first large system of capillaries that the venous blood of the general system meets with. The same fact—the presence of secondary deposit in the lungs—was observed in most other examples of similar osteoid disease—recorded by Müller, Mr. Stanley, Sir James

Paget, and others. To one such case—the earliest placed on record that I am acquainted with—I shall make brief reference, on account of some peculiar circumstances in its history.

The case occurred in the Gloucester Infirmary a century ago, in 1779, under the care of Mr. Cheston, who published an account of it. The patient—a man, aged 22 years—was supposed at first to suffer from rheumatism. He had pains about his back and abdomen. His sufferings, which appeared to have been very great, were aggravated by retention of urine; and it was found to be impossible to pass a catheter for his relief. The patient sank exhausted.

In examination after death a tumour was discovered occupying half the pelvis, connected with one of the innominate bones, and extending upwards upon the vertebræ to the level of the kidney. The neck of the urinary bladder had been compressed by the tumour; and thereby the introduction of the catheter had been prevented. The morbid mass ‘was’ (the note states) ‘seemingly formed of scirrhus cartilage, bone, and stone.’ When dried, it was ‘perfect bone.’ The lungs were studded in many parts with the same substance. Bony substance was found in large quantity in the vena cava, nearly filling the vessel at one point; and ‘the thoracic duct was plugged with ossific matter from immediately above the receptaculum chyli.’

It is curious to observe that the part of the case which excited most attention at the time of its occurrence, as the title of the paper imports, was the state of the thoracic duct.¹ That vessel and a portion of the vein were examined by John Hunter and Cruikshank, and apparently with a view especially to ascertain if the vessels were pervious. You will bear in mind the attention then given to the lymphatics. A similar case occurring at the present time, this having become

¹ ‘Account of the Ossification of the Thoracic Duct.’ By Richard Browne Cheston, Surgeon to the Infirmary of Gloucester. In *Philosophical Trans. of the Royal Society*, vol. lxx. for the year 1780, p. 323, and continuation of the case, p. 578.

the period of microscopical research, the examination of the morbid growth with a microscope in order to ravel out its texture, and perhaps the structure from which it springs, receives most attention. So objects are looked at with the light of the time in which they are observed. Probably the difference of observation has its value; for things thus receive a many-sided examination, and the sum of knowledge is, in the end, the more complete. Let it be understood, however, that the state of the thoracic duct is no unimportant incident in Cheston's case, for osteoid cancer, it will appear presently, but seldom affects the lymphatics in any considerable degree; and this is the only instance that I know of, in which the solid material of the disease—such we must believe it to have been—is known to have been found in the duct.

Seeing the frequency with which the osteoid disease had been found in the veins in the cases I am acquainted with, and the infrequency with which other forms of cancer occurred in the same vessels—at least, in my own experience—I requested Mr. Laurence, the house surgeon, to gather from books, to be added to those in my case-books, a number of examples of malignant growth in the lower part of the body, so far as to show, with some detail, whether the secondary disease more frequently followed the course of the lymphatics or that of the veins; and whether the abdomen or the thorax were more frequently the seat of the secondary deposits. From the insufficiency of materials for our purpose when attention was confined to malignant disease of the bones, the testis was included in the inquiry.

The result may be briefly stated thus:—As regards the testis, the inference being taken from nineteen cases, the most frequent seat of secondary deposit is the lymphatic glands of the abdomen. In less than a fourth of all the cases, secondary growths occurred likewise in the lungs; and in these, wherever the point was inquired into, cancerous material was found also in the veins.

On the other hand, among ten cases of osteoid cancer of the femur examined *post mortem*, the lungs were affected with the disease in all but one; while the lumbar lymphatic glands were involved in three cases only.

Besides the formation of secondary tumours, the direct result of the primary disease, the occurrence of independent morbid growths in other parts of the body must not be omitted from notice. Such separate independent formations are not an infrequent accompaniment of the manifestation of malignant disease. The facts are illustrated in each of the cases we have last had under observation, thus: In the case of the boy Allen there were two new separate growths, one in the clavicle, the other in the brain, apparently independent one of the other and both independent of the original disease in the femur. So, in the second case, two new independent tumours were formed—one in the diaphragm, the other in the omentum. In this recapitulation of facts it should be noticed also that the several added morbid growths in our cases, whether emanating directly from the original disease or formed independently of it, were of the same structure as that original formation—osteoid or fibro-osseous, with one exception. That exception was the tumour formed in the brain of the youth Allen (Case 1). It was wholly soft—brain-like, without a trace of bone in its composition.

The Operation.—I now come to the immediate object of all inquiries into the facts of various cases—viz. the question of removal of the disease by operation. From what has already been said, it is plain that the operation is undertaken not in the expectation of effecting a cure of the disease; for the disease or the liability to its manifestation pervades the whole system; but with the expectation of diminishing, if not wholly getting rid of, the evils attendant on the morbid growth. The removal of the tumour relieves or prevents the direct distress which the morbid growth occasions. The boy Allen suffered extreme pain, was emaciated, and

would probably soon have died from intense suffering, the result of the primary morbid growth, though evidence of disease had existed only for three months.

The operation takes away, moreover, the source of the secondary growth. It was so that health was restored and life prolonged for three years in that instance. The masses of morbid substance in the thorax, which actually occurred in the same case, were consecutive to the disease of the clavicle, borne inwards from it. Would the removal of that bone or the diseased part of it have been beneficial? The answer is: If the removal had been effected at an early period of its growth, before the material for any secondary deposit had passed inwards—had travelled from that bone to the lungs and the mediastinum, the advantage that resulted from the former operation would in all likelihood, might at all events, have been renewed. When, however, the patient was placed under medical care, it was for already existing secondary disease affecting the lungs.

But how as regards the second case? The material facts in this instance are the following: When the patient was brought to this hospital, the osteoid disease had existed during two years; latent at first, the morbid deposit probably being within the bone, masked afterwards by the accident that befell the man, and the common phenomena naturally expected to arise in a case of a large broken bone. Moreover, a fungoid or hæmatoid tumour had existed for some time. The thigh was much enlarged up to the pelvis. The disease had passed with the lymphatics into the iliac fossa, beyond the limits which any useful operation could have reached.

The foregoing circumstances, apart from the disease within the veins and in the lungs, would have rendered an operation ineffective for any real relief to the patient. And when the disease in the chest is considered, the question of operation at the period of its growth we are considering does not admit of discussion.

From the facts adduced, it seems likewise to follow with reference to examples generally of the same disease, that the operation, in order to afford the expectation of advantage, ought to be performed as early as the diagnosis is established; and from the proneness of the disease to be propagated to the thorax, strict attention should obviously be given to the search for evidence of secondary disease in that cavity as well as in the abdomen before an operation is undertaken.

MYELOID TUMOURS.

Myeloid Tumour of Tibia—Amputation through Femur— Good Health four and a half Years afterwards.

Case 3.—Harriet Pink (Case-book 6), æt. 29, had fairly good health until the disease in her leg began. Twelve months ago she felt pain for the first time below the knee, and tied a band around firmly in order to relieve the pain. In a couple of months a small lump appeared. She attributed the pain and swelling to frequent pressure of the part against the frame of the bedstead of a sick person during her attendance as nurse. Three months before admission to the hospital, the patient fell in an effort to avoid treading on a cat. The swelling part being struck in the fall, she felt extreme pain, and could not walk upstairs. The leg quickly became black from the knee to the ankle. The lump was enlarged, and it has since then continued to increase in size.

On the admission of the patient to the hospital, the tumour was found to be on the outer tuberosity of the tibia on the right side. It was elongated transversely; in size more than two inches across and more than an inch vertically. The skin of the limb was not discoloured except a brownish staining over the tumour. The feel of the enlargement was elastic. The lymphatic glands were not enlarged or tender. A small probe passed through a puncture

in the skin penetrated deeply beyond the position of the surface of the bone without any hindrance, as through very soft structure. The puncture was followed by a blush of redness. During a short delay for attention to the patient's general condition, a fungus projected through an ulcerated opening in the skin over the projecting disease. The diagnosis arrived at was, that the tumour came from the interior of the bone, and was in all likelihood myeloid. The removal was determined to be necessary, and was effected by amputation through the lower part of the thigh. Such a tumour might, especially at an early period of its growth, be removed from the cavity of the bone. But in this case the position, the extreme nearness of the tumour to the knee-joint, and its size, seemed to render that form of operation inadmissible.

After the operation the reports day after day are uniformly favourable. On one occasion a good deal of pain occurred, and was relieved by a dose of opium. In a month the patient went to her home in the country in good health. The stump was quite sound.

Reports afterwards.—Three years after the patient left the hospital, a report from her sister reached the hospital nurse (Mrs. Nelson), that 'Harriet Pink was in good health.'

Still later, four years and a half after she had gone to her home, a letter from the woman herself announced that she was in excellent health.

Myeloid Tumour around the Knee, within the Joint, and within the Head of the Tibia—Amputation—Death two Months after Operation—Secondary Tumours in both Lungs.

Case 4.—Alice Fincham, a milliner, æt. 18, had good health till present complaint arose. Father, mother, brothers, and sisters healthy. An aunt died of phthisis.

Two years ago, while going downstairs, the girl 'wrenched her knee.' She was not kept at rest in consequence of the

accident. A surgeon had a knee-cap applied, the use of which was continued till it was worn out. During a year after the accident no inconvenience, neither weakness of the limb nor pain was felt. The girl walked about as usual. But since the expiration of the year, the time the patient connected in her memory with the disuse of the knee-cap, the swelling of the knee has been continuously enlarged. The limb has become weaker, and starting pains have disturbed her sleep.

Examination at Hospital.—The right knee, which is a little flexed, is much enlarged. A degree of elasticity, attended with pain on pressure, is felt on the outer side of the joint. There is some tenderness also over the head of the tibia. A degree of displacement of the tibia backwards is noticed, with consequent prominence of the end of the thigh bone. But the outline of the femur is not clearly defined, because of morbid enlargement within the joint. General health is depressed.

During a short time in the hospital the patient at first improved in general health. But the enlargement of the knee became obviously, at very short intervals, increased in size, especially at the outer side; and there it was generally softer than elsewhere. On the inner side one spot was soft and painful to the touch. A small puncture having been made at this the inner side, where a feeling of fluctuation was distinct, blood was freely discharged. The hæmorrhage was not arrested by pressure on the femoral artery or on the superficial veins, but was restrained by the application of a compress and roller.

Amputation, the only mode of removing the extensive disease, was carried out. Very little blood was lost during the operation, but several ligatures of bleeding vessels were needed. No loss of blood occurred from the wound afterwards.

After the operation the patient had some distress with sickness, resulting, in all likelihood, from the chloroform

inhaled; and she was troubled also with starting of the stump. The distress was soon relieved, and improvement went steadily on. In a week the report states: 'Patient looks well and cheerful;' and three days later it is stated: 'Skin and tongue are natural; appetite good.'

In a month after the operation the stump was healed except a small point. Health was good.

The patient returned to her home, where she was attended for a short time by the house surgeon, till the wound of the amputation was entirely cicatrised.

In a month after the return to her home, the young woman became unwell; and was under the care of Mr. Claremont, who had sent her to the hospital. The lungs became diseased, and the patient died about two months after the amputation had been performed.

I shall now place before you the result of the examination of the parent tumour and of the secondary growths likewise, from the notes of Dr. Wilson Fox (at the time Professor of Pathological Anatomy). Mr. Claremont, who made the examination *post mortem*, enabled Dr. Fox to complete the investigation of the disease in the viscera.

Position of the Tumours.—They surround the head of the tibia, varying in thickness from half an inch to two inches; the patella is covered, but the ligament is unaffected. A prolongation of the growth extends down the interosseous space. Another passes between the hamstring muscles and their tendons—which, however, are not affected by disease—extending about four inches along the leg.

Behind the femur a large process extends upwards, but has no connection with the bone. The tumour here has penetrated the capsule of the joint; the prolongation within the joint surrounds the crucial ligaments. It has invaded portions of the synovial membrane, and a rim of the morbid growth surrounds each of the semilunar cartilages. The articular cartilages of both the bones appear unaffected, preserving their natural appearance and polish.

Character of Tumour.—Around the bone it is an irregularly nodulated mass of varying colour and consistence—some parts greyish yellow, firm with fibrous fracture; on section glistening and almost semi-transparent. The parts were torn with difficulty; yielded no juice on pressure. The larger masses have a white cerebriform appearance and a pulpy consistence, breaking down easily under pressure. None yield pulpy juice. Whole tumour excessively vascular; in some places are spaces filled with blood, many parts deep mulberry in colour.

Head of Tibia.—The articular cartilages rest on a thin layer of bone, and immediately beneath this the whole head of the bone is converted into a tissue resembling the firmer part of the tumour before described, except that it is more vascular. The tissue contains spicula and small masses of bone, but can be easily cut with a scalpel. This condition extends some distance down the medullary canal. The bone surrounding the growth is converted into a thin shell, which on the outer surface has lost its periosteum. When the tumour is drawn out from its position, deep depressions are seen on the inner surface of the osseous shell.

Examination post mortem.—Femoral vein and artery are healthy; so also are inguinal glands. Heart, pale, soft; liver, pale; kidneys and spleen, healthy. Right pleura contained a large quantity of purulent fluid which had compressed the lung.

Left lung contains from thirty to forty nodules, varying in size from that of a Tangerine orange to a pea—average size about a walnut. They are nearly all situated immediately beneath the pleura, and form projections *on the surface*. Pleura is very vascular. The tumours can only be removed by tearing the lung tissue. No appearance of inflammation surrounds them. The nodules in the lung are mostly soft, highly vascular, and break down easily into a pulpy brain-like mass. Some, however, are firmer, with a smooth section, fibroid appearance, with a glistening trans-

lucency and only mottled with spots of a red colour. Others are maroon-coloured throughout. None yield any juice on pressure. Bronchial glands are not diseased.

The right lung is studded with nodules resembling those on the opposite side. This lung presented also at its base a rugged mass, size of a foetal head, of dark mulberry colour, and resembling that seen in the central part of the tumour of the tibia. Mingled with this are firmer and lighter portions, smooth on section, like those in the other lung. In one place is found a recent hæmorrhagic infarct (Plate IV. fig. 3), firm, but friable, of dark red colour; wedge-shaped with the base to the pleura. In the centre is a light yellow nodule of the size of a peppercorn. When cut across this nodule can be easily removed; it leaves a cylindrical depression lined by a smooth membrane. Section of this wall shows distinctly the muscular coat of an artery. This nodule shows under the microscope characters similar to those of the other tumours in the lung. The conclusion, therefore, is that the nodule has been formed as an embolus from the parent tumour of the knee, lodged in a branch of the pulmonary artery.

(For microscopical examination, see Plate IV.)

Now as to any application of the facts of the two cases to practical use:

In such cases, as in examples of 'malignant' disease, the length of time the morbid growth existed before the resort to the only remedy at present known, may be material. In the first case, the disease had existed one year; in the other (Case 4), double that time; and it is stated that in this latter the patient was in good health during the first of the two years. The question arises, might not the girl Fincham have escaped, for a time at all events, the destructive secondary disease in vital organs, if the parent local disease had been removed at an early period of its growth—say, during the first year? An earlier period than in Pink's case would be most advantageous for the patient. The early removal

has obviously, as with reference to ordinary forms of tumour, the advantage of the smaller extent of the operation that would be needed. The secondary growths, exemplified in the latter case (No. 4), are to be considered exceptional as results of the myeloid tumour. But since the immunity from secondary disease cannot be anticipated, the operation should proceed as if the immunity were not to be expected.

*Bone and Cartilage Tumour—Osteo-chondrophyte—
Exostosis—Removed from Femur.*

After reference made to some cases of exostosis which had been removed by operation, the lecture was continued as follows :

Although the case which is to form the principal subject of the present lecture has not been in the hospital, still, inasmuch as it affords a good example of a disease seldom met with, and as I have means of illustrating the most important facts, I am desirous to bring it fully under your notice. This is the record of the facts :

Case 5.—Miss E. B., aged 26 years, a lady of nervous temperament, with fair skin and dark hair, has generally enjoyed pretty good, but by no means robust health. From the inner side of the femur of the right side near its lower end projects the tumour, for the treatment of which advice was sought. It was first noticed seventeen years ago, and from that time it had been increasing slowly in size till a few months since, when it began to grow with greater rapidity, and has since continued to do so. The mass itself has always been painless, but the integuments covering it are often injured by knocks against ordinary articles of furniture.

It has thus become a source of much inconvenience, as well as of anxiety of mind to the patient ; so much so, that

her medical attendant (my friend Mr. Boxall) was led by careful observation to conclude that the lady's health was suffering from this very anxiety.

The enlargement represented in this cast (Plate V. fig. 1) is about the size of a clenched hand of ordinary size, and is pyramidal in shape. Its long diameter is in the direction of the limb, but with a degree of obliquity, the lower end being inclined towards the popliteal space under the muscles which bound the space on the inner side, while the upper end is inclined forwards upon the anterior aspect of the bone. When the knee is straight, the tumour is close to the patella; in fact, its lower end, in this position of the joint, is somewhat lower than the top of that bone. The knee being bent, the patella descended, and the tumour then appeared to be free of the joint.

The tumour, immovably connected with the femur, was hard, bone-like to the feel, and nodulated—a series of blunt processes projecting all over it (fig. 2). The femur has its natural shape. It does not blend with the diseased mass. The surrounding soft parts are healthy; so, likewise, are the lymphatic glands in the groin. There is, in short, no evidence of any constitutional taint, either in the condition of the structures in the neighbourhood of the disease or elsewhere. Neither is there any in the aspect of the patient.

The facts detailed appeared to lead to the following conclusions respecting the nature of the disease:—

1. That, considering the slowness of the growth of the tumour, as well as its hardness and the absence of pain or uneasiness in the part, together with the sound state of the surrounding structures, and the freedom from all appearance of constitutional taint, the disease was not in any degree malignant.

2. From the fact of the femur being unaltered in shape—not swollen or expanded into or upon the tumour, which sprang rather abruptly from its surface—this inference

seemed to flow, namely, that the disease arose from the external surface of the osseous structure; in other words, that it did not pass outwards from the interior of the bone.

The mass, however, had lately been increasing actively, and it lay near to the capsule of the knee-joint. Any considerable augmentation of size would augment the risks of the operation, for the parts involved would be more extensive, and the integuments would probably become ulcerated from pressure, so as to produce an open sore. Moreover, by increase of the tumour, the synovial capsule of the joint might become involved; and, in that event, the difficulty of the operation would be much increased, or even the removal of the morbid growth might be inadmissible, except with the limb itself. To these facts must be added, as no unimportant consideration, the anxiety the patient felt to be relieved of the disease, as well as the influence of this anxiety upon her health. Such were the grounds upon which the speedy removal of the tumour was thought necessary.

The Operation.—The patient being under the influence of chloroform, a tourniquet having been placed around the thigh, and the limb moderately bent at the knee, a longitudinal incision was made over the whole length of the tumour at its back part, near to and in front of the long saphenous vein; and from that another incision was directed across the middle of the tumour to the anterior border of its base. With the integument and the vastus internus, which formed two angular flaps, was raised a thin layer of fat lying beneath the muscle, the edge of the knife being kept to the very unequal surface of the tumour.

The soft parts having been turned aside, the morbid growth was felt to be unconnected with the femur at the circumference of its base. But the interval between it and the bone was very narrow, so much so, that only a thin, narrow chisel could be inserted. With the chisel the short pedicle of the tumour was cut through, and the investing

membrane having been divided, the tumour was easily removed.

Progress after the Operation.—On the sixth day the natural prominences of the knee were indistinct, in consequence of swelling about the joint; and subsequently fluctuation was felt, owing, apparently, to effusion into the synovial sac; but this effusion and fluctuation were perceptible at the outer side of the patella, while none existed between the patella and the seat of the operation.

On the seventh and eighth days small patches of yellowish red colour appeared on the outer side of the knee, and afterwards over the upper part of the thigh, all at the outer side. The same appearance likewise showed itself, at a later period, on the inner aspect and fore part of the leg, slightly also on the lower part of the abdomen. The inguinal glands became painful. The redness was attended with a little elevation of the surface, and tenderness to the touch. A couple of days after the erythematous eruption began on the limb, a rose-coloured patch appeared on the nose, which became swollen, had a vesicle formed on it; and the redness extended to the forehead and eyelids.

The discoloration of the several patches, after remaining one day at its height, disappeared, the whole duration at any one point being about three days. In the third week there was no further appearance of the eruption, and then there remained its vestige in slight scaling of the integument. The eruption was attended with but little constitutional disturbance. The pulse was accelerated, ranging from 108 to 120. But the temperature was but little raised. The skin on the upper part of the body was generally soft and moist, and at night it was covered with slight perspiration. The tongue was always moist, and for only a short time slightly furred at its middle. The appetite, the while, was not much impaired. There was no mental disturbance at any time. The medical treatment consisted chiefly in the use of small doses of muriate of morphia (subsequently of tincture of opium instead), and mild aperients.

On the subsidence of the slight fever, the patient seemed doing, in all respects, well ; but in a few days, and after all the erythema had vanished, some uneasiness was complained of about the right hip. The patient said she had often, at former periods, felt discomfort in that situation, and that there had always been some enlargement of the part. Tenderness was felt about the great trochanter of the femur with a slight fulness, and in a few days fluctuation became distinctly manifest. The fluid was not circumscribed by any distinct boundary. In order to evacuate it, an incision was made on the outer side of the thigh, and another behind the trochanter. Matter likewise formed, a little afterwards, at both sides of the leg, and was evacuated through openings made for the purpose. The discharge of pus continued for only a short time at any point. Once fully evacuated, its formation ceased, and the wounds closed. Such wandering erythematous or erysipelatous patches, and the formation of subcutaneous deposits of puriform matter, are not infrequent after local injuries and surgical operations. The constitutional disturbance in the case was at no time considerable. The pulse, indeed, was rapid, ranging from 120 to 130, and even 140 ; but the expression of the countenance was always good, the eye clear and intelligent, the skin soft, the tongue usually moist and pretty clean. Food was taken the while in good quantity, and with decided relish.

In the medical treatment, when pus was being freely discharged, there was added to the use of opiates, and of an occasional aperient already mentioned, decoction of cinchona with sulphuric acid, instead of quinine, which appeared to disagree with the stomach. The alteration of medicine seemed much to the advantage of the patient.

Finally, notwithstanding the interruption adverted to, recovery went steadily on. The wound made in the operation healed up, even while the subcutaneous abscesses were forming ; and before she left her bed, the patient had gained flesh considerably. Her face was decidedly fuller, and her

countenance was altogether indicative of sounder health than before the operation. She herself declared that she felt now more in health than she had done for some years before. It would seem that the constitutional change attending the local affection, especially, perhaps, the continued warmth and moisture of the skin, exercised a beneficial influence on the system, which for a considerable time had been depressed and 'out of order.'

After her return to the country, I learned from Mr. Boxall, that our patient continued to be remarkably well, and that she was regaining the free use of the limb, in which there was some stiffness when she left London.

The *tumour* is, as you observe, very irregular on the surface. Compact at the middle of its base, it is divided all over a large part of its circumference into a series of processes (Plate V. fig. 2). It has, in fact, a cauliflower arrangement, the enlarged extremities being, however, rounded off. After a section has been made, the mass is seen to consist chiefly of cancellated bone, with a layer of cartilage (fig. 3). The latter structure occurs in small separate pieces towards the circumference of the tumour, and a thin layer of it covers the surface. But no inconsiderable portion of the mass consists of white dense structureless substance, the result of calcification of the cartilage. It is within this calcified structure that the cartilage is met with in insulated patches.

The pedicle, narrow, elongated, was so short, that the growth might be said to have been sessile upon the femur (see figure), the outer dense covering of which was continued into the surface of the tumour, so that when the diseased growth was removed, the cancellated structure of the bone was laid bare. From a consideration of the small size of the connection between the bone and the tumour, it would seem (the conjecture may be ventured) that a certain extent of diseased surface of the femur gave origin to the tumour; but that, while the new growth became enlarged in every

direction, the bone itself was no further affected by the diseased action.

An example of a tumour growing from the humerus, described and represented in M. Cruveilhier's work on morbid anatomy,¹ seems to be of similar composition to that now before us. The mass was, however, in that instance of very large size, and was extensively connected with the bone from which it grew. It had been removed by M. Roux, by amputation at the shoulder-joint. For such growths, M. Cruveilhier has proposed the distinctive name 'osteochondrophyte.'

The Synovial Membrane of the Knee-Joint.

Reference has necessarily been made in the narrative to the synovial sac of the knee-joint, in relation to the operation. In order to lay down the exact limits of the membrane on the bone, a dissection was made of the parts on the dead body, the joint having been beforehand moderately filled with soft injection through a hole in the patella. The following are the facts most important for the object in view which appeared in the dissection :

1. The healthy synovial membrane extends upwards two and a half inches above the top of the patella. But this bone is moved, and with it the sac, as the joint is moved, insomuch that, when the joint is forcibly bent, the patella and the upper end of the synovial sac are two inches lower than they are in the extended position of the limb.

2. The synovial membrane gradually narrows upwards from the articular surfaces of the femur, the breadth at the lower end measuring about three and a half inches (or the breadth of the articular end of the bone), and at its upper end about one inch. It is entirely in front of the bone, *i.e.* does not cover any part of the side of the condyle.

¹ *Anat. Pathol. du Corps Humain*, liv. xxxiv.

3. To the femur the synovial sac is adherent only along the edge of the articular surface. Elsewhere it is merely in apposition with the surface of the bone, or is separated from it by a thin layer of loose fat. In front of the joint, on the other hand, the sac is intimately adherent to the muscles for some space (about an inch and a half), and to the fore part of its upper surface the two narrow fleshy slips of the sub-crureus muscles are connected. A drawing of the dissection is before you.

From the foregoing facts the following practical inferences are deducible. During an operation for removal of a tumour from the lower part of the femur, the joint ought to be bent. The greatest danger of wounding the synovial membrane occurs when the tumour to be removed is situated towards the front of the bone. But even when the disease to be extirpated is, in a measure, in that position, it seems possible to turn down the synovial membrane with the anterior muscles from the femur, and likewise from an exostosis in this situation, provided, however, that no unnatural adhesion has taken place. It is manifest that in any attempt to accomplish the object, the incision through the muscles to reach the bone must be made sufficiently wide of the synovial sac at its upper end.

Enlargement of Patient's Right Side.—Before parting from the case, I wish to refer more fully to a fact already indicated in the narrative. The patient having stated, in reply to inquiry, that her right hip had always been larger than the left, I was led to make an examination, which resulted in affording proof, not only that the statement alluded to was correct, but that the whole of the right side, so far, at least, as it could conveniently be examined, was a degree larger in thickness than the left, without, however, any difference in length. The circumference of the arm, of the forearm, the thigh, and the leg, measured on both sides, showed a difference varying from half an inch to an inch and a half. Moreover, on close inspection, a difference of the same kind

was found to exist between the two sides of the face, and the prominence of the frontal bone was slightly larger on the right than on the left side.

In connection with that enlargement of the osseous system of one side, which was doubtless congenital, I would notice two examples, very lately in the hospital, of enlargement, in each of a part of the lower limb, arising from obvious causes.

Ulceration of the Surface of the Leg: Elongation of its Bones.

Case 6.—A young man, of unhealthy, scrofulous appearance, sent into the hospital by Mr. Hillman to be treated for some ulcers, was observed to walk with a particularly awkward gait. Upon investigating the circumstances, I found the tibia of one side to be considerably (nearly two inches) longer than its fellow, and I ascertained, at the same time, that it exceeded by so much its due proportion to the other division of the limb. The bone was arched forwards at its middle, and the skin over it was ulcerated to the extent of from two to three inches. The difference in length between the limbs was first observed a few years previously.

Aneurism by Anastomosis of Foot on one side: increased Thickness and Length of Leg and Foot.

Case 7.—A boy, aged 16, was found to have a large aneurism by anastomosis, extending over the under surface of the right foot as far as the heads of the metatarsal bones, and upwards as high as the internal malleolus.

By measurement, the circumference of the leg and foot on the side affected with the disease was ascertained to be considerably greater than on the opposite—the sound one

It was found, too, that the limb was an inch and a half longer than its fellow, the measurements being taken between the upper spines of the iliac bones and the lower edges of the internal malleoli respectively, and this excess of length was shown to belong exclusively to the bones of the leg. The whole right foot, it should be added, was considerably enlarged. In this case the pulsation of the femoral, popliteal, and tibial arteries was much stronger, and the vessels seemed proportionately larger on the diseased side than on the opposite side.

In the example of hypertrophy of certain bones last adverted to, the bones, doubtless, partook with the muscles in the augmented nutrition consequent upon the increased circulation in the limb, and to this is to be ascribed the augmentation of their size attending on the disease. So, likewise, to the same cause—to the increased supply of blood that accompanied the inflammation and ulceration on the leg—is to be assigned the augmented length of that part of the limb in the preceding case.

A postscript may be added respecting the history of Miss E. B. in her after-life.

Four months after the lady had returned to her home, a letter which I received from Mr. Boxall, her medical attendant on another subject, gave incidentally a very favourable account of her condition in all respects.

And now, after the lapse of many years, I am enabled to state—the lady having long been married and having a grown-up family—that to a question lately put to her medical attendant, Mr. Humphry, the successor of Mr. Boxall, respecting the peculiarities noted of the osseous system, I have had a reply founded on the statement of the lady herself and partly on the observation of the surgeon. The reply to my question is: that no noticeable enlargement of the bones exists anywhere in any of her offspring—five in number—with the exception that in one girl an increased

prominence exists on one side of the frontal bone. But it must be added that while all the peculiarities of the bones noted in the mother are on the *right* side, the single example of want of symmetry existing in the osseous system of the daughter is caused by a prominence on the *left* side of the forehead.

FIBRO-CELLULAR TUMOUR.

GROWING RAPIDLY—REMOVED.

Case 8.—A female, aged 37, of good constitution, first noticed the small beginning of the tumour two years ago. It was then, she says, like a pea lying just under the skin of the buttock. For some time there had been little change of size, but then there was a gradual increase; and lately the increase has been rapid. No uneasiness was felt until the size of the growth became considerable. Health has been perfect throughout.

After admission to Hospital.—On the side of the pelvis, just above the right buttock, is a globular swelling the size of half a large cocoa-nut. Projecting abruptly outwards, it is raised some inches above the surface. Skin over tumour is entire; at the middle it is thinned, dusky purple from enlarged capillaries, and scaly. The tumour is firm and elastic; movable on subjacent parts. There is no evidence of internal malady, or of infirmity of health.

Operation.—The skin was divided to the base of the mass into three parts by three equidistant incisions; and when the three large flaps had been fully taken back, the tumour was readily turned out of its position with the fingers and the handle of the scalpel. Some condensed connective tissue which was found, especially at one side, was freely removed. Ligamentous and membranous structures lay cleanly dissected at the bottom of the wound.

In the subsequent course of the case, there was nothing at all unusual, except the occurrence of an erythematous redness around the wound. The erythema appeared on the

fourth day after the operation; was attended with the formation of bullæ; and extended from the wound down the thigh, over the left buttock and contiguous part of the abdomen, spreading in one direction and disappearing in another. The general condition of the patient was not at all influenced by the cutaneous affection. The wound was not affected. There was no approach to a rigor at any time. Small boils were formed about the time that the erythema went off. On the twenty-second day from the operation the patient was able to get out of bed; and in a month she was discharged to go into the country.

The Tumour.—Shape, globular; surface, smooth and regular, except in one place where two small lobules project, each about the size of a small filbert; no separation into lobules apparent on the surface. Capsule: a distinct thin, adherent, fibrous membrane covers the tumour in some places. The mass cuts firmly, the colour of the cut surface is dull white. Vascularity is very slight, a few red streaks are visible, no juice escapes on pressure. The tumour consists of two kinds of tissue, (1) the opaque and firm, (2) the transparent and gelatiniform, which are so arranged that the periphery of the tumour (excepting the part nearest the skin at the middle) is made up chiefly of opaque tissue, streaked here and there with the gelatiniform, whilst the middle of the tumour and the part next the skin (*i.e.* that forming the end of the mass before removal) are made up of gelatinous tissue, for the most part with streaks of the opaque substance. When the gelatiniform tissue is scraped, it breaks down into a thin mucus. The difference in consistence between the two kinds of structures is particularly well marked.

Microscopical Characters.—I. Opaque portions consist of: (i.) a stroma of fibres which are very delicate, and have all the characters of the fibres of ordinary areolar tissue; (ii.) fusiform cells, very elongated, containing each an oblong nucleus about twice the diameter of a red blood disc;

these cells are very numerous ; (iii.) a few small fat molecules.

II. Gelatiniform portions consist of: (i.) a few very delicate fibres, having the same characters as those of the opaque tissue, and forming a very open stroma ; (ii.) cells, spherical, size of a white blood cell, contents clear and colourless, and a nucleus in each cell ; (iii.) fat molecules in some places aggregated, or even inclosed in an envelope.

Fibroid Tumours—Recurring repeatedly—Removed.

Case 9.—A female, aged 64, a monthly nurse, is moderately healthy, but subject to bronchitic attacks, and is now suffering slightly from one of these. States that she first observed a tumour sixteen years ago. Tumours have been removed three times by different surgeons. The first tumour weighed two pounds. The intervals between the operations and the reproduction of the disease are said by the patient to have varied from six months to three months. The disease, original and reproduced, has always been in the same place.

On admission to the Hospital the condition noted was as follows : On the inner side of the left limb, just below the knee-joint, begins a series of five tumours, which spread for some inches down over the leg, and are separated by deep depressions. The average size is somewhat less than that of the closed hand. The skin over the tumours is broadly marked with the scars of the previous operations ; and where it covers the middle masses it is dark-coloured from capillaries dilated and loaded with blood. All the tumours are movable on the subjacent tissues.

The glands in the groin and elsewhere are free from enlargement and tenderness—in short, entirely natural.

It was made known by this patient's husband that he would not give his consent to amputation of the limb. He

had previously heard that amputation would probably be considered necessary.

After a delay on account of the bronchial affection, and when the patient seemed and felt herself to be in good health, an examination was made with a view to the operation for the removal of the tumours. The lungs were found to be free from disease likely to render an operation inadvisable. At the same time, however, a tumour was felt low down in the abdomen, rounded, movable, and painless. It was supposed that this might be ovarian; but the patient was very stout, and this condition was a hindrance to reliable physical examination.—Excision of the new growths was carried out.

In the Operation of Excision the tumours were found to be mixed up at the base with the muscles, penetrating between the gastrocnemius and soleus and connected with their fibrous tissue. All such prolongations were traced out and freely removed.

For three weeks after the operation the patient was doing, in every respect, well; but on the twenty-second day difficulty of breathing, preceded by a shivering fit, came on, and she died six days afterwards.

Examination after Death.—Left lung extremely congested and deeply stained with serosity; froths but little. Some patches of a greyish-yellow colour seen through pleura pulmonalis on both sides. These patches are found to be firm in texture, breaking down under firm pressure. Both kidneys studded with cysts. Left femoral vein contains two clots—one at its middle, elongated and firmly adherent at the upper part; the other just above the profunda branch. This clot was soft and grumous. The veins themselves are studded at intervals with slightly elevated patches of a whitish colour. Other organs present no notable change.

Tumours were found in the abdomen and the thorax. The chief mass in the abdomen lay between the umbilicus and the pubes; it was very slightly connected by a few weak adhesions posteriorly, otherwise it was free from

adhesions. Two smaller growths were in the omentum, the larger being the size of an orange. The thoracic tumour, about half the size of the abdominal one, lay in the mediastinum, and was connected with the lung and pericardium posteriorly.

Examination of the Tumours (abridged from the Report of Dr. Wilson Fox).—They are irregularly lobed, almost botryoidal. The lobes are surrounded by capsules, some thick, some thin; processes extend from capsules into interior of lobes. On section, various appearances are presented: (i.) In the older and central part the substance of the tumour is opaque white; quite cerebriform in appearance; glistening; a few blood-vessels; yields no juice on pressure; fracture easy and not fibrous. (ii.) In the smaller lobules the cut surface is very translucent and glittering; fracture difficult and fibrous; colour, from pale yellowish to pinkish; in one or two lobules dark purple mottled with whitish spots and streaks. (iii.) Other lobes presented an intermediate form between the white cerebriform and that last described, being dirty white or greyish.

Microscopic Appearances (Plate 4).—1. Cerebriform portions consist of nothing but innumerable fat globules, scattered through an indistinct fibrous basis. 2. The perfectly translucent portions consist of: (i.) Nuclei, clear and bright, generally round, but sometimes oval, embedded in a clear, faintly marked fibrous tissue; a cell-wall can be traced round a few only of these nuclei; the cell appears elongated, as if ending in a fibre. (ii.) Elongated cells, separate or massed together, with distinct outline, containing a round, clear nucleus. (iii.) Similar cells, but oval, not elongated, massed together, with only a little clear intercellular substance between them; cells faintly nebulous, contain a single clear, bright nucleus. (iv.) Nuclei crowded together in masses forming, with a little clear intercellular substance, nearly the whole of the structure; in other places, where they are less densely massed, a faint cell-wall may be seen.

3. Portions of intermediate character exhibit the fatty degeneration proceeding in the primary elements of the tumour, leading ultimately to the cerebriiform appearance.

The cerebriiform appearance might lead to the opinion that the morbid growth was a medullary cancer, but the absence of any juice, and the firm nature of the smaller lobes, together with the microscopic characters, showed it to be recurrent fibroid or fibro-nucleated. The abdominal and thoracic tumours had all the characters of the older parts of the tumour of the leg, those, namely, which had partly undergone fatty degeneration.

These cases were in the hospital nearly at the same time. They illustrate the leading facts in the history of a form of tumour not frequently met with. Case 8 showed the rapidity of increase which is often observable; while in the other was exemplified the reproduction of the disease again and again in the same place after removal. The latter is the important characteristic from which the name 'recurrent' or 'recurring' has been aptly applied to this fibroid or 'fibro-nucleated' growth (Case 9).

In some points of its history the 'recurrent fibroid tumour' resembles cancer in consistence, and in liability to being reproduced. But it is, at the same time, distinguishable from cancer by other important circumstances, thus:

1. The matter of the recurrent fibroid tumour does not infiltrate and destroy neighbouring tissues, as every form of cancer does. You saw, a short time since, the epithelial form of that disease in the mouth of a male patient (Case-book 33) blend with the muscles, the glands, and other soft parts, while under the influence of the process of deposit and ulceration which belongs to the disease. The bone itself, the lower maxilla, was thinned and broken, and the carotid artery was perforated—the patient, after a lingering decay, dying of hæmorrhage. Two other examples of the same disease are now in attendance here. It is remarkable

that those cases too often apply to us when the disease is far advanced in its ravages. From this the progress of events in the fibroid tumour is very different.

2. Nor does the fibroid tumour, or any morbid emanation from it, travel to or affect the lymphatic glands as cancer does. You are but too familiar with the enlarged glands in the arm-pit and above the clavicle in cases of carcinoma in the mammary gland. You have lately seen cancerous disease of the testis, accompanied with a large morbid mass in the abdomen—the same disease borne, perhaps, with the lymph to the lumbar glands and there developed. We have had the inguinal glands affected from cancerous disease of the scrotum, and the same glands from disease at the anus. In those various instances, too, the glands became involved within a few months from the beginning of the malady. But in the case of fibroid tumour, the history of which I have read to you, the lymphatics gave no indication of being touched by the disease, though the commencement of the malady dated back sixteen years.

I do not lay stress on the cachexia which is seen with cancer as an aid to the diagnosis, for, in truth, it is very often absent even when cancer is far advanced. The presence of the cachectic condition indeed suggests the presence of cancer; but the want of it is no proof of the absence of that disease. Nevertheless, had any cancerous tumour existed and been removed, and recurred as the tumour did in our second case, the patient would not have been free from evidence of a diseased system—in other words, from cachexia, as that patient was. After repeated returns of the tumour, the general health was in that person fairly good, and the countenance had the appearance of health. While, therefore, the recurrent fibroid resembles a cancerous tumour in consistence and in rapidity of growth, it differs from that disease by not penetrating the tissues, by not being extended to the lymphatic glands. Yet examples of un-

usual, if not exceptional, circumstances in the history of the fibroid growths—pointing, perhaps, to some modification of a portion of these general views—will require notice before these observations are concluded.

Observe, however, that the circumstances which distinguish between the two tumours before their removal, are not present from the first. It is only after a time that the neighbouring structures are appreciably infiltrated with cancerous matter; it is only after a time that the material of disease is conveyed from the morbid growth to the glands. Before these changes are superadded to the original tumour, or time enough has elapsed to show that the changes are not likely to arise, it is difficult, perhaps impossible, to make the diagnosis. In our first case, in which the disease was recent, the only material facts we had for our guidance, namely, the hardness and the quick growth, were consistent with the existence of either form of disease; and the diagnosis with reasonable certainty was not possible. Nor is the distinction then very material in a practical view, since, whatever its nature may afterwards be proved to be, the proper course is to remove the tumour. But in the second case the diagnosis, when we saw it, was already made by time—that is to say, by the long duration of the disease, its recurrence, and the absence of enlargement of the lymphatic glands, together with the soundness of the parts around.

After the operation, microscopical examination gives the evidence of what the future of the patient is likely to be, and in this way it is of the utmost importance to the surgeon. In our cases that examination showed, by the absence of the peculiar structure of cancer, that the first patient was safe from the greatest source of apprehension; while, as regards the second, the conclusion drawn from its history was confirmed. At the same time, the positive proof of a different disease by the detection of the microscopical characteristics of the fibro-nucleated structure was added to the negation of cancer in both cases.

But it is to be borne in mind that, although the fibroid tumour does not usually infiltrate the structures about it, or penetrate the lymphatics,—cancerous diseases are said to be malignant because they have that effect—we nevertheless cannot consider it a ‘benign’ or ‘innocent’ growth. It may become very injurious, even destructive. For, besides that the recurrence renders a new operation necessary, and exposes the patient to a renewal of the risks that attend on large surgical operations—our second case died after the fourth operation—besides this, the growth that has recurred is prone to differ from the first-formed one in its connections and in its internal characters as well. Thus the reproduced tumour is disposed to be more deeply placed, and so the difficulty of the removal and the separation of the parts to effect the removal—always an injurious complication—are increased. In the same case (No. 9) the tumour was found, in the fourth operation, to have penetrated between the muscles of the calf of the leg, while the larger mass in the case (No. 8) was entirely an outgrowth, not mixed up with the ligaments and muscles near it. Moreover, the reproduced disease is softer, more like cancer in appearance than the original one. In our case (No. 9) it was brain-like, and closely resembled the soft encephaloid cancer.

Again, if the ‘recurrent’ tumour should from any cause not be removed—for instance, the unwillingness of the patient to allow an operation, or the operation being unadvisable on account of the position of the disease, or the condition of the patient as to general health—in such circumstances the skin at length ulcerates, a fungus is perhaps pushed outwards, and discharges, more or less bloody, are poured out. By this state of things, or such as this, the health is undermined; and so the tumour, though not ‘malignant,’ may yet become destructive. In both our cases events seemed hastening to that condition. Thus the skin was thinned and deeply coloured; the tumours were softened in part.

I have hitherto referred to the disease as if it were local,

recurring in the same place as it usually is. But some facts out of that ordinary course require consideration. In the case (No. 9) masses, considerable in size, of the same kind as the external tumour, were found in the abdomen and in the thorax (p. 39). They were unconnected with—independent altogether of the tumours in the leg.

Again, the disease has been reproduced under different circumstances—after removal of the tumours with a large part of the limb by amputation. The leading facts of the case, for our present purpose, were these. In a healthy-looking woman, æt. 43, 'recurrent tumours' in the leg were removed three times at intervals. On the fourth return of the disease in the same place, amputation was performed in the lower third of the thigh. The stump healed quickly. But in a month afterwards, induration was observed where the pad of the tourniquet had been placed for the amputation. The induration increased rapidly; another tumour was formed nearer to the end of the stump. The two growths coalesced and formed a very large mass, the circumference of the stump becoming seventeen inches more than that of the sound limb at the same place. The patient soon died.¹ In examination of the tumour the microscope exhibited a uniform structure of nucleated fibres and of fibroplastic growth. The only approach to the 'resemblance to cancer' was in some of the nuclei being of very large size.

Another form of fact may be added. Local means used to hinder the usual local recurrence of the disease have been unsuccessful: thus, a portion of the structure from which the tumour took its rise was removed with the new growth, yet the renewal of the morbid growth was not hindered. So, too, the surface from which the tumour took its rise has been cauterised with like failure of beneficial result.²

¹ 'Recurrent Fibrous Growths Removed Four Times,' &c. By Mr. Birkett; 'Examination of Tumours.' By Dr. Wilks, in *Trans. of Pathol. Society.* 1855.

² 'Recurrent Tumours.' Operations by Mr. Stanley and M. Gluge noticed in *Surgical Pathology.* By Sir James Paget.

Seeing that local means, apparently calculated to be effective, have been used ineffectually to hinder the local recurrence of the disease; seeing that independent morbid growths of like kind have been formed in other parts amid the internal organs; and that similar tumours have been reproduced apparently because of pressure on healthy structures; from those facts I apprehend we must conclude that the disease—in some degree and in some instances at least—affects the system generally. The practical inference, then, should be that, besides the removal of the accessible tumours, means to render if possible the system free of the constitutional tendency to reproduce the disease assumed to be present, should be added to the operation for its removal. To invigorated health and medicines we must, I apprehend, look in the hope of attaining such a result. It may be well to begin a medical treatment some time before the operation for the removal of the morbid growth is performed, and to continue it after the recovery of the patient from the direct effect of the operation. This subject will again come under notice when the management of cancerous diseases is under consideration.

*PLACES OF ELECTION FOR AMPUTATION
IN THE LOWER LIMB.*

HAVING considered the circumstances which rendered it indispensable to perform amputation in our last case, it becomes necessary to state why the lower part of the leg was chosen as the place of election for the operation. But as the position of the operation in any one case involves principles applicable to amputations elsewhere in the lower limb, I will review such amputations more generally in reference to the question how the place of operation in each case is to be determined.

It used to be laid down as a rule of surgery that, though amputations of the upper limb, it was always important to retain as much of that limb as possible, yet in the lower limb, 'a place or places of election' were indicated. So that, while part of a finger and each small portion of the upper arm or forearm were allowed to have their value in the after-use of the arm, some portions of the lower limb were considered as 'in the way' rather than useful. Hence, in certain circumstances it was deemed right that a good portion of this latter should be taken off, partly in order to accelerate the operation, but chiefly in order to fit 'the stump' to the apparatus to be afterwards worn in progression. I have long been of opinion that the rule as it referred to the lower limb was not generally expedient; and I have, from time to time, during several years, pointed out in this place the grounds upon which I pursued a different

course in individual cases. These grounds I now proceed to lay before you for different parts of the limb without entering into the details of the operations.

In determining the place at which amputation ought to be performed, we are to keep, it seems to me, two objects steadily in view, namely, the recovery of the patient from the immediate effect of the wound in the operation, and the provision for the facility of progression afterwards.

1. As regards the first of these considerations, it may be stated in general terms, that as the result of a large number of amputations it has been shown that the more remote the place of the operation is from the trunk, the greater is the probability of the recovery of the patient. This may be owing, if to no other cause (and there is probably another cause), to the fact, that, as the limb diminishes in thickness almost uniformly to its end, the wound of the operation in the distant part is proportionately smaller.

2. The facility of progression with an artificial limb is obviously a matter second in importance only to the consideration of the recovery of the patient from the immediate effects of the operation. In providing for this object we have to bear in mind that the greater the length of the limb that remains after the amputation, the greater will be the ease, the steadiness, and the power in commanding the artificial support, and the greater, therefore, the facility of progression. The fact is explicable by the length of leverage of the moving power.

3. We may now add: it is also expedient, where it may be practicable without contravening the two preceding rules, that the cicatrix of the wound made in amputation of the lower limb, with which we are now concerned, should, when practicable, be placed on the side of the stump, rather than on its end.

When I seek to make special application of the foregoing general propositions, to amputations at various parts of the lower limb, it is not necessary that I should allude to the

foot, as the importance of preserving a portion of it, where practicable, is generally admitted and acted on in practice. I proceed, therefore, to consider—

AMPUTATION AT THE ANKLE-JOINT.

It is only lately that this operation has been performed so as to bring it advantageously within the limits of practical surgery. When the amputation was first performed, the bones of the leg were covered, after the removal of the foot, with flaps of skin taken from the dorsum of the foot, or from its sides. An opportunity has recently occurred to me of seeing a case in which the operation was performed, the bone being covered with the integuments taken from above the tarsus. I have little doubt that the skin derived from either of the parts mentioned, if it did not slough *ab initio*, would not support, without damage, the pressure to which it would be subjected if the stump so covered should be made to rest on its end. The operation, however, in the form indicated, does not seem to have passed into use.

A few years ago it was suggested by Mr. Syme of Edinburgh, in amputation at the ankle-joint, to cover the bones of the leg from the soft parts beneath the heel—beneath the os calcis. Tested by reference to the general rules or principles we have been considering, the operation appears to me to be free from any valid objection; and, what is more important, the results of the operation have been found in practice to be good. The ends of the bones are by this operation covered with thick skin, fat, fascia, and muscle, all closely and firmly connected together; the whole, in fact, being organised for the purpose of bearing the weight of the body. The person who has undergone this operation is enabled to bear his whole weight upon the end of the stump without inconvenience; and, on this account, the facility of progression is decidedly greater than when the amputation is performed at any higher part of the

limb. There is at this moment a gentleman in the neighbourhood of the hospital, who, having undergone the operation, makes so good an appearance, and walks so easily with Mr. Gray's apparatus, that with even careful looking for defect or lameness we can observe very little.

To those observations published in 1851 may be added reference to a modification of the plan of the operation which I had acted on with a view to facilitate its execution. The modification referred to, with the details of two illustrative cases simultaneously in the hospital, is thus stated in a lecture noted by Mr. Vincent Jackson at a later period :¹

'After the lower incision from malleolus to malleolus under the os calcis, I make a straight incision at right angles with it to the back part of the heel on the outer side of the foot parallel with the outer margin—between, therefore, the point of the outer malleolus and the margin of the foot. This plan facilitates the dissection—the separation of the soft parts from the bone.'

As regards the management of the bones of the leg in the operation, in Mr. Syme's instructions, 'the articular projections are removed, together with the thin connecting slice of the bone covered with cartilage.'² I removed the two malleolar projections, allowing the articular surface of the tibia to remain entire. It should be added that in the cases under my observation, the tibio-tarsal joint was free of disease. The words used by Mr. Syme seem to imply that the end of the tibia was unaltered.

The condition of the patient at a late period after the operation has its interest. Of one of the cases reported by Mr. Jackson (the other had passed to his avocations far into the country) it is stated: After the wound of the operation was healed, the patient was sent to a convalescent hospital in the country for a month; and, on his return, his whole aspect was that of vigorous health. At the same time it was

¹ *Medical Times and Gazette*, vol. xxxvi. 1857.

² *The Principles of Surgery*. 1856.

interesting to observe that the muscles of the calf of the leg, on the side from which the foot had been removed, had partaken of the general increase of the muscular system. The report 'five months afterwards' adds: The young man, Richard J., walked into the hospital to-day to show himself. He is in excellent health. He walks well with a boot, the foot part of which is stuffed; he bears firmly on the end of the stump. The stump itself is sound at every point; and is in no degree tender to pressure anywhere. The enlargement noted of the muscles of the calf of the leg, coinciding with the growth of the general muscular structure in the improved health, was in a measure due to the fact of the action of the muscles in the movements of the limb being continued by the insertion of the end of this large tendon into the fibrous structure of the flap, through the periosteum.

At a still later period—several years after the operation had been performed, the patient being wholly healthy and active in exertion since the operation, I found that the cicatrix was then beneath the tibia, and therefore pressed on in progression. It was, nevertheless, sound and healthy, and free of uneasiness when borne on. But it would be well in completing the operation that the lower flap should be placed well forward, and the upper one made short, so that the junction of the two, the cicatrix, might be kept upwards and hindered as much as possible from being drawn beneath the end of the weight-bearing bone, under the influence of the large muscles inserted however slightly by their tendon into the lower flap.

AMPUTATIONS OF THE LEG.

The 'place of election' for amputation of this part of the limb used to be stated, nay, is now stated in books of authority, to be at a hand's breadth below the patella. That position has been advised on the ground of the rapidity of execution that it permitted, and the adaptation of a stump of that length, when bent, to the support

upon which it was afterwards commonly made to rest. But how stands this operation, regard being had to the general rules that have been laid down?

1. The wound necessarily made in amputation at the place referred to—through the calf of the leg—is always larger, in some cases very much larger, than it would be in the lower part of the leg, and the operation is, therefore, proportionately more hazardous.

2. The shorter stump would be, it was argued, more convenient for the poor man, because it would, the knee being bent, fit better the supporting ledge of the common ‘pin’ if he were obliged to rest content afterwards with that support of the limb. I believe, however, the greater convenience in this respect to be outweighed by the greater risk to life attending on the larger wound. But in the case of all those who can provide or can be provided with the better constructed artificial limb (and the poor man may be able to procure it), the lower amputation is beyond all question the more advantageous one for the facility of progression—the knee-joint being kept in action. But the reason for the preference will best be understood by observing the construction and manner of applying the apparatus; and, as this is only to be done with the objects before us, I have had specimens of Mr. Gray’s apparatus for different parts of the limb brought here to-day. The artificial limb is, as you see, hollow, and more or less of the truncated member is received into it. (Other points of interest were noticed.)

The important point for consideration in connection with our present purpose is, that the greater the length of the stump connected with the wooden support, the greater is the power the wearer has over this; and the greater power is, as already stated, owing to the mechanical advantage given by the longer lever. Influenced by these considerations, I have during several years regarded the ‘place of election’ for amputation of the leg to be at the lower third, wherever a

choice was admissible. Space is of course left for the mechanism of the ankle-joint in the artificial support. If, then, the amputation at the lower position indicated involve less risk to life from the operation, and if the result be the more advantageous for the use afterwards of the 'truncated' limb, why should not the better and less unsightly apparatus be provided for the man in humble life? Now, when benevolent societies and benevolent funds supply mechanical appliances for those who are in any degree deformed or disabled, persons who have undergone amputation ought to be included. I may mention that a day or two after the amputation in our last case operated on, the man's employer sent to inquire if the limb would allow him to use a 'cork leg.' It should not be necessary for the surgeon to turn from the operation which he believes best suited to the patient's welfare by any consideration of the fitness of the common unsightly support for progression afterwards.

AMPUTATION AT THE KNEE-JOINT.

The full appreciation of the relative advantage of amputation at the knee and immediately above the joint must rest, as in other cases, on the experience derived from a considerable number of cases in which the operations have been performed,—the results as to health, and power of progression, having been observed and noted for some time after the operations. Meanwhile it should be borne in mind that the removal of the limb at the joint is free from the perils involved in the operation above the joint, namely, the laceration of the nutrient vessels of the bone and probable damage to the bone itself with the saw used to divide it.

I believe the amputation which has been performed through this joint (up to this time, 1851) to be objectionable, especially for two reasons.

1. On the score of the large size of the wound necessarily made. The condyles of the femur have been covered in the

operations hitherto performed with a flap raised from the calf of the leg—one of much length and thickness.

2. It seems to me that to arrange an apparatus for future progression must be difficult, seeing that there is no space left for the usual arrangements of the mechanism for a knee-joint.

The force of the first objection is not, I believe, diminished by the experience of the operation in the hands of any surgeon. For myself, I have not undertaken to amputate at this joint in consequence of the reasons I have now alleged against it; and I have only seen two instances in the practice of others. The results of these cases, and of others that I have been made acquainted with, were not favourable.

To that statement of opinion in 1851, something is now to be added. Since that time a form of operation for amputation at the knee-joint has been devised which meets the first objection above referred to. In the operation which has been substituted, the plan of proceeding may be said to have been reversed. A single flap is made as by the former method; but the flap is taken from the structures that cover the joint at its forepart.¹

The structures are those, I may remind you, which support the body in the kneeling position; and after amputation through the calf of the leg, the knee being bent, the same structures rest on the common 'pin.'

The large flap of the more recent operation is necessarily dissected up. The dissection contrasts, as to the time it occupies, with the rapid passage of the long knife from within outwards, through muscular substance, in forming a posterior flap. The longer time, however, required in this, and where needful in other operations, happily does not now, as you know from constant observation, affect the patient.

¹ *Amputation by a Long Flap and a Short Rectangular Flap.* By Thomas Teale. Leeds, 1858.—'Amputation by Single Flap.' By Henry D. Carden Worcester. With figs. 3 and 4. In *British Medical Journal*. 1864.—'On Amputation at the Knee-Joint.' By George Pollock, F.R.C.S. In *Medico-Chirurgical Transactions*, vol. liii. 1870.

The use of ether or chloroform—‘anæsthetics,’ so termed—has removed in large measure the necessity that long existed of determining the plan of such an operation with a view to the rapidity of its execution, and thereby shortening the duration of the patient’s suffering.

AMPUTATIONS OF THE THIGH.

If the facility or the celerity of the surgeon’s manipulations had still some weight in determining the position of the operation, the middle of the thigh would be the place selected. For in that situation the muscular substance is abundant, and the bone is small, smaller than elsewhere; while, on the contrary, the relative size of these structures is reversed towards the lower end of the thigh, the bone being expanded in all directions, and the soft parts, not only relatively, but positively, very much smaller. Hence to pass the knife across the limb (I speak of the flap amputation) in the higher operation, is a matter very easily effected; but to insinuate the instrument between the broad bone and its slender coverings in the neighbourhood of the knee, on the outer side especially, requires caution and address on the part of the surgeon. At the same time I have no hesitation in stating, from practical experience, that the lateral flaps may be here well and accurately constructed by incisions from the surface inwards.

The place of amputation in the thigh being, however, considered with reference only to the welfare of the patient, immediate and prospective, the advantages are, in my opinion, plainly in favour of the lower operation; and on these grounds:

1. The wound to be healed is here much smaller. Several years ago I had to amputate the limb of a very muscular person in consequence of a crushing injury of the leg reaching close to the knee. The patient was an unusually

stout man in vigorous health ; though remarkably bulky at the upper and the middle part of the thigh ; but, as usual, the knee, with the adjacent portion, was of comparatively small size. The operation was performed with lateral flaps close to the condyles of the femur, and the result was in every way favourable. Ever since I have invariably followed the same course wherever the state of the limb made it possible. The results have been satisfactory.

2. When we turn to the second matter of consideration, namely, the facility of progression with an artificial limb, the advantage is also in favour of the lower amputation. With the common wooden leg or 'pin,' the stump is inserted into the hollow at the upper end of the apparatus, and the pressure is made not upon the circumference or upon the end of the truncated limb—but mainly upon the pelvis at its inner side. Still, the greater length of the stump gives the advantage of more leverage, and therefore greater power in moving the artificial limb.

Again, when the best form of artificial support is worn, the advantage of the longer stump is perhaps still more decided. This apparatus does not reach the pelvis ; the thigh-part is accurately fitted to the surface of the stump, and a great degree of the comfort of the wearer depends upon the nice adaptation here ; so that the pressure shall be evenly diffused over the circumference of the stump. From the shape of the thigh, its gradual increase upwards, it is manifest that the greater the extent of it that is inserted into the socket of the artificial limb, the more easily will the adaptation be made, and the more fully will the transmission of the weight to the hollow of the artificial support be effected. On the other hand, when the stump is short, the advantage of the conical shape of the thigh is lost ; and, practically, it is found by the mechanician that, in this case, he cannot construct his apparatus so that the weight of the trunk shall be effectually supported upon the inner surface of the socket. Other expedients are then necessary.

To these mechanical disadvantages in the case of a short stump must obviously be added the defect of leverage in the moving power. Such, then, are the grounds upon which, when amputation of the thigh is necessary, and a choice of the place is possible, the operation near the knee is to be preferred.

To these observations on the places to be chosen for amputation in the lower limb some general considerations respecting the plan of the operation may be added. The details are best understood when attended to while they are carried out.

Plans of some Amputations.—The views stated in reference to amputation of the thigh were carried out with full-sized lateral flaps adapted to the expansion of the femur immediately above its condyles. Each flap at and near its circumference was formed of the integument and underlying fat. We have had several cases in which, with that arrangement, the results have been very satisfactory—the healing process rapid; the cicatrix very narrow; and progression afterwards all that could be desired.

It is well to make arrangement by which such cases, as indeed all cases that have undergone large operation, should come afterwards, when practicable, under observation. A few days ago a man who nine months previously underwent amputation of the thigh immediately above the condyles, came to the hospital on account of a small malady unconnected with the result of that operation. Being questioned respecting his powers of movement, he showed while ‘he bounded along’ (as the note says) how well the stump, and even the common artificial limb, were suited to his purpose.

Should the circumstances admit of the amputation being performed through the condyles of the femur, or immediately above the condyles, I would express the opinion, though as yet without opportunity of observing results of this form of operation, that it might well be carried out with a long flap

in the manner mentioned for amputation at the knee-joint (page 54). In that operation the flap is formed of structures which are in front of and below the place of amputation. But if, on account of the character of the injury or the disease, it should be necessary to place the amputation higher up, the construction of a long flap from structures covering the shaft of the bone would necessarily diminish the length of the moving power that would be available afterwards—would also place the operation in a thick part of the thigh; and so would contravene the two guiding principles which were stated to you to be desirable at the outset of the present observations. In these circumstances, two lateral flaps would, in my opinion, be preferable.

The greatest immediate evil liable to arise from such operations is occasioned by pyæmia. All the arrangements should therefore be such as would tend to lessen the amount of pus formed by guarding against irritation of the blood-vessels, as well as by providing for its easy escape outwards, hindering, perhaps, also its passage within the blood-vessels. In the operation, whatever form it may be made to assume, the large blood-vessels are divided above the end of the divided bone. They are not, when the wound is closed, brought into contact with the end or the edge of the bone, not subjected to the irritation which that contact would occasion, and the increased formation of pus that would probably result therefrom.

Foreign bodies in the wound have the effect of increasing the formation of pus. Each such object, however minute, might be regarded as a so-called 'issue' promoting suppuration. Hence, the strict attention as to the quality of ligatures employed, and the rigid provision made for cleanliness in every object that is used; and in everything that is connected with the wound. The exclusion and removal from the wounded surface of foreign bodies, as those floating in the atmosphere—bodies well seen in a stream of sunshine or of electric light—have been skilfully provided for in modern

surgery. The provision also for the escape outwards of puriform fluid from the wound—the 'drainage'—is an essential part of the arrangements. But the details are before you frequently in the hospital. Moreover, the experience of surgeons of several London hospitals upon this most important subject has been set forth at a meeting held for the purpose; and the substance of the statements of those surgeons has been published in a separate volume.¹ Arrangements to prevent, as much as possible, the formation of pus, and to provide for the passage outwards of any that has been formed, are essential.

In seeking to determine places of election for these operations, it is assumed that the case under management admits of a choice. The disease or injury, however, rendering amputation necessary often in itself determines absolutely the position of the needful operation. Of the influence of disease in that regard we have examples in Cases No. 1 and No. 4. The disease in each extended some space up the thigh. In such cases and in all other forms of disease the necessary operation must be amid sound structures, between the disease and the general system. The same object determines the place of amputation in cases of injury of the limbs also. An example may be briefly stated.

The Leg crushed; soft parts of Thigh injured—Amputation.

Case 10.—George D., æt. $5\frac{1}{2}$ (Case-book 13). On the arrival of a train, a gentleman and his family occupying a compartment, a porter opened the door before the train ceased its movement; and the little boy of the party, who was resting against the door, fell to the platform; and rolled under the carriages on to the rails. From that position he was rescued by a porter, who brought the child at once in a 'cab' to the hospital. There was much bleeding from one of the lower

¹ *Antiseptic Surgery.* By W. MacCormac. London, 1880.

limbs. It was arrested by a tourniquet applied by the house surgeon.

The Injury.—The right leg was crushed—a compound, comminuted fracture of both bones, with laceration of the skin and muscles. The injury of the soft parts extended some distance up the thigh. The great toe of the left foot was also crushed: and the other toes were bruised.

Amputation.—Soon after the child was brought here, I amputated the thigh about the upper third of the femur. Eight vessels required ligature. The great toe of the left foot was also removed. Sickness occurred during the operation and after it—probably caused by the chloroform inhaled. The patient at first slept little. He was troubled with starting, which awoke him.

On the third day after the injury he began to sleep well under the influence of small doses of laudanum. Soon after food was taken fairly well.

The improvement in the general condition then increased from day to day. The ligatures of arteries came away on the seventh day after the operation; except that of the femoral artery, which remained till the twentieth day.

Five weeks after the operation, after having been out in a carriage several times with the attendant, the child was taken to his home in the country—the wounds being healed, and the patient in good health.

Several years afterwards, when grown up as a vigorous youth, we had information that our former patient then walked well with apparatus adapted by Gray. A peculiar form of adjustment was required on account of the shortness of the stump.

In this and in all such cases the place of operation was determined by the injury. Opportunities of observing examples are not infrequently before you.

In arranging, after the operation, an amputated limb advantageously for the healing process, a certain firm pressure over the outer surface of the stump is useful.

The fibres of divided muscles are each allowed free movement by the removal of one of the fixed points—attachments; and they require artificial restraint to hinder the effect of any small contractions on the cut surface. The muscular fibres on the divided ends especially are liable to be affected—put into movement by slight irritation of incised nerves. The divided veins, which had been loaded with blood gathered from the part removed, being now empty, are yet sufficiently patulous to receive and transmit puriform and putrescent fluids into the general circulation.

The object should be to place the muscular structures at rest as fully as may be safely accomplished—to close, at the same time, the open blood-vessels. In order to attain that end, well-adjusted circular compression is needed. The large vessels, moreover, being in some parts of the limb lodged in intermuscular hollows, the compression should in such parts be aided by suitable soft compresses or pads. These may be made extemporaneously. Such arrangements should be carefully adjusted—the limb being conveniently raised towards the vertical position during the process. While the usual arrangement for ‘drainage’ of the stump will be assisted by hindrance to the transfer of puriform or decomposed matter into the veins, the formation of pus will, it is presumed, be lessened, and the healing process promoted by rest of all the tissues—all the incised parts of the amputated limb.

DISEASE OF THE SHOULDER-JOINT.

CASES of disease of this joint are of rare occurrence, contrasting very largely in frequency and, as we shall presently see, in the amount of the disease with the hip-joint.

Acute Pain in a Shoulder-Joint of long duration. Disability of the Arm.

Case 11.—Mrs. J., æt. 48, a monthly nurse, a stout person, of fair complexion, habitually in good health, attending as an out-patient of the hospital, gave this account of her suffering.

Previous History.—Since an attack of cholera, four years ago, she has been wholly hindered from her employment, being unable to use in any degree her left arm, on account of pain in the shoulder. The pain came on immediately after the illness from cholera, or remained after that disease had subsided. The woman states that the pain is intense at times, so much so that she has often walked her room at night unable to sleep or to rest from ‘sheer pain.’ Every movement increases the distress. To lie on the left side has been impossible during the whole of those four years. The woman’s disability is the greater in that she has always been ‘left-handed.’

Examination of the Limb.—Pain is all referred to the shoulder-joint. It is much increased by pressure before or behind the joint. When the arm is slightly moved while

the shoulder is grasped, a degree of grating is felt, and, however light the pressure, very acute pain is expressed by the patient. The arm is closely fixed to the side of the body, and it is found inadmissible, from the increase of pain, to raise it in any degree or to place anything in the arm-pit.

Believing the case to be one of acute disease within the joint, and the pain to result mainly or wholly from the spasmodic action of muscles furnished with nerves from the same source as those that are given to the joint—those muscles especially that pass from the surfaces of the scapula to the tuberosities of the humerus—it was necessary to control the muscular spasm. To effect that purpose a pad was placed in the arm-pit with a view to its use as a fulcrum, and then the arm was used as a lever. The lower, the long arm of the lever, was drawn inwards to the side of the patient by means of a band fixed around the arm above the elbow, and carried once or twice about the patient's body. By sufficient traction or pressure at the latter point, the part of the arm—of the humerus above the pad in the axilla—the short arm of the lever would, in a measure, be lifted from the scapula, or 'eased' at the scapular articulation; and the muscles would thus be hindered from making pressure, through the head of the humerus, on the disease within the joint. The forearm was supported by a sling resting on the opposite shoulder.

That arrangement removed the pain from the commencement of its use. The patient had a liberal diet with an allowance of beer to which she had been accustomed when engaged in her employment as a nurse. Little medicine was given. The same plan was continued during some months, when local and general improvement having for the most part gone continuously on, the woman was quite well and returned to her occupation.

It may be noticed that on one occasion during the treatment indicated, the patient was seen by another surgeon, who, having formed a different view as to the nature of the

disease, subjected the arm to forced movements, with, however, the result only of causing severe pain, or, as the patient expressed it, 'fearful agony.'

Something as to the history of the case afterwards:—The patient's suffering began in 1853. She applied here in 1857. Since she ceased to be a patient she often came to the hospital to seek advice for other persons. In 1866 she reported herself as having been continuously well, free from all inconvenience in her arm, and performing the duties of a 'monthly nurse,' which involve 'lifting' the person in her charge. That most laborious part of her office is, as before, always performed with the left arm—that which had been disabled.

In another year the woman sought advice for a slight ailment, 'chill' she called it, which affected chiefly one of her feet. While unwell on this occasion, a little tremor affected the arm formerly disabled. But the feeling of illness soon passed away, and with the improvement of her general health the arm soon became quite well again.

The subject of the foregoing report having been a very strong person employed in laborious occupation, it may be well to add the note of a case from a patient of different position in life.

Acute Pain in the Shoulder-Joint.

Case 12.—Mrs. W. This lady, in delicate health, a patient of Dr. Walshe, is in the habit of spending the summer months at her home in Lancashire, the winter at 'a health resort' in the South of France. She has suffered for several years from pain in the left shoulder-joint. Movement of the arm causes much distress. Pain is caused by pressure on the front and on the back part of the joint.

A full-sized pad was placed in the arm-pit, with a band carried horizontally around the arm above the elbow and including the patient's body, as in the preceding case. The band to be tightened from time to time if needed to relieve

pain by controlling muscular pressure at the upper end of the humerus. The forearm was supported as in the foregoing case.

Seen many months after this treatment had been used, the lady was 'quite well.' No discomfort is now felt in the shoulder except when she happened to be ailing in health or fatigued by exertion. There is one disability—that which continues longest in other cases—the lady cannot, without feeling some pain, twist the arm that had been diseased backwards behind her body.

Pain is, in some cases, felt under different circumstances, without injury or disease of the joint. I will, as usual, direct your attention to an example of the sufferings, instead of using some general observations on the subject.

A surgeon of eminence in London, a personal friend, told me more than once of the pain he suffered in one or both shoulders. He was, like many other persons, in the daily habit of spending much time, in cold weather frequently, in his carriage or in a railway train, in his rounds of duty. One window of the carriage was often open. After full inquiry into the facts, the pain seemed to be caused by cold—the passage of cold air directly from the open window to the part nearest—or often by the reflexion of cold air from the closed glass on the other shoulder.

In that gentleman, and in many similarly placed in life, the position they occupy during the duties in a sitting-room or office tends to aggravate the evil. The atmospheric air of the sitting-room, made cold through the single glass of the window, is forced into a current by the fire and chimney; and passes, in many cases, against the too often insufficiently protected shoulders of the occupant of the room, while the trunk is protected by the chair.

To the action, then, of currents of cold air on the many nerves which trail down from the neck over the shoulders immediately under the integument, the pain is probably owing. This cause of the suffering being recognised, means to remove the evil will be readily devised.

Examples of very serious effect of extreme cold on the shoulders in working men have been recorded by Duchenne, of Boulogne. In those cases the deltoid muscles were said to be affected in various degrees through their large nerves. Rheumatism of the muscle, wasting and paralysis, are usually recognised. The application of electricity was useful for relief of the suffering.¹

SOME DISEASES OF THE HIP-JOINT.

Diseases of the hip-joint are of frequent occurrence and are often serious in their consequences, as they are liable to result in lameness from shortening of the thigh-bone, from immobility of the hip-joint—fixed, it may be, in an unnatural position, rendering the limb useless; or from supuration of the surrounding soft parts with the resulting evils. It is to hinder or to lessen these evils, as well as to relieve the suffering that attends on the morbid changes of structure by which they are caused, that the surgeon's management of such cases is directed.

Some circumstances in the natural arrangement of the bones forming the joint, which in all likelihood tend to cause a liability to injury, may be indicated at the outset. We may, for example, note in the skeleton the positions the hip-joints occupy. They are far apart one from the other—far out on the pelvis—the solid base of the trunk. At their upper ends, too, the thigh-bones, for a short space, diverge from the pelvis, and form at each side an angle—the prominence of which outwards is increased by the projecting trochanter. All the large space between the two bones—the bones of opposite sides—is in the natural state filled up, so that the thighs of the living person are close one to the other; the space between the bones being filled, you will remember, with muscles, whose office is to maintain the trunk and the

¹ *Selections from the Clinical Works of Dr. Duchenne.* Translated and edited by Dr. G. V. Poore for the New Sydenham Society. 1883.

limbs in their proper relative position, and carry out the varied movements of locomotion. The space between the thigh-bones, so large above, lessens downwards in so much that—the shafts inclining obliquely inwards—their lower ends, the condyles, touch one the other. While the inner side of the femur is thus thickly covered, especially at its upper part, the outer side of the bone, with the large trochanter, has but a thin covering of muscular and membranous structures.

To the hip-joint is commonly assigned more liability to accident and injury from accident than to other joints. The liability to accident, with its evil results, may be attributed largely to the position we have noticed—that outward position at the side of the trunk, together with the projection still farther outward of the angle of the thigh-bone. Nor is, I believe, another circumstance in the construction of the joint devoid of some influence towards the same result:—namely, that while other free-moving joints have a certain mobility on both sides, and yield before many forms of accidental violence, the hip-joint, on the contrary, is on one side fixed by the solidity of the pelvis, which at the same time is loaded with the weight of the trunk. To these facts, then, in the construction of the joint, much of the liability to accidents and their effects may be assigned. Nor should it be forgotten that persons who are least firm in progression—most liable to fall to the ground, namely, the very young and the very old, are most liable to such injuries; and each to a special form of injury.

Structure of Joint at different Periods of Life.—The condition of the structures composing the joint at different periods of life has its influence in determining the character of the results of disease and injury. Thus in early life—childhood—the tissues during their growth being abundantly vascular, an active inflammatory condition is prone to arise from injury; while in old age—the opposite state of the tissues then existing, the general and local failure of strength

with defective nutrition—the bone being comparatively dry, thinner in substance and wasting like other tissues, is broken by the influence of comparatively small accidental violence. In the long intervening space of life, the period of work—of growth completed, of active nutrition, and of firmness of structure—the injurious effects of accident to the hip-joint are rare in occurrence and are different in kind from those noticed as characterising the results of accidents in early life and in old age.

Examples of diseased joints in the varied conditions referred to will now be noticed. We begin with cases illustrative of acute inflammation and its results.

ACUTE DISEASES OF THE HIP-JOINT.

The joint being deeply placed under cover of thick muscular substance, sufficient indication of the state of its constituent parts in an early stage of the disease cannot be obtained by examination from the surface. Moreover, an opportunity rarely occurs of investigating the morbid condition of the joint by dissection at an early period after its beginning. It is in fact only when the patient, suffering from disease at the hip-joint, happens to die under the influence of some malady affecting a vital organ that the occasion occurs for making the examination *post mortem* of the disease in an early stage. Such a case I shall now put before you with some preliminary notes of the previous history.

Acute Inflammation of Hip-Joint in an early stage—Death from Tubercular Meningitis—Synovial Membrane vascular throughout.

Case 13.—George J. Evans, æt. $4\frac{1}{2}$ years, was admitted to hospital for disease of the brain, secondary to scarlet fever, as a patient of Sir William Jenner, to whom I am indebted for the notes of the case connected with our present object.

Previous History.—The child's mother states that about nine months ago, the left hip was hurt during play with other children. 'They took hold of the boy's leg and pulled it hard.' For the injury resulting from that rough treatment the sufferer was taken to a hospital, and 'he got well' in a short time. It is further stated by the mother, that one week prior to the appearance of scarlet fever, the child suddenly complained of pain and tenderness about the left hip, without hurt or any apparent local cause. He then limped on the left limb, which had been injured and apparently cured several months before.

Examination of the Limb.—The child in bed lay on the side of the sound limb. The pain chiefly complained of was behind the left trochanter. In straightening the affected limb, which he did by his own effort, no pain was felt; but the boy could not bend it towards the abdomen without a great deal of pain. Both knees were notably large—perhaps congenitally.

The child lived but a short time. Death was caused by 'tubercular meningitis.' All the other vital organs were apparently sound.

The Hip-Joint.—All the synovial membrane vividly red. The part covering the interosseous ligament—ligamentum teres—with the structure beneath was enlarged, ragged, and very vascular. The hollow of the acetabulum was also very vascular. The redness was most abiding in the soft structure of that fossa.

The bones (sawed through) and the articular cartilages were 'quite sound.'

A peculiarity in the inflamed membrane requires notice. A layer of thin synovial membrane invested the head of the bone separately. (Plate VI. fig. 1.) The unusual investment of the head of the bone was continuous with the synovial covering of its neck. It seemed that the latter, instead of ceasing around the lower part of the cartilage of the articular surface, was extended onwards over the whole

of the globular head, and without any adhesion to it. I take the arrangement to be congenital. It is noted that the fibrous capsule was lined as usual by synovial membrane.

The case to be noticed next is an example of acute inflammation in a more advanced condition than the preceding. The patient was under the care of Dr. Hare, to whom I owe the opportunity of placing the facts before you. The examination *post mortem*, with the record of its details, was carried out by Dr. Wilson Fox, at the time Professor of Pathological Anatomy.

Synovial Membrane of Hip-Joint very vascular and much thickened—Parts of Bone Dead—Tuberculosis of both Lungs caused Death of Patient.

Case 14.—Richard Gleashy, æt. 8, had good health and was very active until about a year before his admission here. He had then a fall which hurt his head; but without any evidence of having injured the hip. A month later, being unwell, suffering with cough and evidently losing flesh, he was received into a special hospital for children, where he remained three months. It was, his mother said, when removing him from that hospital, she first noticed that the child limped. Soon after he was admitted to this hospital ‘for cough.’

Upon examination ‘the clear indications of advanced tuberculosis were found in both lungs.’ Besides the suffering from disease of the lungs, the child complained of pain in his hip, especially when lifted on bed. He had a leather splint placed on his thigh and hip. When that was removed the joint became bent. He could not stand on the left leg.

After some time in the hospital, the condition of the patient was much improved; but when about to be removed to his home by his parents, he was seized with a new set of symptoms:—Pain in the head, so severe that he often

screamed with suffering, and was unable to recognise anyone. There was at the same time much fever. In three or four days, it was observed that the right arm and leg were constantly in motion. Death occurred in a week from the onset of the cerebral symptoms.

Examination after Death.—In the upper lobes of both lungs were several small cavities and many grey deposits. The intestines and mesenteric glands were found infiltrated with old tubercle, and small ulcers also were discovered in the intestines.

Brain.—Effusion in the arachnoid membrane. In the cerebellum on the left side were two masses, the size of small nuts. In the left hemisphere of the cerebrum, embedded in its substance, close to the surface were found two nodules the size of peas. The excited vascular action associated with the presence of the nodules in the left hemisphere of the brain, was in all probability the cause of the movements which had been observed in the limbs on the right side.

Hip-Joint.—The capsule of the joint when opened was found to contain a considerable quantity of dirty yellow pus. Ligamentum teres was entire, but much changed in appearance, being swollen, flattened, ragged, and covered with spots and small nodules of yellow exudation matter. (Plate VI. fig. 2.) It was also much softened, especially at its connection with the acetabulum. The tissue tore with the utmost facility. The whole of the synovial membrane—that lining the fibrous capsule and covering the neck of the femur—was greatly thickened, intensely injected, and like that sheathing the ligamentum teres, covered with spots and small nodules of exudation matter. The swollen membrane was therefore mottled in appearance all over with bright red and dull orange spots intermixed. The articular cartilage was unchanged.

A section of the bones having been made (Plate VII.), an eburnated piece was displayed, measuring three-fourths of an inch across in the soft cancellous tissue of the neck of

the femur. Opposite to that was a like piece in the epiphysis. It was hard, dense, compact, and in colour yellow. (Figs. 1 and 2.) The peculiarities of colour and hardness were most marked in the portion within the neck of the bone. A section being made through one half of the bone (Plate VII. figs. 2 and 3), this eburnated portion split transversely at the line of junction of the epiphysis and diaphysis, leaving an irregular worm-eaten surface on both sides. (Fig. 3.) The altered pieces were still, however, retained in place by the cartilage surrounding the bone. (Fig. 2.) By the entire absence of vascularity, that mass presented a strong contrast to the rest of the bone. The line of separation between the tissue so altered, and the vascular cancellous tissue was sharply defined in the lower portion; while in the upper part, that in the epiphysis, the morbid change was less advanced. (Fig. 1.)

The line of separation between the epiphysis and diaphysis corresponded with the line of attachment of the fold of the synovial membrane to the circumference of the bone. In two places the capsule, with the periosteum, was ulcerated, destroyed, and the bone left bare with only a small amount of *débris* of the capsules hanging to it. This was not the case around the whole circumference, but only at those parts where altered bone reached the outer surface of the neck. (Fig. 2, *b*.) In most parts the dead pieces were each surrounded by a line of cancellous tissue of greater or less thickness. The yellow masses of bone effervesced in a remarkable degree with acids.

Below the altered bone, and throughout the neck and shaft of the femur, the cancellous tissue is very lax, its walls being very thin, and the medulla filling them appearing unusually red. At the beginning of the medullary cavity (fig. 1, *e*), the medulla is very red and vascular. In the cancelli are numerous little bodies the size of millet seeds. They pervade the whole bone, and are found, but in smaller numbers, in the acetabulum. To the naked eye these little

bodies present a close resemblance to the descriptions given of miliary tubercle of bone; but on examination with the microscope they are found to be masses of newly formed medullary tissue which has not yet become fatty.

The facts stated in detail may be summed up thus: all the parts of the synovial membrane of the joint—namely, that investing the ligamentum teres, that lining the fibrous capsule, and that covering the neck of the femur—were much thickened and very vascular.

The inflammatory process affecting the whole synovial membrane had gone on to ulceration at some points, by which process the underlying periosteum and the nutrient blood-vessels of the neck of the femur being involved, the bone beneath was deprived of its vascular supply, became at those points dead and was in progress towards separation from the living bone.

There were some appearances within the bone leading to a suspicion of the presence of miliary tubercle, but examination with the microscope failed to give further information.

*Advanced Disease in both Hip-Joints—Abscess and Sinus—
Death from Diphtheria.*

Case 15.—John M'Ginnis, æt. 11, a patient of Mr. Marshall. Family history good, parents living, and in health.

Previous History.—Patient was a strong healthy boy until three years ago, when he had an injury on the left hip. After the accident—a fall from the height of a few feet—he for the first time limped. Six months later an abscess formed in the left groin. It was opened by a surgeon, and soon healed. At a later period still, five months before admission here, another abscess formed in nearly the same place, and still discharges matter. The opening of the abscess is about four inches below the spine of the ilium, at the anterior border of the tensor vaginæ femoris.

Pain was complained of six months ago in the groin on the opposite—the right side, without previously known injury. A swelling arose and pus was discharged. Other abscesses were afterwards formed, and likewise gave out purulent matter.

Examination in Hospital.—The boy is thin, feeble; can walk with crutches, but cannot bear his weight on his limbs. The right limb seems the most diseased. It has three open sinuses. The left limb has one sinus. Much pain is constantly felt in both hips.

Extension was used by weights and counter extension, with distinct relief of pain and tenderness. But after the lapse of ten days the patient had a rigor and became very ill with fever and loss of appetite. The right leg became painful and swollen—slightly œdematous. It increased so much in size as to require incisions. In a few days sore throat and difficulty in respiration came on. These evils increased from day to day. The urine was nearly suppressed—only two drachms being voided; and this loaded with albumen. The child died a month after admission to the hospital.

Examination of the Body.—Intense diphtheritic inflammation extended throughout the pharynx and œsophagus to within an inch of the stomach. In liver albuminoid disease was moderately advanced. The kidneys were pale and opaque; the cortical substance being evidently the seat of old degeneration.

Hip-Joints.—On the right side the sinuses are found to communicate one with the other, and to lead to the hip-joint. The capsule is closely united with the surrounding structures, which are matted together by adhesive material. The joint being opened, disease is found to be far advanced. The head of the femur is almost entirely destroyed by caries; the remainder, separated from the neck of the bone, is embedded in the acetabulum. The soft structures around are covered everywhere with soft exudation matter—not puri-

form in appearance. The sinuses contain grey puriform matter and shreds of tissue.

The joint on the left side (Plate VIII) is less diseased. The capsule is much thickened, and the bone is kept firmly in the acetabulum, notwithstanding the removal of part of the head and the shortening of the neck. The sinus leading from the surface penetrates the capsule, and there a new deposit of bone forms a channel for the sinus into the joint. The globular head has been in great part absorbed; the remainder of the epiphysis separates easily from the neck. The joint being laid open, the cancelli of the neck of the femur are found loaded with greyish matter. The acetabulum is carious, but covered by soft glairy granulations. The remnant of the synovial membrane lining the capsule is highly vascular, thickened, and soft. But there was no pus in the joint.

*Depressed Health after Scarlet Fever—Swelling on Hand—
Hip Disease—Abscess—Extension of Limb.*

Case 16.—Eliza S., æt. 14, is said to have been always delicate, yet to have had general health unbroken until she had scarlet fever three years ago. Since that illness has been extremely weak, and has been deaf. In addition, a swelling formed on the back of her right hand, from which she lost the use of her fingers for several months. Subsequently the swelling of the hand subsided, and then, about twelve months ago, the hip became affected on the right side. According to a statement of a neighbour of her family, the child has always been fed and clothed poorly and lodged in a damp cellar.

In hospital the little girl lay on her back in bed; the right, the diseased, lower limb was straight, and in its natural direction, the foot neither inverted nor everted. In length it measured three-fourths of an inch less than the sound limb. The glands of the groin were not enlarged. In front of the

hip-joint a fulness is evident, and below the great trochanter is a swelling in which fluctuation is detected. Pressure made on the trochanter or behind it gives pain. Any attempt to bend the hip or the knee is much complained of; during the movement of the thigh forward, the pelvis is moved with it—the patient complaining much of pain, which she refers to the knee, where there is no disease. Especially does she complain of fits of pain occasioned by jumpings of the limb, which hinder sleep.

Besides the disease of the hip, the left lung was found at its apex to be hardened—tubercular, but that disease not in an active state.

By means of extension made with weights and cord apparatus, the jumping of the limb was hindered, the pain ceased, and sleep then became tranquil. All the pain at the knee and elsewhere was relieved, and did not return after the removal, in due time, of the extending cords.

The fluctuating swelling on the outer side of the thigh was found, by puncture with an exploring instrument, to be formed by a sero-puriform fluid. It was treated at first, and while very tender, with a lotion—hydrochlorate of ammonia in water and spirits of wine—applied warm with lint and oiled silk. Subsequently strong tincture of iodine was frequently applied over separate small patches. Steadily the swelling decreased in size; the fluctuation was gradually diminished, and within two months the note is: ‘no sign of the fluid remains in the thigh.’

Meanwhile the health made uniform progress in improvement. So complete, locally and generally, was the improvement in the case during her stay in the hospital, which lasted three months, that the child was removed by her parents, at their own desire.

Several points of importance are illustrated in the record of the case now stated in outline. A delicate child has been ill-fed, ill-clothed, ill-lodged. It needs but little to excite a local malady in such a person under such circumstances

—a fall, a knock, little noticed at the time, may be the starting point.

Observe, the diseased limb was straight, the joints not bent as the hip-joint usually is. The puriform deposit was removed by absorption. As is common, the pain and the starting of the limb were relieved by extension. The general improvement of the girl's condition in the hospital was doubtless much owing to the comparatively healthful circumstances amid which she was placed, contrasting as they did largely with those she suffered under at her home.

She was removed in a much improved condition. But we must have some fear as to the health in future of that case and of other such cases.

*Thickening of Trochanter and in Groin—Pain in Hip—
Obliquity of Pelvis—Elastic Extending Bands.*

Case 17.—H. W., æt. 16, a woodcarver (Case-book 30), one of a family of eighteen children, of whom eleven are living and in good health; has himself been always pretty healthy, never confined from illness longer than a couple of days at a time. About seven months ago he was taken with slight pain in his right hip, which gradually increased, and shot down to the knee. He is not aware of having received any injury. His employment required his standing all day. Since the pain arose in the hip, he has got about with two sticks.

Examination in the Hospital.—As the boy lies in bed, the right limb is bent, and laid on its inner side. It cannot be made straight at the hip with ordinary pressure. There is in front of the hip-joint an evident fulness which reaches a couple of inches from the inguinal groove. Both the great trochanters being grasped at the same time, an evident thickening is felt on the right side; and the circumference of the limb on that side, measured over the joint, is found

to exceed by an inch that of the opposite side. The lymphatic glands are enlarged and tender. The gluteal region is in a degree flattened.

The patient being still in the same position—on his back in bed—the right side of the pelvis and the right knee are plainly lower down than the left. In like manner, when he stands he cannot place both feet on the floor at the same time; so, while he rests on the sound limb, the other is bent; and when he bears on the foot of the diseased side, the toes only of its fellow reach the floor. The diseased limb, therefore, seems the longer; but by measurement both limbs are alike in length, the appearance of a difference being due to the obliquity of the pelvis. There is no defect in the form or otherwise of the vertebral column. The foot of the diseased limb is not everted when the patient lies on his back or stands.

Pain.—When asked where he had first felt pain, the boy touched the great trochanter of the right side; and afterwards he referred pain for the most part to the same place. Ordinarily, and while lying without movement, he is free from acute pain; but he feels an aching about the hip and trochanter, and states that he is hindered from sleeping part of the night by shooting pains, which come while he is dropping off to sleep. Some slight testing movements of the hip-joint, made in examining the patient, gave him pain; so did any pressure against the sole of the foot.

Treated with the elastic extending bands, and a long splint, the note in a few days made is: 'The patient states that the aching left him immediately after the adjustment of the apparatus. He feels much more comfortable. Eats well.' The remaining reports show steady improvement, with a short interruption of some disturbance of stomach and bowels. He left the hospital with a leather support covering the pelvis and the thigh. For some weeks before leaving he had been moving freely about on crutches. He felt no pain. He was in very much improved health, and

had for some time been gaining flesh. Was sent to the seaside convalescent home.

Acute Inflammation of Joint, Abscess, Recovery—Returns of Suffering under various circumstances during many years—Rest and Change of Climate.

Case 18.—The incidents of this case, extending over several years, from childhood to manhood, may be taken to exemplify a not uncommon course of events in disease of the hip-joint. F. F., then three years of age, his parents in respectable position, resident in London, was noticed to suffer pain when moved. A swelling formed about the left hip attended with fever. There was much tenderness to very slight pressure. Startings of the limb came on at a later period, and hindered sleep. They occurred during the day as well as at night. A leather case was applied over the hip and the thigh. The child was taken to the seaside. In five months he was reported to be well.

After an interval of more than a year, and while he was still at the seaside, at another part of the coast, a swelling appeared at some distance below the same hip in front of the thigh near the outer side. For six months, the mother said, the swelling got very slowly larger, then became soft. There was, when I saw it, plainly a collection of fluid reaching to the surface. I opened the abscess. For two months pus was discharged; after which lapse of time the discharge ceased and the wound was healed. In the following summer, matter formed again and escaped at the same place. After a time the abscess was healed—and now permanently. This time the recovery was speedy. The boy walked well afterwards.

Slight causes have been sufficient to bring back suffering at the hip. Thus it has often happened that when fatigued with walking or being engaged in play with his fellow-pupils at school, the boy has been for a time unable to use the

limb. On two or three occasions, having got wet in his feet, he suffered in the same way; and by a return of pain in the hip from the same cause, he has been repeatedly laid by—in bed or on a couch—for a month at a time.

Seven years after the beginning of disease, Master F. happened, while at play, to be struck with a ball on the sole of the foot of the diseased side, and he was obliged in consequence to 'lie by' for two months. A knock of his knee against a form at school earned for him pain and a month's confinement.

It was observed in the injuries referred to, that when the direct local effect of the hurt passed away, the distress at the hip began to be felt.

General ailments were attended with pain at the seat of the old disease, there first, usually. Whenever the boy began to ail with a common cold, it was the hip that first gave token of suffering. At one time severe fever arising, the suffering in the hip came on. The boy's mother, seeing that the pain of the hip was extreme, supposed that there must be a recurrence of the old abscess. But, in due time, measles appeared. As this malady subsided the suffering in the hip disappeared.

And now as to the condition of this youth after several such chances and attacks of suffering, the following is a report: F. will be in a few months fifteen years of age. He is a well-grown boy, in good health, and plump. He walks quite straight, bearing on the whole foot and equally on both legs. There is complete freedom of movement, but there is an evident shortening of the left limb. When the boy stands or lies on a couch, both limbs are in the same direction. The trochanter of the left femur is a little more prominent and thicker than natural. The groin is natural. By measurement the left limb is an inch and a half shorter than the right; the gluteal region is fuller and more prominent on the left side.

He states that when tired he is more tired in the left limb than anywhere else. That is all the complaint he has to make.

For several subsequent years while this youth has been at school, and afterwards while he has been at work at his professional (legal) studies, he has often been obliged, on account of the recurrence of pain and inability to walk which attended every even slight general ailment, to remain in bed or on a couch for days at a time. And this, though, without the local complication, the general ailment would not have been sufficient to have kept him from some attention to his occupation.

Notwithstanding such occasional interference with work and the inconvenience of the short limb, F., now a young man, is in good health. He moves about actively, and is fully equal to the efficient discharge of his professional duties. He bends the hip-joint fully on the diseased side and sits firmly on his chair; but the knees are unequal in position. In walking a thick-soled boot on the left foot is all placed on the ground—the heel included.

The inequality noticed in the position of the knees is owing to the shortness on the diseased side of the upper part of the femur, resulting doubtless from the early stoppage of its growth occasioned by disease at the place of junction of the epiphysis, and the extension inwards of disease to the cartilage connecting the epiphysis with the neck of the bone. (Plate VII., fig. 3.)

In the management of this case 'counter-irritation' in any shape was not at any time useful. The application, when used even on the smallest scale, seemed to have caused general heat of skin—a feverish state without any apparent local benefit. Most benefit was derived from rest in bed or on a couch. In the early times of the disease the application of a case of leather or a starched case over the pelvis and thigh was beneficial; with change of atmosphere to the sea-side from even an open space in London—a square—one among several neighbouring squares on high ground and with gravel soil. So placed was the parents' residence.

Acute Disease of Hip-Joint—Treatment by Issues and Blisters useless—Extreme Pain relieved by Morphia—Much Improvement.

Case 19.—Thomas M., æt. 21, a bricklayer, has been lame for fifteen months.

Previous History.—The history of his health up to the present complaint is good. So is that of his family; his parents, brothers and sisters, being all habitually in good health. On admission here the young man gave this account of his lameness: Fifteen months ago, in his sliding down a balustrade, the left foot was knocked forcibly against the floor, and he felt immediately at the groin and under the knee-cap much pain, which continued for two days. Afterwards, in three days, he had a similar accident; and pains again arose in the same places—in the groin and under the knee-cap. From the time of the latter accident he continued to get worse, suffering much pain, which was constantly aggravated during the night. He had difficulty in getting about with help of a walking-stick. Under direction of a medical practitioner, liniments and blisters were used; but during their use the suffering did not cease to get more intense. Admitted at this period into a hospital, an issue was made in front of the hip-joint; blisters were applied; and cod-liver oil was administered with the result, the man states, that while he entered the hospital with walking-sticks, he left it, after two months, with crutches; the general health at the same time being worse. Now he went to the country, continuing there for six months, when he was admitted here.

Examination in Hospital.—In bed the patient is found lying on the right (the sound) side; with both the knees drawn up—a pillow between them. Movement of any kind gives great pain; and there is difficulty in getting him into anything bordering on a symmetrical position,

with a view to determine the correspondence or want of correspondence between the diseased side and the sound one. While he stands supported with a crutch on the left side, the iliac crest of the right side is considerably the higher. The left buttock is much flattened. The left foot is in advance of the right one; the knee is bent. The depression behind the left trochanter is less evident than that on the sound side. Measurement shows the left limb to be an inch shorter than the right. Pain is chiefly at the groin and under the patella. To the touch there is much tenderness in the groin, as well as before and behind the trochanter. Much suffering from startings of the limb at night.

After a little time the patient is reported to be much improved in general health, but the startings at night were still troublesome. With reference to that distressing complication these observations are recorded from the patient's statement: The limb never jumps but when he is falling off to sleep. No mental abstraction—such as being engrossed with the subject which he may be reading, or active engagement in conversation—tends to any startings of the limb. 'A twitter' sometimes occurs before the leg starts. As soon as he perceives that feeling, he grasps the back part of the thigh (the hamstring muscles); and the doing so, he finds, hinders the pain from running up to the hip. He mentions also that, when asleep, the noise as of a person walking along the ward, loud talking and like noises, will cause the limb to jump, and he ceases to sleep owing to the pain occasioned by that movement of the limb.

The limb was brought straight by degrees. Rollers with a long splint were then applied. Later, a starched apparatus was adjusted over the thigh and the pelvis. It was noticed that an issue which had been formed below the iliac spine several months before, had become open and was discharging pus. The startings of limb at night, which were still distressing and interfered with sleep, were now controlled with

the use of morphia; a third of a grain, afterwards half a grain, was necessary to give a comfortable night.

This patient left the hospital in a very much improved condition. Being more advanced in life than the patients commonly are who suffer with hip disease, and an intelligent person, his evidence respecting the distress which attends on the malady was proportionably clear and useful, and has been placed before you on that account with some detail.

*Much Exposure to Wet—Hip-Joint Disease—Wasting of Limb
—Long Splint with Elastic Perineal Band.*

Case 20.—S. B., æt. 25, a railway porter (Case-book 29).

Previous History.—Five years ago, having been before then in good health, he got very wet and allowed his wet clothes to dry on him. He became ill, and afterwards had stiffness of the right hip, but without pain. The man grew better, though not altogether well.

Lately, about five months ago, he became much worse, and was obliged to keep to bed in consequence of ‘excessive pain, which shoots like an electric shock from the hip to the knee,’ and is especially sharp at night, causing the whole limb to start violently: at no time has the pain been in the knee only, but there concurrently with the hip. For some months he has noticed that the flesh of the affected—the right—limb has been flabby.

Examination in Hospital.—The patient being on his back in bed, the right lower limb lay straight, fully extended. It was seen to be diminished in bulk, not perceptibly in length; its direction natural, neither inverted nor everted.

In front of the hip-joint is a swelling with a degree of hardness in place of the natural hollow. Every movement communicated to the joint gives pain—adduction less than flexion or abduction. Pressure on the great trochanter at

its outer side likewise causes pain. At night pain is distressing as it was before the man came to the hospital.

Extension was applied to the limb, with elastic band adjusted to the long splint. The arrangement was so made that the elastic perineal band could be made more or less tight, or might be allowed to be altogether loose. This was attained by means of a hook fixed to the band and inserted into holes at different heights, but close one to the other in the long splint.

In a month after the apparatus had been adjusted, the report is: There is very little pain or starting of the limb at night. Afterwards improvement continued and pain decreased steadily. In a month, by way of trial, the bands were unhooked. After the lapse of some hours, pain returned to the knee. The trial was renewed a fortnight later; the interval of entire freedom from pain was longer. It was only at night that a degree of suffering returned; and it was much less than the former severe starting pain of the night. The patient for a time, and for his own comfort, fixed the perineal band at bed-time and loosened it in the morning. Ten days later the extension was not required for three successive days, when, and at 2 A.M., he was obliged to relieve himself by fixing the hook of the perineal band.

Six weeks from the time of his admission to the hospital the patient went about on crutches. He had now no pain at any time, and his general health was improved.

After he had left the hospital and had been in a convalescent home—more than four months from the time he was admitted here—this man was seen again. The report then made of his condition is as follows: The general health of S. B. is good. The diseased limb is, as before, smaller than the sound one; the thigh being two inches, and the calf of the leg one inch less in circumference than its fellow; and after repeated measurements it is found to be an eighth of an inch less in length. Both limbs, as the man lies down, are in the same direction. When the right thigh is gently raised

from the bed, the pelvis evidently moves with it, while the movements of the sound limb are quite natural. There is no pain; the man walks with ease.

Commentary.—The morbid changes of the hip-joint as shown by dissection in three of our cases are as follows:

a. The alteration of structure begins in the synovial membrane—that covering the interosseous ligament (ligamentum teres), the cotyloid fossa, and the neck of the bone, as well as that lining the capsule of the joint; all is vascular and in part thickened. (Plate VI. fig. 1.)

b. Further progress of disease is shown in Case 14. There was pus within the joint. Synovial membrane much thickened all over; ulceration had occurred in parts of the membrane investing the bone, and had involved the underlying periosteum with the nutrient vessels of the bone; with the result that pieces of that bone had become dead, yet still were retained in the natural position by overlapping cartilage of the joint. Portions of dead bone extended from the neck to the head, involving the intervening cartilage. The part in the diaphysis was most completely deprived of vascularity. (Plate VI. fig. 2.)

c. Still further does the disease advance; the head and neck of the bone becoming destroyed (Case 15, Plate VIII.), suppuration extending outwards on the thigh and sinuses opening through the skin.

The Causes assigned for the origin of pain and disability in the limb at the outset of the disease have been very various in the cases read to you. All, however, were such as involved some form of injury, when it was ascertained that a cause had been assigned. In the very young generally there can scarcely be correct knowledge or remembrance of such incidents or accidents. Accidents are the more completely forgotten in that they are commonly slight, and the most serious part of the effect on the limb follows, it may be, after some lapse of time.

But in no small number of the children brought to the hospital the power of throwing off the effect of slight injury

is much diminished by the feebleness of the sufferers and the unhealthy circumstances with which they are surrounded. Their homes are often in cellars damp and cold, with atmosphere, food, and clothing little suited to promote general health, so as to enable the system to get rid of the effect of local injury. A serious evil as regards many of the sufferers brought under observation is, that it is usually when disease is in an advanced stage, and health is impaired, that the aid of the hospital is sought.

Diagnosis.—Indications of the presence of the disease may be briefly stated:—Lameness and pain when the foot is placed on the ground and bears the weight of the body, or when the femur is pressed against the acetabulum; pain when the joint is moved, the inflamed tissues within it being disturbed. In some cases increase of pain occurs at night especially, and when the patient falls off to sleep, occasioned by spasmodic action of muscles. You have had examples of swelling and inflammation in front of the hip-joint; enlargement of the lymphatic glands with tenderness to the touch, and heat of skin, and general febrile condition.

The diagnosis of hip disease seldom presents difficulty. Notice of an error will probably in this, as in other diseases, assist towards accuracy. With that view I would refer to some of the facts in the case.

Case 21.—S. J., æt. 9. I saw this boy after he had been laid on a couch or bed during a month, for relief, as I was informed, of hip disease. He was unwell, and had been unable from the beginning of the confinement to place more of one foot than the toes on the ground. The result of examination was as follows: There was no fever, no restlessness at night, no increase of natural heat over the hip-joint. Pressure, whether on the groin or against the trochanter, did not cause pain. The glands of the groin were unnaturally large; but were not tender to pressure. Moreover, the glands of the other limb were equally large; and the cervical glands also were enlarged. These glands

had been known to be habitually so. Movements of the hip-joint caused no suffering. In short, though there were indications of disease in the enlarged glands and the lameness, the actual signs of disease in the hip-joint were wanting. The cause of the lameness was necessarily to be sought elsewhere. Accordingly, the search being continued downwards, tenderness was found when the heel was pressed or touched; and the boy was aware of something amiss there. Two small swellings projected slightly behind the os calcis at its upper part—one at each side. They were formed by the bursa of the tendon of Achilles, swollen and prominent at each side of the tendon. The swelling was fluid accumulated in the inflamed synovial bag, on which pressure of the tendon was the cause of the lameness. This little ailment was soon removed. The boy of that time is now a healthy young man actively engaged in important public affairs.

Some of the most important circumstances connected with the disease will now be referred to.

Position of the Limb at the Joint.—When the patient is admitted to the hospital, the diseased joint is seldom found in a straight position. In one of the cases cited (No. 13), in which the limb was straight, flexion of the joint caused pain. That was an example of disease in an early stage. In it the synovial membrane was found on dissection to be devoid of swelling, except the part encasing the ligamentum teres and the cotyloid fossa; the joint was free from puriform effusion. (Plate VI. fig. 1.)

The limb is usually bent towards the abdomen and inclined inwards. By experiments it has been shown that fluid being injected, *post mortem*, into a healthy hip-joint, it becomes bent, and the flexion of the joint increases as the fluid injected is increased in quantity. That result was clearly obtained in experiments made at my request by Mr. Alexander Bruce.¹ So the fluid formed within the joint in

¹ A hip-joint removed *post mortem* from the body of a healthy person—the muscular substance being still around it—was injected with a solution of coloured

disease has, we assume, the same effect on the position of the limb; and the thickened synovial membrane tending also to fill the articular cavity, contributes to the same result. The fact is illustrated in Case 14. In that case the capsule of the joint contained a considerable quantity of dirty yellow pus, and the synovial lining of the capsule was largely thickened. (Plate VI. fig. 2.) It should, perhaps, not be omitted from mention that flexion of the joint is the most usual position of rest in the healthy limb. That position involves relaxation of muscles, and perhaps the absence of irritation of the principal nerves distributed to the joint.

If that bent position of the limb should be constant—should be allowed to continue while the diseased joint is being healed, when the healing process is completed the patient will, in all likelihood, be unable to place the limb straight. That result would, it might be said, be disastrous to him in locomotion—would certainly be so, if the cicatrised joint were fixed in the bent position. For, as the foot of the bent limb is brought to rest on the ground, the joint being fixed, the pelvis and the spine are tilted forward, and much distressing inconvenience is the consequence. It is therefore essential, in treatment of the disease, to extend the joint so as to place the limb in a straight position—in a line with the trunk. If that object cannot be attained by gentle effort, ether or chloroform may be used in a strong person. And in the event of the surgeon's inability to straighten the limb with allowable force, the accomplishment of the purpose will, if attainable, be effected and maintained by the apparatus to be presently noticed.

The limb when brought into the desired position is then fixed during the healing process. The immobility of the

gelatine through a hole bored in the ramus of the pubic bone behind the ilio-pectineal line, with this result:—As the capsule became distended, the femur was flexed more and more and slightly adducted. When the capsule was fully distended, the femur was flexed at about an angle of 25°. Experiment in January 1867. M. Bonnet obtained similar results from a like proceeding.

joint is necessary from the effect of movements in inducing pain and interfering with the progress of the healing process.

Pain is a very prominent characteristic of disease of the hip-joint. It is caused by compression of the structures of the joint, or by pressure of one part of the joint against the other—the diseased part being necessarily included in the pressure. In attempts at locomotion, the weight of the body pressing downwards on the thigh bone, or the pressure by the surgeon from the foot or the thigh bone or the trochanter, induces pain, and is an indication of disease—of a tender part within the joint. Without such direct pressure, too, or any apparent mechanical pressure, very distressing pain spontaneously occurs. This is commonly accompanied with muscular spasm—startings of the limb. It arises from pressure in another form—pressure occasioned by contraction of the muscles—muscular spasm around the joint, by which one of the bones is forced against the other; by which, also, the inflamed, swollen structures within the joint, and necessarily their nerves, are compressed. The muscular spasm results from the reflex nerve influence—reflected from the compressed sensory nerves in the diseased part of the joint to the motor fibrils of the same nerves distributed to the muscles, and controlling their action, causing forced or spasmodic action.

The contraction of the muscles induces pain in two forms: 1. It causes compression of the actual disease. 2. The constant or frequent action of the muscular fibres is itself a source of pain—painful weariness; the almost constant pressure on the sensory nerves among the muscular fibres being the source of the added distress. The startings of the limb commonly occur when the patient is becoming unconscious, as in dropping off to sleep, when the control of the will on muscular action ceases. Hence the hindrance to rest.

In some instances pain is felt at the knee—at the forepart and the inner side, in consequence of fibrils of the

same nerve being distributed to the hip-joint and to the knee. The nerves distributed to the hip-joint are, I would remind you, derived from three sources—the anterior crural, obturator, and sciatic. The muscles that would be brought into action under the reflex influence of any one of these nerves are very powerful. Commonly the muscles in front and on the inner side of the joint are those that exert influence in disease, and accordingly the joint is usually bent—bent from muscular force and from that swelling within the joint already noted, page 88. The tendency to that position causes a good part of the difficulty in the treatment. Here the fact may be recalled that in one of the cases cited, the muscles behind the limb seemed to be those in action—those supplied by the great sciatic nerve. (Case 19.) The man, when pain was coming on, grasped the back of the thigh to hinder or restrain the action of the hamstring muscles.

Shortening of the Limb.—A very frequent result of hip-disease is the shortening of the thigh. The acute form of the disease occurs, we have seen, in young persons—generally in children. There are two sources of shortening seen in after-life. 1. The bone may be partly destroyed by caries, whereby a portion being removed, the bone is actually shortened. 2. The other, the most frequent source of the defect, arises from the diseased state of the connecting cartilage between the epiphysis and the neck of the bone;—by which cartilage in children the elongation, by the growth of the bone at the upper end, is effected.

The Treatment is best interpreted when observed in cases as it is carried out in the wards of the hospital. It will be briefly referred to here so as to illustrate the principle to be followed out in practice. If the straight position of the limb, which has been stated to be indispensable for progression after the patient's recovery, cannot be attained directly, the apparatus of weight and pulleys will be used. It has the advantage of gradually effecting the

desired change in the position of the limb. The traction which the apparatus effects relieves the pressure within the joint and the resulting pain; it hinders, also, the spasmodic action of the muscles which aggravates the pain and causes those startings of the limb with the attendant suffering.

The limb being straight, pain would be relieved by continuing the weight and pulleys, or by the use of a straight splint and elastic bands. How effective the latter arrangement may become is illustrated in Case 20. The patient, an intelligent young man, was allowed to fix the apparatus when relief was needed or likely to be needed.

Means must likewise be used to keep the joint fixed, free of movement. Movements of the diseased parts would hinder or retard the healing process. Immobility must therefore be effected. That object, if needful, is attained effectively by a case moulded to the pelvis and the thigh. It is constructed, you will observe on the patients, of different materials. The long splint is used in some instances with the same object. (Case 17.) The immobility is often sufficiently provided for with the extending force adopted.

The same principle of management is illustrated by the narrative of two cases of disease affecting another joint, the shoulder, which have been recorded. They exemplify the same evil as well as the same beneficial result of the control of movement and pressure by the use of a continuous extending force effected by means of lever and fulcrum, (Cases 11 and 12.)

You will, then, in the local treatment of acute hip disease, seek these objects:—the favourable position of the limb; the control of muscular movements; and the immobility of the joint.

We should notice the fact that a case occasionally—rarely, indeed—occurs in which the various forms of apparatus may be unsuitable. In one of those that has been cited (Case 19), morphia was used with much advantage.

That medicine controls the sensibility of nerves as well as that of the nerve centres. It may be administered in the usual way by the stomach, or in a grown-up person by the subcutaneous method. The use of that potent medicine must be of short duration. The objections to any protracted resort to its aid, or to the aid of any other sedative, need not be insisted on here.

The custom long existed to apply blisters, issues, or setons in the neighbourhood of the diseased joint. We do not continue that practice. There is some notice of it in the records of our cases. (Case 19.)

It is not, however, for the local management only of cases of hip disease that they are admitted to hospital. Among the causes of continued disease, the unhealthy surroundings of the homes of many of the humbler classes have been mentioned. Removal from these to a comparatively healthful residence, with the supply of food suitable to the age and general condition of the patient—removal, that is to say, to the hospital, and, when leaving it, to a convalescent home or an equivalent away from town—is very generally essential to the restoration of such patients to a healthy condition as far as that is attainable.

Recurrence.—After the suffering has ceased and the patient has recovered the use of the diseased limb, recurrence of the symptoms of the malady is not unfrequent. The return of suffering results from slight injury or from even slight general ailing. The records of cases cited illustrate this statement: thus, the schoolboy case, after a knock in play with other pupils, was obliged to lie down for several days in consequence of a renewal of the pain in the hip. During many years, also, the same person when ailing slightly had, from the same cause, to abstain from his occupation. In that case, too, the advent of an attack of general illness was attended with a return of acute pain in the joint before affected, though it had apparently been restored to a healthy condition, insomuch that a return of active disease

in the joint was alone expected by the attendants, that expectation being removed by the appearance of measles.

(Case 18.)

The facts of another of our cases (13) may be recalled on account of the elucidation afforded by examination *post mortem*. A child who had become lame from slight injury of the hip, recovered soon in a hospital and remained free of pain or other evidence of any morbid condition in the joint during several months. But then, being unwell a week before an attack of general illness (scarlet fever), pain in the previously affected hip-joint returned with much severity. Brain disease of tubercular nature supervened on the scarlet fever, and the child soon died. As regards the joint, its inner surface was found to be inflamed throughout. (Page 69 and Plate VI.)

In that case the local disease, after it had subsided during some months, was reproduced—recalled to activity. The whole system, affected by the fever of coming acute disease, had undergone a certain physical change in all its parts. Participating in the effect of the general malady, the joint was inflamed anew, and, by reason of the previous disease—which had apparently passed away—it was more susceptible of the pervading morbid influence, and was therefore more affected, more inflamed than other parts. The same return of the disease in an aggravated form is shown in the records of other cases.

The practical inference must be that much time is needed for the complete reparation of a part which has undergone an attack of inflammation, as of hip-joint in this case. It would, therefore, be concluded that, after the subsidence of active local disease, much time and care are required in conducting the hip-joint or, it may be added, any other organ to a condition fit for the performance of the natural functions—and so able to prevent the recurrence of a local disease.

CHRONIC DISEASE OF THE HIP-JOINT.

As in a preceding lecture it has been stated that we have seldom the opportunity to examine the changes of structure that belong to the acute form of hip disease in its early stages, so now it should be noted that the occasion rarely occurs of connecting the history of the patient's condition in chronic disease of the joint with the morbid changes that attach to it, as seen in examination after death. We have frequently under observation examples of the disease; but the persons seek admission here on account of some incidents in the course of the malady—some form of urgent suffering. Being relieved of the passing evil, such patients return to their homes and to their occupations. The accident or injury, the starting-point of the disease, with its effects on the living person, and the resulting changes in the part injured observable in dissection after death, are spread over so long a time that any approach to a continuous record of the facts is not to be looked for by the same observer, except under unusual circumstances—such as I would now refer to.

Examples of the morbid results of the disease that occurred in soldiers serving in the colonies, who were under observation during the interval between the injury and their death some years later, are in the Royal Military Hospital at Netley. Cases were published by Mr. Gulliver, an army surgeon of scientific distinction.¹ For the opportunity of putting before you the actual specimens of the disease in two cases, I am indebted to the courtesy of the authorities of the Army Medical School at Netley.

¹ *Edinburgh Medical and Surgical Journal*, vol. xlvi.

Chronic Disease of Hip-Joint—A Soldier in West-Indies, in Hospital for Phthisis—Death from Disease of the Lungs—Examination after Death.

Case 22.—J. Fox, æt. 32, a soldier, after service during eight years in the West-Indies died of phthisis, for which disease he had been two years in hospital. A long time after his confinement had begun, the right lower limb was found to be emaciated; but there was no note of any previous fall or injury. (See result of inquiry afterwards.)

Examination after Death.—The right lower limb was an inch and a half shorter than the other, the distance between the pubes and the trochanter being diminished ‘in a corresponding manner.’ The limb was much emaciated; its position and the movements of the hip-joint were natural. The neck of the femur was almost wanting; the head flattened, and approximated to the shaft so as to be below the trochanter. (Plate XIII.) The cancelli of the bone filled with caseous matter, in some places nearly colourless, in others tinged with dark grumous blood. The acetabulum shallow and expanded to fit the altered head of the femur. The interosseous ligament was entire; its insertion to the pelvic bone fixed partly in the acetabulum. The cartilage of the joint had the usual thickness and consistency, and was lubricated with synovia. The other thigh bone was natural. A healthy joint is shown in Plate IX.

Inquiry being made among the man’s comrades after his death, it was ascertained that he had fallen about three years before his death; and that afterwards he often complained of pain about the hip, but he continued military duties many months, never having been off duty on account of lameness or any effect of the accident.

In commenting on the case Mr. Gulliver makes these

remarks: That the lameness not being perceptible before the man's admission to hospital, and the change of structure in the bone having come on during confinement for phthisis in the hospital, these circumstances cannot be regarded as favourable to the treatment of such cases. Moreover, the opinion that the alteration of the bone is owing to the gradual operation of the superincumbent weight of the body requires modification, seeing that the patient lay all the time in the recumbent posture. Applying, however, in this case the views already expressed on other cases of similar disease, we would interpret the facts thus: 1. That the fall twelve months before the admission to the hospital, coupled with the man's suffering afterwards from time to time, was evidence of an altered condition of the joint, though apparently but slightly marked. 2. That the shrinking of the muscles and the change in the bones originating as the effect of the fall were in great degree promoted by the constitutional malady. That malady, phthisis, which affected the whole system, produced its most marked result on the nutrition of the limb—the part already altered in a degree by the fall.

Chronic Disease of Hip-Joint—Recovery—Active Duties of a Soldier in India during Three Years—Then Lameness, which increased in Hospital—Death from Snake Bite—State of Limb.

Case 23.—John Lynn, æt. 19 (Dr. Dempster's case), a stout active recruit for the army, fell into the hold of a ship in which he was going to India to join his corps. The right hip being injured, he was confined to his berth. On arrival in India, about three months after the accident, being 'perfectly well,' he was attached to the light company of his regiment. The young soldier continued to discharge the active duties of his position for about three years, when, without obvious cause, he became gradually lame in the

injured (right) hip, and was admitted to hospital in consequence.

When he had been eighteen months under treatment, as the infirmity was still steadily increasing and he was much addicted to drinking spirits, the young man was considered to be 'unfit for service.' The general health had nevertheless been 'throughout good.' He moved about with a crutch. While detained for the purpose of being 'made an invalid,' he was bitten at night by a snake (*Bungerius lineatus*), and died in a few hours, being then twenty-four years of age.

Hip-Joint.—The head of the femur is enlarged at the lower border, the upper and fore part being flattened so that the articular surface is close to the shaft in front, while the neck is less shortened behind. Acetabulum is much widened and shallow. Articular cartilages of usual thickness, and without traces of ulceration. No mark of the pit for the interosseous ligament remains. (Plate XI.)

There was here what may seem a peculiarity among the cases cited, namely, that the lameness gradually increased, making the man unfit for soldier's duty, though the general health is stated to have been 'good throughout.' It should, however, be borne in mind in reference to that point, that: (*a*) he was in an Indian climate; (*b*) in a hospital; and (*c*) 'much addicted to drinking spirits.' These circumstances should be considered as, in all likelihood, unfavourable to the restoration or the support of the vigour of general health, which we might suppose to be needed in order to stay the progress of the chronic local disease.

It would be well if accurate investigation were made to determine whether, independently of the diseased condition resulting from the accumulated influence of continued spirit-drinking, there is not even on each occasion of the free use of alcohol such a departure from the natural state of the system as to constitute it for the time a condition capable of interfering with the reparative process of a local disease.

Left Hip-Joint injured by Fall—Pain recurring with Illness or Fatigue—Free use of Limb.

Case 24.—Richard Evans, æt. 20, a student of medicine in this school, short in stature, strongly made, usually in good health, met with this accident. On the occasion of a visit to a friend in a ship at the London Docks, when descending a ladder to the hold of the vessel, he fell from a height of about sixteen feet, pitching violently on his left foot, then falling on his side. At the moment of the accident no pain was felt, but on his attempting to rise there was loss of power in the whole limb. While coming in a 'cab' from the East of London to his lodgings in this neighbourhood he felt severe pain in the hip-joint.

On examination soon after I found that there was nothing unnatural in the position, the shape, or the length of the limb. Movement of the hip-joint was effected without difficulty. There was some pain, which was said to be internal to the great trochanter. It gradually subsided. Relief was obtained by the application of a few leeches and hot fomentations with continuous rest. At the end of a week, however, from the time of the injury, the patient continuing the while in bed, violent spasms of the thigh and the leg came on in paroxysms, at intervals during two days. At the same time there was entire loss of power in the limb, and every movement gave pain. 'The pain was felt at the inner side of the great trochanter behind. There was, the patient said, a feeling as if the muscles were being torn.' A long splint was applied.

In the fifth week from the accident Evans went about on crutches. He was, however, able to bear his weight on the injured limb. Some pain still recurring at intervals with want of ability to move the limb freely, a strong solution

of iodine was applied in small patches. That seemed to expedite the recovery.

Six months afterwards R. E. says, 'The only evil now remaining from the accident is a limping gait, the result of shortening of the limb to the extent of about an inch.'

Two years afterwards this is the note: R. E. suffers ordinarily no inconvenience. There is no pain at night; no pain on pressure being made on the hip or on the sole of the foot. Neither is pain occasioned by any movements as in free abduction of the limb, nor when the great trochanter is firmly pressed inwards. A degree of uneasiness is produced when firm pressure is made between the trochanter and the joint behind. At changes of weather there is some uneasiness. He then feels 'that he has a hip.' Lately there has been, and this morning there is some discomfort. This is assigned to the fact 'that he has been working for the last two months all day preparing for his examination. When he rises from the sitting posture he occasionally perceives a kind of crack in the hip-joint.' The limb is perhaps a degree shorter than at the last examination, and the bone is thickened about the trochanter. Nevertheless, the deviation from the natural gait is so slight that it would escape observation unless looked for.

Two years later, after Evans had entered the Navy as surgeon, news of him reached me through one of his brother officers. He was on the West Coast of Africa; and to my inquiry as to an appearance of lameness, the gentleman alluded to answered that 'he had never observed or heard of any.'

Returned from the coast of Africa, where he had been in most malarious districts during two years and a half, Evans was in good health and had not been lame during the time. I should mention that he took special precautions for the preservation of the health of all on board his ship. Thus, being in a very malarious country, especially near or above the mouths of some rivers, and aware of the peril

both to crew and surgeon, in order, if possible, to hinder the disease, he gave every morning to each man while in his berth a full dose of quinine. The result was wholly successful. No life was lost, no man had real illness during the whole time. Of the service thus rendered, the surgeon received an acknowledgment from his superiors at home.

The report of his condition at that time by R. E. was, that when tired or depressed he felt fatigue and discomfort in the hip more than elsewhere. Otherwise he is wholly free from inconvenience. He walks very actively, both feet going accurately in the same direction. That there is, however, a peculiarity recognisable by the sound of the footsteps is shown by an anecdote he has mentioned. It has happened to him repeatedly while walking on the deck of his ship to receive a message from the captain when desiring to rest, in these words, 'Tell the doctor not to walk over the cabin.' Examination of the limb gives now this result: In the injured limb a shortening of one inch; a slight diminution of muscular development; some thickening of the trochanter, appreciable when the trochanter of each side is grasped at the same time. There has been no appreciable physical change for a long time, no defect in the power of the limb.

That was the report on the last occasion that the young surgeon called on me. On making inquiry several years later of his brother—a doctor of medicine in private practice—I learnt that the naval surgeon died of an attack of illness while on duty in the Gulf of Mexico.

I would now recall some leading facts of the cases which have been cited in detail, with a view to their application to practical uses.

The Morbid Changes in the joint involve the bones that constitute it, namely, the femur, its head and neck, and the acetabulum of the pelvic bone. These changes may be indicated by comparison with the bones in their natural state. The head of the femur, as pointed out in individual cases, is altered to a variable extent—expanded and in a

measure flattened; the neck much shortened as if thrust down. The interior, the cancellated structure, is altered from its natural arrangement in different degrees according, probably, to the duration of the disease.

In the natural, architectural—pre-architectural arrangement of the cancellated structure, angular arches are seen resting on the solid wall of the bone all around, and upraised to support the bone above. (Plate X.) To preserve the arrangement of the whole structure, the angular arches are seen in the shaft and are recognised also in the neck supporting the head of the bone. Contrast with that the compressed beams within the bone, changed by the morbid process of a chronic disease. (Plates XII. and XIII.) The acetabulum has necessarily undergone a corresponding alteration—has become an outspread shallow cavity fitting the shape of the opposed articular surface of the thigh bone. (Plate XIII.) Compare with that the healthy joint in Plate IX.

There is not apparent in the chronic disease any of the alterations that result from the acute inflammation previously noticed. The inflamed synovial membrane and its effects are not manifest. The interosseous ligament, which in the examples of the acute form of disease we have seen much altered and swollen by vascularity, has, in examples of the chronic change, wholly disappeared (Plate XI.); or is, it may be, but little altered (Plate XIII.). Though the latter is, in my observation, a rare condition.

Associated with that morbid condition of the bones, the muscles around are also altered, their size diminished in a less or greater degree—it may be, and as in an extreme case attended with extensive disease of a vital organ—pale and flabby, greatly atrophied. (Case 22.) The thigh, therefore, is lessened in circumference. Such are the physical changes of chronic disease of the hip-joint.

It should, however, be noted, that our facts are derived from examples of long-existing disease. The condition of

the parts at the earliest stage—soon after the injury—we have not had an opportunity to observe after death. We can only suppose that they would show something of the change that is exhibited after a long duration of disease.

Cause of the Disease.—An injury—a fall on the side in which the hip is involved—is recorded in the history of each of the cases cited. In the accident the end of the femur, from the great trochanter upwards, and the acetabulum of the pelvic bone opposed to that end of the thigh bone, are forced together by the impulse of the fall; and so both undergoing concussion are in some degree injured.

Indications of the Injury.—The diagnosis of the nature of the changes of the injured bones, which precede the chronic disease, would be the absence of indications of fracture or dislocation. In other words, the fact that the bones are found by examination to be unchanged as to form and position. The movement also is natural; but it may give rise to pain; and pain may be occasioned by pressure on the foot upwards; on the trochanter inwards, or behind it. Pain may be said to be a constant accompaniment of the disease. It occurs with every illness affecting the general system, even with the slightest ailment. When at all unwell the sufferer feels the local inconvenience. He then, as he perhaps says, ‘knows he has a hip; and when he feels tired, the hip is most tired.’ When unwell he is unable to move about by reason of pain in that hip. It would seem, as was noted in another form of disease on the same part, that the whole system being affected by any general illness, the part which has already undergone a morbid change suffers most markedly.

‘Limping’ occurs in progression. It is occasioned at first by increased sensibility of the joint; and afterwards, when sensibility ceases, by an unevenness of the limbs, the result of shortening of the thigh bone on the injured side.

The Treatment will vary with the circumstances of the case. Rest is the general—the indispensable remedy. Absolute immobility, if needed, with strict attention to the general health may be added. Pain may require a degree of traction, as by means of a long splint and elastic bands.

Lastly, I would add, if occasion should serve for an examination *post mortem*, it would be well that the state of the blood-vessels which supply the wasted muscular structure as well as the altered bone should be investigated. I apprehend, however, that though such an investigation would add to our knowledge of the extent and the limits of the morbid changes effected by the disease, the results obtained would not lead to any further relief of the suffering and the inconvenience in progression.

Results of Rheumatic Gout—Removal of Head and Neck of Femur on both sides—Formation of new Bone in connection with Synovial Membrane and within the Muscles.

Case 25.—John Adams, æt. 57, a master baker, whom I saw with his physician, Dr. Beck, was suffering from inability to walk or even to stand for more than a very brief period at a time.

Previous History.—Between five and six years before I first saw him, the man states that he had what he calls ‘erysipelas’ over the right thigh and hip without any previous accident or injury, and without accompanying or preceding pain. The surface of the affected parts was then red and swollen. It was treated by hot-water fomentation. He remained in bed at that time for three months in consequence of weakness of the lower limbs. Before the attack of ‘erysipelas’ he had often complained at night of the thighs being swollen; and although not then lame, he could not walk any moderate distance without distress in

consequence of 'feeling weak in his limbs and afterwards being very tired.'

So far from being improved in any degree as to his power of locomotion after that prolonged rest, he was less able to move than before. During that time the right limb had become shortened, and then and afterwards swelling with a feeling of tightness of the thigh was complained of. He walked with a stick, a thick solid shoe being on the right foot. But he constantly felt as if there was no strength in the limb; and as if it would give way during the effort of progression.

For about two years Adams continued in nearly the same condition; but, at the end of that time, the other hip went through a similar set of changes. Being now unable to stand, he used to work at bread-making in the sitting posture; as time went on, he became less and less able to move from his chair, for his hips gave way whenever he attempted to stand.

The general health the while was said to be pretty good, except that severe 'bilious attacks' occurred about every three months. Each such attack required that he should remain in bed a fortnight. He 'vomited sheer bile.' At these times nothing was taken into the stomach but 'a little drink and his medicine.' In every seizure of sickness he became very weak. From weakness and inability to move about, the man was obliged to give up his occupation.

Some circumstances in the domestic history of this person are not perhaps immaterial: He was twice married. With his first wife he had six children, who were all dead when he gave this account of himself. Since the second marriage—a period of twenty years—he has wholly wanted sexual power. During that part of his life (the last twenty years) he has been, as he states, abstemious as regards the use of stimulants, not using more than a pint and a half of beer daily, and that with his meals. Before that time—

twenty-five years ago, being then in the habit of attending at fairs to sell sweetmeats—he is said by his wife to have been ‘fond of company,’ implying free use of intoxicating drink. Such was the previous history.

Examination of the Patient.—The appearance of the man is unusual. His figure is short, thick-set, and fat; the expression of his countenance dull and pasty, seemingly œdematous without œdema; lips pale; tongue ‘salt-beef-like.’ His appearance was altogether unhealthy. Nevertheless he ‘felt pretty well. Appetite not amiss. Bowels acted regularly.’

When the man stood up there was a curious deformity about the lower limbs. The weight of the body being borne on either limb it became unnaturally shortened; the upper part of the thigh being at the same time thickened, and a prominence projected on the back of the pelvis. It was formed by the great trochanter. This part of the femur being then much above its natural position, a singular depression was formed upon the sacrum, the muscles being made to project at each side, as two lumps, by the displaced thigh bones.

As the patient walked, with assistance, into my room, each lower limb, while being advanced, seemed natural. Then suddenly as the body sank upon it, each in its turn was shortened; a soft rubbing or crushing sound being at the same time heard. The patient lying on a couch, the same alternate shortening and lengthening of the limbs occurred while they were pushed towards the pelvis or drawn from it.

For three years after the second hip had become altered and after employment in his trade had been given up, Adams continued in moderately good health, complaining, however, at times of distension of the belly after food had been taken; and requiring aperient medicine occasionally. He grew stouter and was less and less able to maintain the erect position even while he arranged his dress. At the same

time a feeling of tightness and numbness of the thighs troubled him.

Six months before death violent sickness suddenly came on. This was said to be different from the bilious vomiting of an earlier period. There was in those later attacks much pain across the epigastrium with flatulency and frequent vomiting without effort—'spewing' up fluid coloured with bile. Cold shivering occurred often. The skin cool; the tongue large and furred; the bowels acted freely; the evacuations were of dark colour and offensive in smell. Urine was scanty, dark red, and also offensive. In the last month of life the hands became swollen and painful—not reddened; and a numbness of the thighs was complained of. The intellect, meanwhile, was unimpaired; sleep was said to be sound; pain was felt only in the epigastrium. Nevertheless, the man expressed himself conscious that life was drawing to its close. Near the end the stomach cast up a dark fluid of a peculiarly offensive odour. During five last days of life no urine was passed; during four days no food, not even drink, was taken. Death occurred more than eight years after the beginning of disease in the thigh. It may be well to mention a fact or two of surrounding circumstances, which in an ordinary case would not be material. The weather was cold and dry (in January), but the rooms are noted as warm from the contiguity of a baker's oven. It was in those rooms, in such temperature, that Adams lived for many years, before and during the arthritic disease.

Examination of the Body by Dr. Beck.—Cadaveric rigidity moderate in both limbs; little discolouration on back part of body. Much fat generally; in abdominal wall, omentum, and mesentery especially. Intestines distended with flatus. The stomach small; contained a coffee-coloured fluid of peculiar and offensive smell. Its mucous membrane looked thick and velvety in parts, and was mottled with hæmorrhagic spots the size of the end of a finger. Liver of small

size, and cells under microscope smaller than natural. Kidneys: the tubes of medullary part void of epithelium, and some contained much granular matter. In the cortical part were yellowish streaks which were found to consist of slender needles of crystalline matter. The heart was small, pale, somewhat fatty, and very flabby; its muscular substance easily torn; its structure not well marked. The lungs, spleen, gall-bladder, and other viscera, offered nothing requiring a note.

The Hip-Joints and the Structures around.—The capsules of both joints were loose and at the upper part thickened. When divided the inner side of each was found to be studded to a large extent with villous projections varying from the size of a slender pencil to that of a finger; some were arborescent. For the most part these villi were pliant and tough, consisting of an investing structure continuous with the synovial membrane and, under that, connective tissue of different densities from soft cellular to fibrous (Plate XV.), while bone was found in not a few. The bone of these villous bodies appears as deposits in their interior, or as a considerable mass appended to the end of a foot-stalk of some length, or closely bound to the periosteum by a short membranous connection. The more completely ossified mass is doubtless the older and more advanced in growth. (Plate XIV.)

The bones about the joints are much changed. Both thigh bones want wholly the head and the neck. From the outer side of the femur on the left side a large outgrowth projects at the base of the trochanter. It lies parallel with the shaft, which it nearly equals in thickness. This growth seems to have begun in ossification of the tendons of the vastus externus muscle; the surface is marked as by the fibres of that muscle. The acetabulum is smooth, and there is no trace of the fossa at the inner side. Parts of the pelvic bone are thickened—viz. on each side the anterior

inferior spine of the ilium, the spine and tuberosity of the ischium.

Osseous deposits exist around the joint outside the capsule, and in the fibrous structure of the muscles in the psoas-iliacus on each side, and in the tendon of the pectineus. A thick growth extends transversely on the left side between the slender ossified portion of the psoas-iliacus and that of the vastus below the joints.

The details of the case have been told at greater length than usual because of the peculiarities it presented, and the conclusion to which the facts seemed to lead. We have observed in preceding cases how much the local disease of the hip-joint—in those cases the primary disease—was influenced by the general ailments of the system. But this man's whole system was in an unhealthy condition. 'His face pale, pasty, seemingly œdematous without œdema; lips pale, tongue salt-beef-like; urine insufficient and disordered; the thighs, at times, swollen and red.' Here the disease of the hip-joint must be taken to have resulted from the primary disease of the system.

In the morbid condition of the system which has been indicated, the weight-bearing thigh bones, which at the angular and inclined part yielded, became broken and carious, while the shafts of the bones, being nearly vertical in direction, remained entire like other bones of the same limbs.

While the destruction of the large bone was in progress there occurred, within the joint and around it, deposits of osseous matter—those newly formed seemingly errant pieces. These may be supposed to have been produced from unwonted action of the blood-vessels, resulting, it may be, from friction within the joint, and from the straining action of muscles around. The resistance to the pressure of the weight from above being less and less efficiently supported as the destruction of the natural support went on.

*DISLOCATION OF THE HEAD OF FEMUR
BACKWARDS.*

I PROPOSE to place first an essay published some years ago,¹ and then to illustrate the subject further with the lecture on cases.

Opportunities of ascertaining, by dissection, the exact position of the bones and the condition of the surrounding soft parts in cases of dislocation, especially those of recent occurrence, are so infrequent, that every example of the injury examined under such circumstances becomes a study of value to the practical surgeon. It is on this account that I venture to bring under the notice of the Society a case of dislocation of the femur, at the hip-joint, which I dissected soon after the accident by which the bone was displaced. No attempt had been made to restore the bone to its natural position.

Case 26.—Maurice Coghlan, æt. 60, a stout man, employed as a bricklayer's labourer, while bearing a loaded basket in his hand up a ladder, when he had ascended about thirty feet, was observed by one of his fellow-workmen to drop the burden, and then instantly to fall to the flagged court on which the ladder rested. He was taken up lifeless, and his body was brought to University College Hospital, June 11, 1845.

The cause of death was found to be an injury of the head. The skull was largely fractured over the right parietal eminence; and the fracture extended completely

¹ 'The History of a Case of Dislocation of the Femur Backwards, with some Observations on that Form of Dislocation,' *Medico-Chirurgical Trans.* vol. xxxi. 1848.

across the base of the cranium, through the body of the sphenoid bone and the petrous part of the temporal bone on each side, rupturing both the internal carotid arteries at the cavernous sinuses. In the base of the skull the pieces of the broken bone were widely separated. Something very unusual having been observed in one of the lower limbs, I made a careful examination of its condition, assisted by Mr. J. T. Griffiths, previously my intelligent house surgeon. The result was as follows :

The Injured Limb.—As the body lay on the back, the right lower limb was a good deal deformed. It appeared considerably shorter than its fellow, the knee being from two to three inches higher than natural. But notwithstanding the apparent shortening of one of them, only a slight difference was detected between both limbs upon measurement of the distance between the respective upper spines of the iliac bones and the lower margins of the external malleoli. The injured limb was, however, a little the shorter. It was likewise inverted in its whole length, the patella being inclined inwards, and the foot resting on its inner side upon the table which supported the body. The whole limb was further back than the sound one, and at a distance from it. The great trochanter of the femur, which was readily distinguished, was altered in its position with respect to the iliac spine ; and the depression or flatness that naturally exists behind that prominence was wanting. Towards the back part of the pelvis was found the head of the femur ; but it was far from being so easily detected as the trochanter. The movement of the limb forwards (flexion) was easily effected ; its rotation outwards was impracticable. It should be added that, at the time the body was examined, there was no cadaveric rigidity. The preceding statement of the external appearances is illustrated in a cast (exhibited to the Society when the paper was read), which includes the lower part of the trunk and both the thighs.

Dissection:—The Bones.—The gluteus maximus being removed, the head of the femur was in view. (Plate XVI.) It lay, with a moderate quantity of blood around it, below the pyriform muscle immediately behind the acetabulum—over the base of the ischiatic spine, and opposite to a part of each of the two sacro-sciatic foramina. From the pelvic bone it was separated by the obturator internus and the gemelli muscles. The crista of the ilium was broken off, and the bone was likewise broken through its dorsum for the length of three or four inches, the fracture extending backwards into the great sciatic notch; but the edges of this fracture were separated by only a narrow space, and there was no displacement and no looseness of the parts. Some blood was extravasated in the immediate neighbourhood of the fracture.

The Muscles.—The gluteus maximus was uninjured. The gluteus medius was found in a state of relaxation at its back part, and some of the deeper fibres of this muscle, being connected with the ilium over the fracture above noticed, were torn. As regards the other muscles, the pyriformis (which it has been already stated lay immediately above the head of the femur) was slightly stretched; it might be said to have been held from falling loose rather than stretched; but the gemelli with the obturator internus were in a state of extreme tension. The last-named muscles, with the capsular ligament of the hip-joint on which they rested, separated the head and neck of the femur from the acetabulum, and from the surface of the innominate bone behind that cavity. The only muscles which sustained much injury from the dislocation were the obturator externus and the quadratus femoris. Both were torn quite across.

The Joint.—The capsular ligament was torn at the internal and lower part of the joint, or, rather, was there separated from the neck of the femur; while the posterior and the upper parts of the same structure were entire.

Ligamentum teres was torn out of the depression on the head of the femur. The edge of the acetabulum was broken off at its upper part, but only to a small extent; otherwise the articular cavity was uninjured.

Over the neck of the femur was stretched the *great sciatic nerve*, which had come into contact with the bone in the interval between the fragments of the quadratus muscle. Between the nerve and the bone was interposed the broken tendon of the obturator externus. Most of the facts brought to light by the dissection are represented in the accompanying drawing, for which I am indebted to the pencil of my friend, Mr. Noah Brangwin. (Plate XVI.)

A comparison of the foregoing details with the generally received account of the dislocation will show several points of difference between them; at the same time that a full examination of the facts, at present ascertained, will lead us to correct some of the opinions which are commonly entertained respecting the nature and proper management of the displacement. The further observations will be arranged under the following three heads:

1. The condition of the structures immediately concerned in the dislocation, and especially the exact position of the head of the femur;
2. The characteristic signs of the displacement;
- and 3. The course to be pursued in order to restore the bone to its natural position.

1. Of the cases in which the results of *post-mortem* examination of the parts have been recorded, the first that requires notice is described in the work of Sir A. Cooper, where the dislocation of the head of the femur, backwards, or into the sciatic notch, is treated of;¹ the second dissection is reported by Dr. Scott;² and the third, conducted by M. Billard in the presence of Professor Bécclard, has been

¹ *A Treatise on Dislocations, and on Fractures of the Joints.* By Sir A. Cooper, Bart. 4th ed. p. 68, and Plate IV.

² 'Case of Dislocation of the Hip-Joint, and the Manner of its Reduction and the Appearances on Dissection.' By James Scott, M.D., in the *Dublin Hospital Reports*, vol. iii. 1822.

published by the former.¹ This short list shows the materials for arriving at a satisfactory conclusion respecting the first of the subjects of inquiry above proposed to be scanty. But they require on this account the more careful examination, in order to interpret them aright ; and such an examination will, I believe, lead to a more correct determination of the nature of the displacement than that which is usually received. Before we enter into particulars, a few remarks are necessary concerning the respective value of the cases above referred to for the purpose here in view.

Sir A. Cooper's dissection was made at a remote period from the occurrence of the displacement, the person having survived it 'many years,' according to the statement of the eminent observer himself. The structures about the joint had therefore undergone much change, and all the more because of the effect which the weight borne on the limbs must have produced. There is, moreover, no account of the person from whose body the joint was removed ; neither is there any statement of the appearances, or of the length of the limb. For these reasons the case in question, unless supported by others not liable to the same objections, cannot be regarded as illustrative of the alteration of structure which accompanies the dislocation. With respect to Dr. Scott's case, the reduction of the displacement having been effected before death, the amount of damage sustained by the parts around the joint in consequence of the accident cannot be very clearly separated from that which might have resulted from the efforts to restore the femur to the acetabulum. Still, this case is valuable in so far as it corroborates the evidence afforded by others. To the objections made in the preceding remarks, the cases observed by Billard and myself are not liable. They were examined immediately after the accident, and without any attempt having been made to remove the head of the femur from its accidental position.

¹ 'Luxation du Fémur en Arrière et en Bas : *Archives Générales de Médecine*, tom. iii. p. 538. Paris, 1823.

From the cases, I now turn to an examination of the leading facts they exhibit.

The *Head of the Femur* is stated by Sir A. Cooper to be lodged on the pyriform muscle, at the edge of the sciatic notch; and it is spoken of as 'buried in the notch.' Dr. Scott found the same part of the thigh bone below the pyriformis, where the nerve passes beneath that muscle, or rather found evidence of its having been so placed; and it occupied the same position in Billard's case and mine—that is to say, the head of the femur in these instances was immediately behind the acetabulum, and opposite the interval between the two sacro-sciatic foramina.¹ Here, then, is a material difference, the statement of Sir A. Cooper placing the bone considerably higher than it was found in the other cases; and it is important to decide which of the positions indicated is the more accurate.

Experiments on the Dead Body.—With a view to elucidate the point, I performed some experiments on the dead body. After removing the gluteus maximus, and dividing the quadratus femoris and the obturator externus, as well as the inner and lower part of the capsular ligament with the ligamentum teres, I reproduced in several instances the dislocation, as it is represented in the drawing; and I then found that the length of the limb, as compared with its length before the head of the femur had been displaced, was diminished by seven-eighths of an inch. Slight variations of length were noticed in different bodies, and even on the

¹ Mr. Wormald has published an account, accompanied with a drawing, of an interesting case of dislocation backwards and 'downwards,' which I have not taken into account in these observations, in consequence of the head of the femur having been lower than the position assigned in this paper to the common form of the dislocation backwards. The head of the femur in Mr. Wormald's case was 'on the ischium, opposite to the lesser ischiatic notch and the upper part of the tuberosity.' The difference is so small between this and the cases adverted to in the text, that it might well be considered a modification of the dislocation backwards. See a paper entitled, 'Cases of Dislocation of the Head of the Femur' (Case I.), by Thomas Wormald, Esq., in the *Medical Gazette*, vol. xix. p. 657. London, 1837. And *A Descriptive Catalogue of the Anatomical Museum of St. Bartholomew's Hospital*, vol. i. p. 128. London, 1846. The preparation is preserved in the Museum.

opposite sides of the same body, owing probably to the varying degrees in which the capsular ligament happened to be divided at its lower part.¹ In the experiments I found likewise that, in order that the head of the femur should reach the sciatic notch, it was necessary to divide the posterior part of the capsular ligament together with the muscles covering it there, namely, the obturator internus and the gemelli (the obturator externus and quadratus were previously cut across); and when the head of the femur was in that position, *i.e.* lodged on the pyriformis and at the edge of the sciatic notch, the limb was diminished in length by upwards of two inches. Now the statements of all observers agree in this, *viz.* that the shortening of the limb which attends the dislocation backwards (to the sciatic notch, as it is usually called), is less than an inch—‘from half an inch to an inch, . . . but generally not more than half an inch,’ according to Sir A. Cooper. But this alteration of the length is exactly what is found when the head of the femur is lodged behind the acetabulum, in the position noticed in Billard’s case and mine, probably also in Dr. Scott’s; while, on the contrary, it differs materially from that which would accompany the displacement of the bone into the place assigned to it in the work on ‘Dislocations and Fractures of the Joints.’

Proceeding now to the condition of the other structures immediately concerned in the dislocation.

The *Muscles* most affected are those named the external rotators of the femur. Some variety was observed in the state of these muscles in the different cases, as the following plan will show:

¹ It is often difficult, in consequence of some peculiarity in the construction of the bones, or the manner in which they are covered with the soft parts, to mark the spines of the iliac bones with such accuracy as to determine small degrees of difference between the limbs. When assistance is at hand, I have found it best to mark the pelvic prominences with the forefingers of both my hands at the same time, while an assistant measures from these to the lower edges of the internal malleoli. But in the experiments on the dead body, after dividing the integuments over the bones, I fixed on each side a nail into the spine of the iliac bone, and another into the edge of the malleolus. The space between these points was then measured before and after the dislocation was effected.

	Scott	Billard	Quain
Pyriformis and obturator internus .	Entire	Entire	Entire
Gemelli	Ruptured	Ruptured	Entire
Obturator externus	Not stated	Entire	Ruptured
Quadratus femoris	Ruptured	Entire	Ruptured

From the circumstance of the femur being moved backwards in the dislocation, the psoas, iliacus, and pectineus muscles are perhaps necessarily in a state of tension. They are stated to have been found so by Billard. For the same reason the back parts of the two smaller gluteal muscles are in a state of relaxation.

The *Capsular Ligament* was torn at nearly the same part in Dr. Scott's case and mine—at the inner and upper part in the former, the inner and lower part in the latter. The condition of the structure is not mentioned by Billard, but, considering that the obturator internus was uninjured, it is reasonable to conclude that in this instance, as in the others, the capsule was entire at its back part. The ligamentum teres was necessarily torn in all the cases.

Looking to the state of the capsular ligament in this dislocation, it seems to me that the head of the femur leaves the acetabulum at the inner and lower part of the cavity, and turns from below, backwards and upwards, to reach the position which appears to belong to the dislocation. Moreover, the place at which the bone rests is materially influenced by the condition of the capsule; for, if the posterior part of this structure should not be torn through, the femur will not reach the sciatic notch; and the small muscles about the joint—obturatores, gemelli, and quadratus—have the same effect.¹ (See *ante*, the Experiments on the Dead Body.)

Sciatic Nerve.—The connection of the great sciatic nerve with the dislocation is not devoid of interest. It was found to turn over the neck of the femur, coming into contact

¹ 'In a case of dislocation recorded by Mr. Todd, the head of the femur being lodged over the back part of the gluteus medius, all the small muscles, viz. "the pyriformis, gemini, obturatores, and quadratus," were completely torn across.'—*Dublin Hospital Reports*, vol. iii. p. 395.

with the bone between the ends of the ruptured quadratus muscle, in the case of Coghlan detailed at the head of this paper (see the drawing); and it is highly probable that in Billard's case, though no mention is made of the fact, the nerve was likewise behind the same part of the femur; for the quadratus muscle, unbroken, occupied this position with reference to the bone; and in the natural state of parts the nerve is behind that muscle.

A circumstance observed in the treatment of a case of this form of dislocation may be here noticed, because it seems explicable only by reference to the position of the nerve. The patient (Horan, whose case will be afterwards detailed) stated that he suffered, and he appeared to suffer, much pain when his limb was moved, and even when it lay stationary on his bed; so much so, indeed, that taking the suffering he complained of in connection with his inability to evacuate his urine before the dislocation was reduced, I feared that he had sustained some injury of the trunk or of organs within the abdomen. But when the traction of the limb was begun, the countenance of this patient lost the expression of anguish it previously bore, and on being questioned he said that the pain was relieved by the pulling. It seemed to me that the relief experienced by this person might be explained by supposing the femur and the weight of the limb to be withdrawn from the sciatic nerve, the relative position of both structures (the bone and nerve) being the same as in the cases above referred to.

In Dr. Scott's case, however, the nerve is said to have been in front of the little cavity in which the head of the femur had been temporarily lodged; and it is also stated that, before the bone was replaced, 'every attempt at rotation outwardly caused extreme pain in the groin, at the hip, and in the course of the sciatic nerve.' These facts, especially the latter, would lead to the conclusion that, in this instance, the nerve had been most probably between the head of the femur and the pelvic bone. In the same

situation was it found by Mr. Wormald, in a case before alluded to.

The great nerve then, it is manifest, is always close to the neck or to the head of the femur in the dislocation backwards; but it may be either over or under [behind or in front of] the bone.

So far respecting the anatomical history of the parts immediately concerned:

2. *The Signs of the Dislocation* are next to be considered. Into this subject some inquiry becomes necessary, in consequence of a few points of difference between the external appearances of the limb, as observed in the case of Coghlan, and the generally received account of those that characterise the displacement. The peculiar extent of the shortening of the limb; its inversion; the direction of the femur; the situation of the two great prominences at the upper end of that bone, viz. the trochanter and the head, together with the fulness behind the former prominence—these indications are the same in all the cases. The points of difference have reference to the direction of the dislocated limb and the position of the foot.

‘The knee,’ says Sir A. Cooper, ‘is not so much advanced as in the dislocation upwards, but is still brought a little more forwards than the other; . . . the toe rests against the ball of the great toe of the other foot.’ According to Dr. Scott’s report of the case he had observed, ‘the thigh lay very awkwardly upon the other;’ and when the patient was ‘lifted out of bed and placed erect, the limb retained the position above described; the toes . . . lay above the opposite instep.’ The dislocated thigh is described by Billard to be slightly inclined towards the trunk, and the position of the limb such, that, to use his own words, ‘le genou droit chevauche sur le genou gauche.’ The foot is not mentioned by this observer; but it might be inferred from the direction of the thigh, which, in a great measure, determines the position of the lower part of the limb, that the

foot must have been placed somewhat as it is said to be in the preceding extracts. In the case of Coghlan, however, the dislocated thigh, instead of being inclined towards the trunk, or in advance of the sound limb, was actually farther back than it; and the foot of the same side, though directed towards the opposite foot, as a part of the general inversion of the limb was at some distance from it. The question therefore arises—Is that case to be considered altogether exceptional in these respects? To assist in the reply to this question, I will refer to a case which occurred in my practice at the hospital.

Case 27.—John Horan, æt. 47, a middle-sized and rather muscular man, was admitted April 3, 1847. He stated that, being engaged in driving a large empty brick-cart, and standing on one of the shafts, a wheel having suddenly struck against a post, he was jerked forwards on his belly upon the horse, and then slipped to the ground head foremost. While he lay prone on the road, one of the wheels of the cart passed over his loins and the back of his right thigh to the outer side of the knee, the course it took being marked by ecchymosis and slight excoriation. He is not able to give any more detailed account of the position of the limb when the wheel struck him.

When placed upon his bed, Horan lay on his back, but inclined to the sound side. The right lower limb was inverted, the inner side of the leg and foot being flat on the bed at the distance of some inches from the left limb, towards which the patella and the toes were directed. The length of the dislocated limb was about an inch less than that of the uninjured one. The outline of the femur being followed upwards with the eye, which was easily done, the bone appeared to be behind its natural position; and the trochanter seemed to be separated by more than the usual distance from the spine of the ilium. The head of the femur was obscurely felt at first, but it became more distinct by slight rotation of the limb inwards. It was situated behind

the trochanter and lower than that process, far back upon the pelvis, close to the upper end of the fold of the nates. Doubtless from this change in the position of the femur the thigh was altered in shape, the alteration consisting in an augmentation of its depth from before backwards, and apparently a decrease of breadth. When the affected limb was raised and placed in contact with the sound one the patient complained of pain, as indeed he did whenever it was moved; and the new position seemed to cause so much suffering that the leg was again laid upon the bed, resting on its inner side.

The patient being then raised from bed and supported in the erect position, the displaced limb was observed to hang still at some distance from its fellow,¹ and farther back than it—certainly not in advance of it. The toes rested on the ground. While he was in the same position I moved the foot inwards, and made the toes to rest on the other foot; but this movement, and the retention of the foot in the new position, were attended with an increase of pain.

The man was at first in a half-fainting condition, and micturition being difficult, a catheter was passed. He complained of much pain, and fearing that the pain would be made worse when reduction of the dislocation was being effected, he asked that means might then be taken to hinder pain. His desire was not complied with, as it was thought best that the patient should be watched while in a state of consciousness on account of the apparent severity of the injury.

To the statement of the signs of the displacement may be added some evidence as to its nature of a different kind. During the efforts to restore the femur to the acetabulum the patient experienced decided relief from pain, which

¹ I observed in another case of the same dislocation, which occurred in a young boy, that the leg on the injured side hung in the same manner away from its fellow, when the little patient was raised from bed; but when he lay down, the flexed position of the limb in close contact with the sound one was most agreeable to him.

before that was constant. Of this fact mention has been already made, and its probable cause has been adverted to in the observations on the sciatic nerve. Subsequently, also, to the reduction of the dislocation (on the day after), I found that on manipulating the dorsum of the ilium, no uneasiness was felt by the patient; but he complained of pain when moderate pressure was made at the back part of the pelvis, in the depression behind the great trochanter of the femur; and the pain was greatest behind the top of that prominence. The various facts now detailed leave on my mind no doubt that this was an example of dislocation backwards, as that dislocation has been described in the preceding part of this paper. And since, in this case, as well as in that of Coghlan, while unerring signs of the nature of the displacement were present, others usually stated to be characteristic of it, namely, the advanced position of the thigh and the lodgment of the foot upon the opposite one, were altogether wanting; it must be concluded that though these signs, when present, have their value in the diagnosis, their absence is by no means to be considered a proof of the non-existence of the dislocation they are taken to indicate. A few words may be added respecting the patient.

Report on the following day.—The man slept well. In two days, on account of pain and tenderness to pressure in the renal region, ‘cupping’ was resorted to with much relief. The day after the patient walked to a room at the end of the ward without permission, but without inconvenience. A week after the accident he left the hospital by his own desire.

3. *Reduction of the Dislocation.*—Sir A. Cooper, in the rules he lays down respecting the means of effecting this object, states that, when the extending force is to be applied, ‘the thigh is to be brought across the middle of the other thigh.’ Acting on this rule, I began the extension in the direction here laid down in two cases—that of Horan and that of a little boy, whose limb had been dislocated about

sixteen hours; but, in consequence of circumstances to be presently noticed, I soon changed the direction so as to bring the thigh forward to a right angle with the trunk. After this alteration the head of the bone, in each of the two cases, speedily returned to the acetabulum. The circumstances by which I was led to place the limb in the position just indicated were these: While making the experiments on the dead body, which have been before alluded to, I observed, that as the thigh was bent towards the abdomen, the head of the femur was brought nearer to the lower part of the acetabulum, where the capsular ligament was divided. To this it should be added, that in the bent position several muscles must be in a state of diminished tension; viz. the psoas, iliacus, and pectineus, with, to a certain extent, the pyriformis, and the other so-named external rotators of the thigh. Be this, however, as it may, this important point remains, namely, that the restoration of the femur to the acetabulum was effected the more easily in proportion as the thigh was approximated to the abdomen.¹

It is likewise advantageous that, while the traction is being made, the thigh should be in a state of abduction, so that the head of the femur shall be drawn in a degree away from the side of the pelvis. With the view of effecting this object the pulleys were, in each of the two cases of dislocation before mentioned, fixed at a point higher than the patient's body, which was laid in the usual position for the reduction of the dislocation, viz. on the sound side. I was led to adopt this plan by observing the facility it gave me in reducing the dislocation on the dead body.

Sir A. Cooper, it will be remembered, advises that the

¹ After extension, or rather traction, has been carried to a certain degree, besides its abduction, rotation of the limb outwards is required, on the dead body, in order to turn the head of the femur in the opposite direction towards the inner side of the acetabulum; but in the living person a 'spontaneous evolution' of the limb is, as it is generally known, effected through the agency of the muscles, and by means of this the femur is wheeled into its place.

upper part of the thigh should be drawn away from the side of the pelvis while the extension is carried on. 'Whilst this (the extension with pulleys) is in progress, an assistant pulls the napkin (previously adjusted beneath the limb) at the upper part of the thigh with one hand, rests the other upon the brim of the pelvis, and thus lifts the bone, as it is drawn towards the acetabulum, over its hip.' My own observation has led me to the conclusion that the object to be obtained in this part of the operation is, not only to prevent the head of the femur from being drawn against or along the pelvic bone, but also to give space or opportunity for that rotation of the thigh bone, by which its head is turned forward beneath the trochanter to its natural situation. For this purpose I have, in several experiments, found the abduction of the thigh, as above suggested, the most effectual means: but there is no reason why the plan of Sir A. Cooper should not be used at the same time: and the combination of the two expedients might perhaps be resorted to with advantage in some difficult cases.

It will not be irrelevant to mention, in concluding this part of the subject, that the plan of fixing the pulleys to the thigh above the knee which is commonly practised, but without, I believe, any other reason for its adoption than that of convenience, is important on other grounds in reducing the dislocation backwards. The reason is this: when the knee is straight the great sciatic nerve is stretched; but when the joint is bent, the nerve is in the opposite state, loose; and I have repeatedly observed that the great nerve is much stretched during the extension of the limb, when made from a point below the knee. This observation applies, whatever the position of the nerve may be, but most strikingly when it happens to be above the neck of the femur. The hamstring muscles are likewise relaxed by the bent position of the knee.

Summary of Results.—The inferences to be deduced from the foregoing observations may be summed up as follows:

In the ordinary form of the dislocation backwards, the femur does not reach the sciatic notch. The head of that bone is lodged immediately behind the acetabulum, over the base of the ischiatic spine and opposite to a small part of each of the two sacro-sciatic foramina.

The advanced position of the displaced limb at the knee, and the situation of the foot, *i.e.* 'the toe resting against the great toe of the other foot,' are not necessarily present in this dislocation.

a. During the traction made in restoring the bone to its place, the thigh is most advantageously directed across the pelvis, so that it shall form a right angle, or nearly a right angle, with the abdomen.

b. At the same time the limb is to be in a state of abduction. The femur is thus drawn away from the pelvis forwards and outwards.

c. And the knee is to be bent, the extending means, if any should be used, being fixed above this joint.

To prevent misapprehension it may be well to state, in conclusion, that certain cases, mentioned in the preceding pages, exemplify important modifications of the most frequent form of the displacement of the femur 'backwards,' which it has been the purpose of this paper to illustrate. Thus, the case observed by Sir A. Cooper, and that by Mr. Todd should be regarded as instances of dislocation 'backwards and upwards,' but in different degrees. While, on the other hand, Mr. Wormald's case should, in strictness, be considered an example of the dislocation 'backwards and downwards;' it being understood, however, to deviate but slightly from the usual form of the injury.

Dislocation of the Head of the Femur Backwards.

Case 28.—John P., æt. 26, a railway porter (Case-book 35), engaged at a railway station in placing labels on

contents of a waggon, was kneeling on his left knee when a bundle of small trees fell on his back and knocked him down, 'the left knee under him.' Being unable to walk or to stand, he was brought to the hospital.

Position of the Limb.—As the young man lay on his back in bed, the left lower limb was inclined towards its fellow—inverted, the great toe crossing the metatarsus of the uninjured side; the left patella looking to the fore part of the opposite thigh, and higher than the other patella. The space between the iliac spine and the great trochanter was less on the left than on the right side. Measurement gave a diminution of seven-eighths of an inch. The head of the femur was felt towards the back of the pelvis, near the sacrum—most clearly distinguished when a slight rotatory movement of the thigh inwards was effected. The patient complained much of pain.

Reduction of the Dislocation, under the influence of chloroform, was readily carried out. During the process, the knee being bent, the thigh was raised to less than a right angle with the abdomen, and was abducted from its fellow. Slight traction with the aid of pulleys was used.

Pain ceased with the restoration of the bone to its natural position. A padded splint was applied to keep the joint at rest. The man left the hospital, by his own desire, in a week.

Dislocation of the Head of Femur Backwards.

Case 29.—John Goodsak, æt. 8 (Case-book 11), a healthy boy, fair hair, florid complexion, while playing with other boys in a neighbouring park, was, when stooping forwards to catch an object, pushed from behind by a playmate, who fell over him on his back as he stooped. The injured limb is said to have been at the moment doubled under the boy. One of the lower limbs being disabled, he was brought to the hospital.

Diagnosis.—While the boy lay on his bed the injured limb was turned, its fore-part inwards—inverted. When both lower limbs were put together, the body being in horizontal position, the great toe of the disabled limb was turned towards that of the opposite side. The great trochanter was behind the natural position; the head of the bone was obscurely felt—more distinctly felt when the thigh was subjected to slight rotatory movements inwards. Pressure being made in both groins at the same time, it was manifest that there was a want on the injured side, the fingers sinking back into a depression. The limb was easily rotated inwards; did not admit of any movement in the opposite direction. Although the injured limb is apparently in a degree shorter than its fellow, yet it is noted that measurement being made, there is no appreciable difference in length between the limbs. The patient being raised from his bed to the erect position, the displaced limb hung away from the other.

Reduction of the Dislocation.—The boy being under the influence of chloroform, the limb was easily restored to the natural position, sixteen hours after the accident. During the manipulation there was nothing to indicate that the displaced bone had been restored to the acetabulum, except the fact that the limb had regained its natural appearance and the facility of being moved at the hip-joint.

REVIEW OF CASES.

IN REVIEWING THE SEVERAL CASES you will observe that the cause and the manner of the displacement were the same in all. Thus, each person at the time of the accident was stooping forwards, resting probably on the knee of the injured limb—the fact specially noted in Case 28; and each was struck by a weight on the back. The trunk of the person—the pelvis, moved by the impulse from behind, was then in each case, we must assume, forced forward—or, in

the position of the body when the impulse was received, downwards. In the resulting injury to the joint, the ligaments on its inner side were torn; and the head of femur escaped from the acetabulum. The pelvis being then unsupported by the thigh-bone, its descending weight was borne by the thick unbroken part of the capsule of the joint which connects the edge of the acetabulum with the fore-part of the femur. That surface of the femur in its movement backwards is bound against the pelvis, and the posterior surface of the bone is turned outwards to the surface as seen in Plate XVI. By that position of the femur at its upper end, the whole limb is inverted.

Diagnosis.—That inverted position of the limb is a leading characteristic of ‘the dislocation of the head of the femur backwards.’ It was clearly marked in each of the cases.

The place which the dislocated limb took in reference to the sound limb differed. In three the limb hung away from its uninjured fellow; while in one—Case 28—the injured limb was close to the sound one, and the toes rested on the fore-part of the foot. This latter relative position is that commonly assigned to the dislocation. The difference of position is doubtless due to some difference in the condition of the soft structures involved in the injury; especially, I believe, to the place of the sciatic nerve in reference to the neck of the femur. Pain, it will be remembered, was much increased when the limb, hanging away from its fellow, was brought into contact with it. (Case 27.)

The position of the head of the femur in the dislocation is to be noted. It is felt at the back part of the pelvis, behind the trochanter—felt the more completely when slight rotatory movement of the thigh inwards is effected by the surgeon. Some change noticeable in the condition of the thigh near the groin assists the diagnosis—viz. a degree of narrowness there with want of firmness to pressure resulting from the removal of the head and neck of the femur. The change is readily appreciable

when both limbs are pressed on the fore-part at the same time.

Reduction of the Dislocation.—The main facts bearing directly on the attainment of that object, with the rules for effecting it may be briefly stated:—The displaced head of the femur is behind the acetabulum. That, the acetabulum, is covered, except at its fore part, by the unbroken capsule of the joint. The opening of the capsule, which is to give admission to the head of the femur to its natural position, is in its inner part. The object to be attained is, obviously, to bring the head of the femur from behind the acetabulum to its fore part. In effecting the movements to restore the displaced part to its natural position, the femur may be considered an angular lever—the arms of which, of very unequal length, meet at the trochanteric angle. That angle is held in place by the unbroken capsule, strengthened by the ilio-femoral fibres and by muscles—the obturator internus with its twin muscular slips (*gemelli*). The capsule so strengthened acts as a support or fulcrum on which the lever is moved. The short arm, the head and neck, the part to be replaced, is moved, can only be moved, through the agency of the long arm—the thigh. The arms of the lever move in opposite directions.

To be replaced in the acetabulum, the head of the femur must be made to travel downwards behind the acetabulum, inwards beneath it, and, if needful, rotated inwards. To effect that course, the knee being bent, the thigh must be moved *up* towards the abdomen—flexion; *out* from its fellow—abduction, with, if necessary, *rotation outwards*.

It has been said that the knee should be bent when the reduction of the dislocation is being effected. That position of the knee has the effect of relaxing the hamstring muscles, which have influence on the hip-joint. There is also the additional advantage of the flexed position of the knee-joint, namely, that the sciatic nerve is then loose, and the head of

the bone is more easily moved from beneath the nerve. See Plate XVI.

It may be noted also that in the abduction and rotation outwards, the trochanter is in great part turned out from the surface of the pelvis, and so space is formed for the head with the neck of the bone to be turned inwards free of the trochanter to its destination.

In the cases recorded here I used pulleys, with very gentle traction. My rule would be to trust to manipulation, and if it did not speedily effect the object to add the aid of some traction.

FRACTURE OF NECK OF FEMUR.

NECK OF LEFT FEMUR FRACTURED AND IMPACTED—
SOLID UNION.

Case 30.—Mrs. B., æt. 80, who had for some time been rambling in her intellect, fell in her bedroom when grasping at her nurse. On the following day I saw her with her physician, Dr. Darling. It was stated that, since the accident, the lady has had complete inability to move the left lower limb; and that any motion communicated to it causes the expression of much pain. The upper part of the thigh to below the trochanter of the femur is obviously swollen. As the patient lay in bed, the foot of the left, the injured side, was in the same position as its fellow—directed forward—neither inverted nor everted. Slight rotation of the limb moves the trochanter; the shaft of the femur is uninjured. The interval between the upper spine of the iliac bone and the top of the patella was one inch less than on the sound side. The defect then was in the neck of the femur. It was broken and probably impacted.

The patient had much heat of skin, with stupor; and the urine was passed involuntarily. Rambling in speech was often heard, as, however, had been customary for a considerable time; but now more frequent and more excited.

The limb was kept steady with a long padded splint. In a fortnight the constitutional disturbance passed away, and health was improved.

A tendency to ulceration over the sacrum—about half an inch of skin being broken with a little surrounding redness—was speedily removed. The healing was promoted by

an occasional application of a solution of nitrate of silver, with the aid of pillows adjusted to bear off the weight of the body against the bed, from the sacrum, as well as by inclining the patient from one side to the other at intervals. Meanwhile, the health became as good as it was before the accident—as good, it was said, as it had been for the last two years. The broken bone seemed to be immovably fixed.

But, five months later, Mrs. B. sank rapidly, I was informed. She died it seemed from mere failure of life.

For the condition of the fractured bone see Plates XVII. and XVIII.

The mental condition of this patient may be said to be typical of what is from time to time witnessed in persons enfeebled and in advanced age. The memory of recent occurrences had passed away, while long past events recalled seemed wholly to occupy the mind. The lady spoke of persons whom, it is explained, she knew in her very early life—persons who died before her daughter, a lady of middle age, was born; but some of whom she had heard of in her childhood, and not since then. To her present medical attendant, the patient gave the names of medical men who had attended her family sixty years ago, whom her daughter had only heard of in the same way.

Fracture of Neck of Femur—Foot not Everted—Limb at first not Shortened—Ecchymosis—Swelling—After some Days Limb Shortened.

Case 31.—Mrs. D., æt. 89, fell in her bedroom during the night. The left hip was injured. Since the fall complains much if the part be touched—movement gives distressing pain. For some time the lady has been weakened in her intellect and especially in her memory. She speaks willingly of matters which happened in her early life, but forgets completely recent circumstances, even the fall which

has caused her so much pain. She speaks as if she had been out of doors, though entirely confined to bed.

Examination of Limb.—I saw Mrs. D. for the first time with her physician, Dr. Neil Arnott, the day after the accident. She lay in bed on her back, but inclined to the left—the injured side. Both legs were turned together in the same direction. When she was placed straight, both feet rested on the heels in the same direction. She kept them together and sometimes raised the right, the uninjured limb, from the bed. On the injured side any lateral movement of the knee moved the trochanter; but even slight movement of the limb caused the patient to exclaim violently, as if it caused extreme pain. No crepitus was distinguished during any slight necessary movement. Some ecchymosis with swelling was seen on the upper part of the injured thigh.

The patient continued for some days in a state of stupor, dozing constantly. She took none but fluid food and in small quantities. Twice in ten days she became very ill. Bowels were constipated, urine trickled away involuntarily, as, indeed, it had done before the accident.

At first the patient, with a leather support adjusted to pelvis and thigh, was placed on one of Dr. Arnott's slack-band beds. After a little time the skin of the lower part of the spine began to suffer. The evil of pressure on the sacrum was here increased by the trickling away of urine. A water bed was used, much to the advantage of the patient.

In eight weeks from the time of the accident, my attendance being required, I found that there was then a shortening of the left limb to the extent of an inch and a half. It had doubtless occurred much earlier. There was at same time much thickening above the trochanter. The foot as before had the natural position—the toes directed forward.

At a later period there was much complaint of distress about the sacrum, and the formation of abscess being feared, my attendance was asked. All the distress was occasioned solely by accumulation of fæces. The removal of a hardened

mass gave much relief. The patient, I was informed, now went on for some time 'remarkably well.' But then suddenly, and while all seemed to be going on favourably, a change arose: Mrs. D. became comatose, and sank on the following day.

Diagnosis.—The indications at the first examination were sufficient to cause a strong suspicion of the femur being fractured, but not sufficient to place the nature of the injury beyond a doubt. The affirmative signs were the patient's entire inability to move the injured limb, though she frequently moved the other; the extreme pain when it was in any degree moved; the ecchymosis; the swelling, and severe constitutional disturbance. In a little time the shortening of the limb which had come on was conclusive as to the existence of fracture; and that fact, taken in connection with thickening about the trochanter and the ecchymosis with general fever, led to the belief that the fracture being at the trochanter, partly at least extracapsular, as the injury at that part of the bone is designated.

The neck of the bone was broken across at its base, and was thrust outwards into the trochanteric part of the shaft. Besides that circular fracture, the trochanter sustained a vertical fracture which separated the back part of that large process and the small trochanter from the rest of the bone.

That last-mentioned fracture or split of the bone was apparently caused by the separated neck of the bone being thrust against the interior of the trochanter in the fall the patient sustained. The preparation is in the Museum of University College.

Fracture of Neck of Femur—Long-continued Gout—Disease of Kidneys.

Case 32.—R. Pavia, æt. 70 (Male Case-book 21), admitted on account of injury of the hip. Two days pre-

viously, when crossing the steps of his door, having slipped on a piece of orange peel, he fell, and has since been wholly unable to move.

Previous History.—The patient has suffered from gout from an early age. Marks of the effects are very distinct. His fingers are bent inwards at their phalangeal and their metacarpal joints. They are also strewed over with chalk stones. He has, it is said, the disease by inheritance; his grandfather suffered from it.

Examination in Hospital.—As he lies in bed the left lower limb rests entirely on the outer side, the heel opposite the inner malleolus of the sound limb, the foot upon its outer edge, the patella directed away from the other limb. Ecchymosis about four inches long reaches from the middle of the thigh in front up to the groin at its inner side. The limb is shortened, the thigh is swollen, its circumference near the groin being an inch and a half more than that of the sound one.

The left trochanter is a little behind the natural position. Pressure behind the neck of the femur, near the edge of the great trochanter, causes acute pain.

Extension of the limb having been gently made, the trochanter was moved, returning towards its natural position, and the shortening of the limb was diminished by an inch. The patient expressed himself relieved when the limb was put to rest with a starched bandage. But in a couple of days vomiting came on; it was unchecked by the treatment, and he sank in the night.

Autopsy.—In the dissection attention was at once given to the kidneys. They were both much shrunken, especially in the cortical part. The uriniferous tubes were, many of them, blocked with urate of soda. The lungs were found to be congested. Those were the only noteworthy affections of vital organs.

At the seat of injury this was the condition: the limb was everted, shorter than the right limb by three-quarters

of an inch. Discoloration of the skin (ecchymosis) was extensive, above as well as below the fold of the groin, on the scrotum and the root of the penis, on the middle of the thigh, and extending thence to the outer side and back part of the limb. An isolated spot, size of the end of a finger, was seen on the patella. The skin being divided blood is found in the cellular membrane, its extent being as indicated by the ecchymosis. Passing more deeply, blood is found abundantly along the femoral blood-vessels, amid the adductor muscles, and especially in approaching the place of connection of these muscles with the femur. The upper part of the adductor magnus is black with blood, and higher up the extravasation extends along the iliacus and psoas some way within the abdomen.

The Femur.—Its neck was broken within the capsule and also outside it, the fracture being comminuted. The small trochanter was separated as if cut off; the large trochanter was fractured. The pelvic bone is noted as uninjured.

Commentary.—It is only in a person advanced in life, and affected with general or constitutional disease, that so large an injury is likely to occur from so small an accident as that which befell the man Pavia. He had gout from early life, and suffered much and often from that disease.

The nature of the injury in the case was clearly indicated by the form of the unnatural position and the shortening of the injured limb. Fracture of the neck of the femur was legibly written, so to say, in those facts; while the discoloration of the surface, its situation on the inner side of the thigh, proved that the fracture was near the upper end of the bone but outside the capsule of the hip joint. The vascularity within the capsule being only that of the bone is inconsiderable, and the hæmorrhage would be confined by the capsule; while outside the capsule the tendons of muscles fixed to the broken bone are torn, and with them the blood-vessels, which are numerous. From that position

near the bone the blood is borne forward and inwards by the adductor muscles.

It is probable that the loss of blood, together with the diseased condition of the kidneys, the want of restorative power attaching to the organic disease, were the cause of the patient's death occurring within three days of the shock of the injury. The extent of the hæmorrhage receives additional explanation in the morbid state of the blood itself.

Examples are seldom wanting in hospitals of the deleterious effects of organic disease upon the results of local injuries. Persons suffering under such diseases, who may live on for a considerable time, have their lives brought into much peril, or even to a speedy end, from an amount of injury which would involve little or no danger to the healthy.

Neck of Femur Fractured—Peculiar Form of the Fracture and its Effect.

Case 33.—N. G. (F. Case-book 9), æt. 68, brought to hospital in consequence of injury to the hip on the right side by an accident. A very emaciated person having the appearance of senile debility; is very decrepid, stooping much, and walking habitually in a hobbling manner; is said by her landlady to be eccentric in her habits. Lately her legs have been swollen and painful, and moving about has given her pain. The poor woman has been altogether disabled by the accident, which is said to have happened thus: while turning quickly in her room, her foot having come against a small object, she fell, pitching on the right side of the hip. From loss of power in the injured limb she was unable to rise.

In Hospital.—On the day after the accident, the woman was eager to be taken to her home. So feeble in mind was she that little or no reliable information about her previous condition could be got from herself.

Respecting the injured limb this was the condition noted: when the patient is put standing the right limb is advanced, the fore part of the foot resting on the back of the great toe of the opposite side; and the patient can move the foot over the instep of that side. She cannot rest the weight of her body on the injured limb. When she is laid in bed the right leg and foot are slightly everted. The limb is shorter than its fellow by a little more than half an inch.

At the first examination the patient, by her own unassisted effort, raised the extended injured limb from the bed. She also bent, without help, the knee and the hip-joint, the foot resting on the bed. But these efforts gave pain. In four days afterwards she again raised the extended limb, unaided, some distance from the horizontal position, and bent the joints as before. Now the efforts were made without pain. The hip, being examined, tenderness was felt on slight pressure in front of and behind the joint. Between the trochanter and the head of the bone behind, instead of the natural smooth depression, a fulness of the neck, as of bone, was distinguished—bone projecting backwards. Under traction the limb was not extended to its natural length; crepitus was not induced by slight rotatory movements. There was no ecchymosis. The limb was at first placed on pillows. The general health continued to be much disturbed, with a good deal of fever and vomiting. The last was controlled with difficulty.

As the woman felt unhappy amongst strangers, her desire for removal to her home was complied with after a stay of eight days here. It was afterwards ascertained that the vomiting returned and continued up to her death, which occurred three weeks after the accident. The hip was soon after examined at the lodgings by Mr. Briggs and Mr. Clover, with the following result:

The right lower limb was slightly everted, and was shorter than the left. It was stated by the nurse, as something strange, that in adjusting the body after death she

had much difficulty in bringing the toes of the right foot near to those of the left.

In the Dissection.—The capsule of the hip-joint and the re-flexion of the synovial capsule were unbroken. The head of the femur was found to look backwards with a slight inclination outwards; and it was turned as much out of the acetabulum as the *ligamentum teres* would allow. The bone was broken across the neck a little below its middle, half an inch of the neck being below the fracture, three-fourths above it. The parts of the broken bone were in contact at the back part, while they were separated by a gap in front.

Some of the facts of this case require special notice—the shortening of the limb, the inability to bear upon it, the power of raising it horizontally while extended when the patient lay on her bed. Had there been evidence that no lameness existed before the accident, the shortening ascertained by measurement would have been proof of fracture having resulted from the injury the patient had sustained; and that view would have been strengthened by her inability to bear on the limb. But evidence as to the previous condition—whether she had been lame before the accident or not—could not be obtained in consequence of the patient's mental debility.

Putting aside, then, the shortening of the limb because of the absence of that evidence, we would still rely on the inability to bear on it and the projection on the neck of the bone, with the tenderness over it on pressure, as proofs of fracture. While the position of the osseous projection, with the absence of ecchymosis, give evidence of the fracture being within the capsule of the hip-joint.

The patient's facility of raising the extended limb in the horizontal position and bending the joints, the foot resting on the bed, indicated the unusual form of the parts of the broken bone. The explanation was fully given by the dissection.

The examples we have had before us of fracture of the neck of the femur all occurred—always, it might be said, do occur—in persons advanced in life, in whom the bones are wasted and brittle. The angle of the bone may be said to localise the effect of the injury—to determine the place at which the fracture of the femur from slight injury is found. Such fractures are not, according to experience, expected to occur in the strong well-nurtured bones of early or middle life. Yet I have to bring under your notice a very exceptional instance of departure from that general rule of experience, which was communicated to me several years ago by one of your predecessors here, Dr. Forester of Barnstaple.

Fracture of Neck of Femur in a Young Man.

Case 34.—A healthy young man, not thirty years of age, thrown from an Exmoor pony, sustained no other injury than that of the hip. He was able to bear his weight on the limb, and he moved on it some steps in the room in which he was examined by the surgeon.

There was difficulty in determining the nature of the injury during life, and after death no obvious proof existed of any injury.

Dr. Forester, however, mentioned that by careful measurement he became satisfied of a diminution in the length of the injured limb, but to a very slight extent. There was no ecchymosis. The man died of double pneumonia.

The drawing (Plate XIX.) is the representation of healthy strong bone. There is the mark of fracture all around, and the upper part is forced into the lower one—impacted to a small extent. The position of the fracture is on one side of the bone, within the remains of the capsular ligament; on the other side, beyond it. The strip of capsule remaining was coloured with blood.

A transverse fracture of the neck is noted as having existed in Case 33, but there was the difference from the

fracture now under notice that the bone was completely broken, the pieces remaining partly in apposition.

In such cases, under treatment, the object would be as in other examples of fracture, to guard against movement of the limb by suitable apparatus, so as to hinder the separation of the parts of the fracture. In the two examples of such fracture (Cases 33 and 34), death speedily occurred from other causes

*LATERAL DISLOCATION OF THE KNEE-JOINT—
THE LEG DISPLACED OUTWARDS.*¹

As the mere displacement of the bones of a limb does not compromise life, it is only where other injuries accompanying it are so severe as to cause death that an opportunity occurs to examine the state of the parts in dissection. I have lately met with a dislocation of the knee under such circumstances. It is the only instance in which I have had occasion to note the state of the parts in dissection after that injury.

Case 35.—A young man fell from a scaffold, on which he had been engaged at work, a height of forty feet; and as he fell struck against a wall ten feet from the ground. He was brought to the hospital immediately after the accident. Besides dislocation of the right knee-joint, there was compound and comminuted fracture of the upper end of the left leg and compound dislocation of right shoulder, the articular surface of the head of the humerus being protruded through the skin in the arm-pit. The left thigh was amputated; the dislocations were replaced. But the patient died in a couple of days. Further reference will here be confined to the injury of the knee.

There was much deformity of the limb at that joint. The nature of the change in it was perceived at a glance. The leg was thrown outwards, a considerable part of the head of the tibia projecting beyond the femur at the outer side; while another large portion of the bones still remained in apposition, but not in their natural relative position.

In the dissection, the only muscle found to be injured

¹ From the *Proceedings of the Royal Medical and Chirurgical Society*, vol. i.

was the gastrocnemius, the inner head of which was torn across an inch below its origin from the femur. All the other muscles about the joint were traced individually, and found to be uninjured. After the integument and the muscles had been turned aside, the joint was largely open at its inner side (Plate XX.). The internal lateral ligament and the fibrous capsule between the ligament of the patella and the posterior ligament of the joint were torn through, opposite the interval between the bones; and the laceration extended through a part of the posterior ligament as well. In addition, both the crucial ligaments were completely severed at a short distance from their upper ends. Several slender threads, separated from the irregularly torn crucial ligaments and hanging loose in the joint, were taken off in order to facilitate the artist's work; hence the flat appearance of the lower part of the incised crucial ligaments in the preparation.

The dislocation being reproduced, the inner condyle of the femur was seen to project at the inner side of the limb, while the outer condyle of that bone rested against the lower fragment of the crucial ligaments above the upper (inter-condyloid) spine of the tibia. I found upon trial that to place the bones in the position mentioned by Sir A. Cooper as belonging to this dislocation, namely, 'the [outer] condyle of the os femoris in the situation of the inner semilunar cartilage, or rather behind it,'¹ would have required a further laceration of the ligaments. It was also upon trial found not to be possible to place the outer condyle of the femur further inwards than the position above stated without causing the leg to form an angle with the thigh, which it had been noted not to have formed before the bones were placed in their natural relative position. This, it may be remarked, is one of those dislocations which Sir A. Cooper appears not to have had an opportunity to dissect, and the nature of which, so far as the condition of internal parts was

¹ *Dislocations and Fractures.* By Sir Astley Cooper, Bart.

concerned, he described from what seemed probable and from external observation only.

The blood-vessels and the nerves were carefully dissected out, and were observed to be in no way damaged. Extravasated blood was found in the cellular texture of the ham, likewise about the lacerated part of the gastrocnemius muscle and beneath the vasti, but only in very small quantity anywhere. For the careful dissection of the parts here described I am indebted to my house-surgeon, Mr. Tilbury Fox.

I will now mention some details of cases which may be taken to be examples of injury of the knee-joint, similar to that shown in the dissection with which we have been engaged.

Dislocation of the Knee-Joint.

Case 36.—Mr. H——, æt. about 35, a surgeon, in 1851, happening to pass in a gig under one of those railway bridges or troughs which span the highway in the neighbourhood of Camden Town, and, his horse having taken fright and set off at a gallop, he sprang to the ground. He recollected having pitched on his feet, and having then been thrown violently against the road, upon which he felt himself forced onward, ‘as if ploughing it.’

When taken up, Mr. H. ‘was horrified to observe that his right leg formed an oblique angle with the thigh at the outer side,’ and that, as he also said, ‘it swung loosely like a flail.’ The skin was bruised and scraped. He was conscious of having received a very severe shock in his whole system.

I found, in my visit made a short time after the accident, much swelling from effusion into the knee-joint. The leg was inclined outward by the slightest movement. A good deal of pain was felt then and subsequently in the head of the fibula, that part having been injured in the accident ;

and doubtless the pain there was the greater and more continued on account of the nearness of the peroneal nerve.

Mr. H. was confined at first to a mattress or couch, the whole limb being at first fixed by a long padded splint on the outer side, with similar support behind the joint. Subsequently he went about on crutches. After the use of other mechanical appliances, he wore for two years a slender jointed iron rod, extending along the outer side of the limb from the pelvis to the heel of the shoe. The apparatus was fixed at both ends, and to it the thigh at the lower end and the leg were bound with padded straps. This contrivance was applied in order to give Mr. H. confidence in using the limb, as well as for security. While it was still applied—indeed, before the expiration of twelve months from the time of the accident—he felt so well that he indulged in some days' shooting on foot. Since then he has constantly taken exercise on horseback, and he has followed the hounds occasionally, as was his custom before. Mr. H. has long put aside all mechanical support, even to the knee-cap, which he wore for a time, and he habitually walks considerable distances, and rapidly too.

After the lapse of six years, there is observable, on close examination, a slight inclination inwards of the injured limb at the knee; and the head of the fibula is enlarged. 'When shooting,' Mr. H. says, 'he suffers some inconvenience if he should happen to step on a loose lump of earth, and he feels something to remind him of the past when tired from walking.' Otherwise there is no inconvenience in any exercise of the limb.

Much of the completeness of this gentleman's recovery is, I have no doubt, due to his own knowledge of the nature of his case and to his resolute perseverance in submitting to everything which was necessary to retain the limb in the best position—namely, with the leg and the foot directed inwards, while the lower part of the femur was drawn in

the opposite direction. The patience, too, with which he abstained from going abroad until he might do it with safety was a material advantage.

In March, 1849, I saw the case now to be briefly noticed, with Mr. Pretty and Dr. Pretty.

Case 37.—Mr. S., a master-builder, æt. about 50, fell with a brick arch which he was having built. He pitched on his side. The left limb was so placed, resting on its inner side, that while the foot and the hip were firmly sustained beneath, the knee (its inner side) was unsupported, the place under it being hollow. By the weight of a mass of bricks which fell upon him the knee was bent inwards, and the leg and thigh formed an angle one with the other outwards. Mr. S. spoke very clearly and decidedly of the manner in which the limb was injured. He described also the angle formed by its two parts, and mentioned a much smaller angle (giving the number of degrees it would measure) than I should have expected. Other injuries were occasioned by the accident, namely, some bruises on the same limb, on the face, and on the temple.

The swelling from effusion into the joint was very great. I found the leg to be easily and freely movable outwards—the joint very loose. Mr. S. continued under the care of Messrs. Pretty for three months, and I saw him occasionally. It was not, I learned from Mr. Pretty, till after the lapse of several months, that his patient would venture to walk without crutches; but a great part of the delay was due to his own distrust of the solidity of the joint. His progress in the end was accelerated by a visit to Brighton; his health, and with it his reliance on himself, being thereby improved, while the limb itself was benefited by systematic rubbing.

I have lately seen Mr. S., with Mr. Pretty, now more than eight years from the time of the accident. His health is very good. He walks without pain or inconvenience. There is a difference in appearance between the two knees:

while the right (the uninjured one) is a little bowed outwards, the other is inclined inwards in a degree. The internal condyle of the femur on the injured side seems to be prominent, from apparently the imperfect cicatrisation of the internal lateral ligament and the inner part of the capsule. When asked to bear all the weight of his body on that limb, Mr. S. does so firmly and without hesitation; at the same time that, under manipulation, there is not the slightest lateral mobility between the femur and the tibia. Yet, notwithstanding the firmness of the joint, and that he walks well, Mr. S. wears still a short jointed metal splint upon the outer side of the limb. It extends over part of the thigh and of the leg. There cannot be a doubt, however, that this precaution is only necessary because of his timidity.

In the two foregoing cases the joints underwent apparently the same kind of injury; and the question arises, what was its nature? In each there was looseness of the connexion between the bones (femur and tibia), with free mobility of the leg outwards. Important ligaments must have been torn; for it is the special function of those structures in the joint under observation, while they retain the bones in apposition—bind them together, as the name implies—to hinder their movement in any unnatural direction. What ligaments, then, were ruptured? With a view to determine the answer to that question, I performed a few experiments on the dead body.

While endeavouring, with two assistants, to imitate the injury, I was struck with the great amount of force it required to incline the leg outwards from the knee in any degree. When the leg was moved outwards to any noticeable extent, I found, by dissection, that the internal lateral ligament, and the inner part of the capsular ligament backwards to the posterior ligament, with a portion or the whole of the anterior crucial ligament, were torn; and when the leg was moved outwards more fully, as it had been in the cases

narrated above, both the crucial ligaments were ruptured in addition.

Varying the experiments, I divided the ligaments successively, and obtained the following results as regards the mobility of the limb, viz:—

When the internal lateral ligament only was cut across, the joint did not lose perceptibly any of its natural firm resistance against pressure on the leg outwards. The inner part of the capsular ligament being also divided largely from before backwards, I was able to incline the leg outwards a very little—only in a degree which could just be observed. This slight inclination outwards ceased, moreover, as soon as the lateral pressure on the limb was removed. The solidity of the joint was still undiminished, or nearly so.

With division, in addition to the foregoing, of the anterior crucial ligament (which can only be effected after the joint has been bent), there was distinct mobility of the leg outwards. But the movement admitted was clearly less, and the firmness of the joint still remained much greater, than in either of the examples of the actual injury narrated above.

Lastly, it was not till the second crucial ligament had been cut through, as well as the ligaments previously divided, that the leg was easily and freely movable outwards, or in the same degree that it seemed to me to have been movable in the cases of Mr. H. and Mr. S.

The efforts to move the leg outwards, it may be added, were made, on every trial, while the limb was in the extended position.

It is needless to point further to the conclusion the foregoing facts lead to respecting the extent to which the ligaments are torn in the injury it has been my object to illustrate. The laceration of the crucial ligaments is doubtless the chief part of the damage the joint sustains.

The full restoration of the displaced bones to the natural position, and their retention in that position, require much and continued care, the knee differing in this respect from most other large joints. You will readily recall to mind joints in which the bones replaced after dislocation are retained in place by the construction of the articular surfaces and parts around—for example, the hip and the shoulder. But in the knee-joint the construction of the articular surfaces does not tend to retain the bones in their natural position. They are retained by the ligaments only. In the displacement of the knee, those ligaments being torn, mechanical management is required, and it may be for a considerable time, while the ligaments are being cicatrised, in order to retain the bones in the natural position. Thus, in arranging, say, a long, padded splint, which may be used at first to retain the parts free of movement—fixed, as they should be—some lateral traction outwards of the condyloid part of the thigh bone, and it may be also a degree of pressure of the bones of the leg at the upper end in the opposite direction, would be found necessary. Suitable expedients will be suggested by the circumstances of the case.

The shape of the uninjured limb will guide in determining the exact position to be given to and retained by the bones that had been displaced; the obvious object being to restore the knee to the shape it had before the injury.

SOME DISEASES OF THE URINARY ORGANS.

WHEN engaged in the practice of your profession, there are few ailments that will more frequently require your care as surgeons than disturbance or difficulty in effecting the evacuation of urine. This refers especially to the male sex. The causes of disturbance of the urinary discharge or of hindrance to it are various. These will appear fully by reference to cases I shall cite. Some of those cases, that occurred under observation here, and were noticed in detail by the bedside and in lectures, will now be placed together consecutively. I propose to place before you also the narratives of a few that have not been in the Hospital.

Several of the maladies that will be referred to are chronic, or become chronic—that is to say, they last a time—a long time, it may be—and are prone to return at intervals, perhaps even for lengthened periods. Examples of such chronic and recurring complaints, seen in private practice, will be useful for our purpose, inasmuch as they were seen again and again during more or less extended periods; and so came—some at least—to require attention under varied forms of change. While cases in the Hospital often remain but a short time to obtain relief from the pressing distress, and then pass away, perhaps permanently, from observation.

The cases are noted and arranged ‘clinically,’ as they come under observation in the wards, while the pressing evil is to be relieved. The source of the evil—its physical cause, the morbid change which occasions it—comes after for investigation and treatment.

*Retention of Urine, Evacuation being Delayed—Prostate
Enlarged in Unusual Form.*

Case 38.—Mr. Miller, æt. 68, generally in good health, with the exception of occasional ailing from rheumatism, first suffered inability to evacuate urine in consequence of over-staying the desire, the need to evacuate, during a journey by railway. He was at that time fifty-eight years of age. It was ten years later that I first saw Mr. M. He applied to me to be relieved of an attack of the same inability. It caused extreme pain. From that period, during several years, this gentleman visited me frequently for the same purpose. He sometimes applied to me at short intervals; but he was once, during my knowledge of him, fifteen months without suffering inconvenience or wanting assistance. The disability to pass urine always arose under the same circumstances, namely, resisting the inclination to pass it, or delaying the usual time of evacuation.

The visits to me occurred, with very rare exceptions, during the night—most frequently about two or three o'clock, occasionally as late as six o'clock—very infrequently during the daytime. The common interval between the evacuations was two hours or two hours and a half. When that time happened to be prolonged in any considerable degree, the inability to evacuate occurred. The delay was easily avoided in the daytime—the waking hours; but, at night, the insensibility of sound sleep would now and then carry Mr. M. over the proper margin of time. That was the usual—indeed, it might be said, invariable—cause of the disability to evacuate.

Having, at his first visit to me, by the position of the catheter, determined the existence of a peculiarity in the position of the urethra, and having made a remark about it, I learnt that Mr. M. had previously sought the aid of other surgeons. He said that he had suffered much pain, and had lost blood whenever the instrument was passed.

While the attack of inability to empty the bladder lasted, the suffering of this gentleman was intense. That it was so was evident from his strong expression of pain and from his extreme anxiety to obtain relief in the shortest time possible. The evidence of his eagerness to be relieved of the pain he suffered was at times curiously manifest in his appearance; for instance, escaping from his home at night, he passed along in any available form of street-carriage, with at times a cover snatched even from his bed. Of his strange garb he became conscious by the notice of some passers-by. From apprehension of recurrence of suffering, with the knowledge that it might recur any night, Mr. M., when quite well, was in the habit, during those many years, of making arrangements, often very ingenious, to secure access to relief in the shortest time.

I advised this gentleman when I first saw him, and frequently afterwards, to use a catheter for himself; but he absolutely refused to make a trial, from fear that he must fail, and that he might do mischief on account of a degree of clumsiness of his fingers, which were partially stiffened by slight attacks of rheumatism. He had besides, from former experience of pain and loss of blood when the instrument was used, a fear of any new trial, whether by himself or anyone else. At length, however, on an occasion that I proposed to be away from home—further away and for a longer time than usual—he made the attempt, and he succeeded with little more guidance than is required in common cases. The instrument he used was a large, long one of silver, with a wider curve than that of the ordinary prostatic catheter, of the same form that I had been in the habit of passing in his case. Thereafter I saw nothing of this gentleman for some years, until he had an attack of general illness. He had passed the eighty-first year of his age—twenty-three years from the first occurrence of retention of urine—in good health, when he had a severe attack of idiopathic erysipelas. After the erysipelas had passed away he sank

from exhaustion, owing apparently to inability to take food of any kind.

The examination after death, in so far as concerns our present purpose, gave the following results:—

In the place of the urinary bladder, with its usual consistence at the forepart of the pelvis, was a large mass, for the most part solid, which extended above the pubes (Plate XXI.). This was, in fact, the urinary bladder—its lower part much stretched out, and filled to a large extent with a firm tumour. The tumour itself, covered by the bladder, occupied the space immediately behind the pubes, extending even above it. A section of the whole having been made (Plate XXII.), the tumour was found to be the prostate gland enlarged, in an unusual position—above the urethra instead of below the canal, as is usual in ordinary forms of enlargement of the gland. The upper end of the enlarged prostate is seen to be conical (Plate XXII.), so formed that urine would necessarily glide from it towards the urethra, unimpeded by the tumour or any part of it. The lower part of the prostate (lateral lobes and the middle lobe included) is represented by a thin layer of glandular substance mixed with muscular fibres (Plate XXI., fig. 2). This is, as in the ordinary condition, continuous with the anterior—upper—part of the gland.

The urinary bladder was free to contain urine only in part. The bladder proper—the reservoir for urine—was wholly in the abdomen, or very nearly (Plate XXI.). There was no dependent part—base (*fundus*)—behind the opening into the urethra, as is usual in the adult, and is especially well marked in advanced age.

The position of the ureter shows the distension which the lower part of the bladder had been subjected to by the enlarged gland.

The urethra—in which a bougie had been placed for the dissection—continued from the back part of the bladder, instead of being at the forepart of that cavity. From the

natural position it was doubtless pressed away during the growth of the tumour in front. The free course of the canal was not, it may be noticed, impeded by any obstruction, either by the prostate gland or any other structure.

Summary.—The points of greatest interest in the foregoing case may be shortly stated thus:—The power to evacuate urine remained entire except at intervals. All through the long series of years (twenty-three) during which Mr. Miller was liable to, and at intervals suffered from, retention, the inability to pass urine did not continue beyond the single seizure; insomuch that, after relief once obtained, the inability did not return except after a certain space of time—several days, or weeks, or even months.

For thirteen years on no more than two occasions was it necessary to resort to the use of the catheter a second time—not once a third time, on the same day; and even then the bladder had evacuated its contents spontaneously several times before the return of retention on the day alluded to. Thus, the recovery was complete each time after the single act of assistance; and so it was to the end.

Again, there was no indication throughout the whole history of the case that any urine remained after the spontaneous evacuation. Nor was there an indication that the kidneys or other part of the urinary organs were otherwise than healthy. The general health, too, was unimpaired, except in so far as occasional slight rheumatism was concerned.

The use of the catheter.—The difficulty, together with the loss of blood, said by the patient, when I first saw him, to have been experienced in the passage of the catheter, must, I apprehend, have arisen from the unusual position of the deeper part of the urethra, and the attempt to trace the canal in the position that is usual. The instrument in its course along the urethra seemed, in fact, to reach and to pass

before the front of the rectum (without the interposition of the normal prominence), to reach the back part of the bladder—helped, mainly, by light pressure, and with the guidance of the urethra itself.

It has been stated that Mr. Miller's distress had its beginning in a railway journey; and that the retention of urine recurred invariably from delaying the evacuation. Aged persons not infrequently begin to suffer in the same way, *i.e.*, in some form of travelling or in the too protracted delay of the evacuation under any circumstances. There are, however, points of clear difference between the case narrated and those ordinarily met with. In the latter—cases of the ordinary kind—the first distress does not usually pass away quickly, as it did in that which has just been narrated. That case was, in my experience, singular, both in the frequent recurrence of retention, and in its rapid cessation. Instead, however, of speaking in general terms as to results of other cases, I shall, as usual, make reference to the facts of actual cases.

Retention of Urine—Evacuation Delayed—Enlargement of Prostate Gland.

Case 39.—C. L., a gentleman, æt. 64, much distinguished in a department of Natural Science, while engaged in some out-of-door scientific inquiries, in one of the Midland Counties, drove in a carriage with friends. No effort to evacuate had been made for several hours. In the evening, when arrived at the journey's resting-place, he was unable to pass urine. After ineffectual attempts had been made to relieve him, he came to his home in London. The disability and the difficulty experienced in passing a catheter were found, as expected, to be connected with enlargement of the lower part of the prostate gland. Under treatment by the passage of the catheter at regular intervals, sixteen days elapsed before there was any natural evacuation

of urine; and then only a little was passed without the catheter. It was twelve days later—four weeks from the attack of retention—that the patient became independent of assistance. More than ten years after the incident referred to the gentleman was in good health.

A case may be mentioned which illustrates the distressing, even serious, effects which may be occasioned by delay of the evacuation of urine in aged persons.

Retention of Urine: Evacuation Delayed—Senile Enlargement of Prostate—Injury in use of Catheter.

Case 40.—W., a gentleman of robust frame, in excellent health, æt. 66 years, occupying high official position at home after long official employment in India, was obliged by illness of a member of his family to travel by railway a distance of about 150 miles from London. When arrived at his destination he was unable to pass urine. A catheter being passed in order to afford relief, it was stated that hæmorrhage occurred; and that there was much difficulty in introducing the instrument to the urinary bladder on several occasions. The patient suffered much distress and pain arose in the renal region, with a good deal of constitutional disturbance. The prostate was found, by examination through the rectum, to be much enlarged and prominent there. Urine passed involuntarily. There was no accumulation in the bladder.

At the end of four months the patient was much improved in health as well as locally; and he went to his country home. But I learnt that some months later, having been exposed to damp during occupation out of doors, he was suddenly seized with a return of the worst symptoms in an aggravated form, accompanied with copious discharge of puriform matter from the urethra. He sank rapidly. There was no examination afterwards.

In the three cases the alteration of structure, which preceded the sudden seizure of pain and illness, affected the same organ, the prostate gland. But while in the first the upper part of the gland was enlarged, the lower and lateral part was so altered in the other two. The latter is the common condition.

The disability which the three suffered being practically the same, and the circumstances under which it arose in all being also the same, though with some difference in degree of alteration of structure, I would inquire, what was its immediate cause? and why were the results of the cases different, using the first and most remarkable case for the elucidation of the others? The last case may be considered typical of considerable numbers.

Inasmuch as the only change of condition when the suffering began was the unwonted accumulation of urine, it must be concluded that the inability to evacuate was owing to the over-distension of the bladder, and the enfeebling, in a measure paralysing, effect on the vesical muscular fibres, unduly stretched by the distension. As to the difference of the results: The expulsive power in Case 38, though impaired by the cause adverted to, was yet, the first difficulty being overcome, equal to the accomplishment of the natural function because, in all likelihood, of the entire freedom of the urethra from encroachment or obstruction of any kind; while, in the other cases, the diminished muscular power was insufficient to overcome the impediment afforded to the flow of urine by the altered prostate gland, now, in the advanced life of the person, enlarged from below upwards, and raising the vesical orifice of the urethra with a portion of that canal above the natural level of earlier life. With the recovery of muscular tone the expulsive power was restored.

Now, seeing that in consequence of the enlargement of a natural structure—not a disease—which commonly, but not invariably, accompanies advancing age, many men, while

still in good health of body and in vigour of intellect, are liable to be struck with painful illness of some duration (Cases 39 and 40)—nay, to be permanently damaged in health, or even to have life cut short (Case 40); seeing, moreover, that the evils are excited by what appears so small a cause—one clearly preventible—it is right that those liable to such evils should be provided with the means of avoiding them—‘prophylactic’ means. One obvious precaution is necessary, namely, an apparatus to hinder the necessity for delaying the evacuation. The apparatus ought to be well constructed, and well adjusted to the person who on needful occasions wears it.

In the foregoing cases, to the general enlargement of the prostate was added, as causes of retention of urine, the over-delay of the evacuation with the atony of the bladder resulting from its over-distension. We now turn to cases in which the inability to evacuate or the difficulty in evacuating was due directly to obstruction by the prostate.

*Retention of Urine—Inflammation of Senile Prostate—
Recurrence of Retention—Use of Catheter.*

Case 41.—D. B., æt. 73. I saw this gentleman in a distant county with his medical attendants and Mr. Marriott. Being unable to pass any urine for some days, he was at intervals relieved by his medical attendants; but the use of the instrument—a silver catheter—was attended with pain and the escape of a little blood.

Advantage was derived from the French gum-elastic beaked catheter (*coudé*). That instrument was passed by the surgeon in attendance every six hours at first, but less frequently as the patient’s inability to pass urine subsided, with the subsidence apparently of the prostatic inflammation. After a short time the patient himself used the same form of instrument without difficulty during two years. He began by passing it once daily, lessening

the frequency, however, till once in a week was found to be sufficient.

Two years after the beginning of the disability the patient had again absolute retention, occasioned by a fresh attack of inflammation in the prostate, and being unable then to relieve himself as before, the assistance of his medical attendant was necessary. The elastic instrument was superseded for a silver catheter, one largely curved, which now was found to be more easily passed. Since that attack of disability the patient has been unable to relieve himself. The same metallic catheter is, I have been informed by the local surgeon, passed 'when the urine begins to smell strong,' once in six weeks or two months. The use of the catheter at those long intervals proves, it is stated, sufficient to restore the urine to a healthy condition.

The natural micturition is frequent, and in small quantity at a time. The residual urine is 'about a pint.'

Now, ten years after the first attack of the urinary disorder, the gentleman is reported to be in fairly good health.

Retention of Urine:—Projection from Prostate Gland behind Urethra. Disease of Brain and of Cranium.

Case 42.—Samuel F. (Book 9), æt. 64. A sailor; has for several years been imbecile in mind, and had much wandering in his talk. Having on the day before his admission here—then for the first time—been unable to pass urine, a neighbouring surgeon passed a catheter, and drew off a large quantity. But on the following day, the same surgeon having failed to reach the bladder with the instrument, and blood having escaped freely from the urethra, the patient was brought to the Hospital.

The man was found talking loudly and incoherently; his skin with fever-heat; his pulse rapid. The urinary bladder

was felt in the hypogastrium, distended, and causing much sensibility to any pressure over the surface. After a hot bath a large quantity of urine was removed with a catheter. As the instrument was being passed, roughness with tenderness of the canal was plainly distinguished in the situation of the bulb of the urethra.

The inability to evacuate urine having continued, the catheter was afterwards passed at intervals—every eight hours.

The patient continued to talk loudly and incoherently. His strength gradually failed. He died in ten days from the beginning of the urinary complication of his brain disorder.

In the examination of the body, the skull, it is noted, had 'enormous thickness.' The brain was much congested; the arteries contained some blood. Their coats were loaded with atheromatous deposit. The kidneys were in a state of congestion; the mucous lining of the urinary bladder thickened, congested, and in colour dark. The prostate was enlarged—one side more than the other; in consequence, the urethra through the gland deviated laterally. Immediately behind the vesical orifice of the urethra, a nipple-like process, with a duplicate outgrowth from it, projected upwards from the middle lobe of the prostate at its back part. Over the bulb, the urethral lining membrane was torn—the erectile tissue laid bare. The surface of the prostatic outgrowth was slightly cut at one point.

We have had now the opportunity of observing the strongly marked source of mental alienation and suffering which affected the poor man for several years, in the condition of the brain, the cranial bones, with the blood-vessels; and we have observed the cause of the urinary obstruction, which is our immediate concern in this place. The obstruction was caused by the projecting process from the back of the prostate, added to the enlargement of that gland.

The bleeding that accompanied the use of the catheter was caused by injury, the result doubtless of the difficulty in passing the instrument.

The unequally enlarged prostate with the projection from it behind the opening of the urethra, and the lateral bend of the canal, show the need that exists of much care when difficulty exists in passing an instrument, and in the selection of the instrument. A large and much curved catheter is associated in name with the enlarged prostate. With that instrument should also be mentioned a large gum-elastic catheter curved by a much bent stylet, and the elastic catheter sharply bent at the end (*coudé*). They are useful resources for eluding difficulties.

Forced and Imperfect Evacuation of Urine—Outgrowth from Prostate surrounding orifice of Urethra—Bladder Sacculated—Muscular Structure Hypertrophied—Kidneys Diseased.

Case 43.—Mr. R., æt. 70 years, whom I saw with Mr. Jakins, told the story of his malady in a written statement, from which a few extracts may be usefully made.

Previous History.—‘Nearly four years ago, at Scarborough, I drank three or four tumblers a day of the water of the well there, under professional direction; and sometimes kept it too long. A difficulty in passing water came on, and I could not refrain from passing it more than two hours at a time. I underwent (elsewhere) in the same year a course of medical treatment, taking many medicines—the last, steel. From this, as well as from other medicines, I derived no benefit. Then I had hip-baths at 80° temperature. After that time a catheter was passed once, and a full pint of urine was drawn off’ (after he had passed urine by his own effort). . . . ‘Three years later I went to a hydropathic establishment,’ the patient continues. ‘There

the steam-bath, packing, and mustard plasters were used ; and I had, more than anything, tepid baths, which were occasionally run down to cold. . . . But after three months' persevering, I was no better.' When I first saw him, Mr. R. stated that for nearly four years he had to get out of bed not less than five times every night in order to pass water ; and that in the daytime the intervals between the periods of evacuation have been one hour, sometimes two hours. He complains that he is slow to begin, and has to make efforts, when, at times, a stream will come.

He expresses himself, 'much weakened and depressed by his long-continued illness and suffering, together with the treatment he had undergone. He appears so ; and upon examination he proves to be so. About a pint and a half of urine is passed daily by voluntary effort, but a good deal (patient believes) remains behind each time.

Examination of Patient.—A considerable quantity being found with a catheter to remain after the natural evacuation, it was determined to empty the bladder at fixed intervals. The patient, after having made a trial or two with a catheter, in which some blood appeared, declined to pass the instrument again for himself ; but he applied morning and evening to have the instrument passed.

The urine was at first pale and opaque, not offensive in smell, but it afforded evidence of deep organic change of the kidney in the form of abundant casts of tubes.

Soon after pus also was found. Four years after the urinary complaint had been recognised by himself, the patient sank under an acute attack of pyelitis.

Autopsy.—The condition of the urinary organs was ascertained to be as follows : Both the kidneys, much diminished in size, were shrunken—leather-like to the feel. The pelves of both and their subdivisions were largely dilated with urine and thickened. They were smeared on the inner surface with pus. The ureters likewise were dilated and thick-

ened. The bladder, unnaturally capacious, was, in the recent state, partially divided into two nearly equal portions—upper and lower—by a transverse constriction, which seemed to be occasioned by contraction of muscular fibres. That appearance is effaced in the preparation. A dependent part, behind, drops from the fundus below the level of the vesical orifice of the urethra; and that dependent part is further deepened by a projection upwards from the prostate. The muscular fibres, much hypertrophied, project in bundles prominently upon the inner surface. A sac of considerable size, membranous, wholly devoid of muscular fibres, has been formed behind; its orifice being near that of the right ureter. The bladder is thus ‘fasciculated’ and ‘sacculated.’ (Plate XXIII.)

The prostate is enlarged, but not immoderately so, with the exception of the middle lobe. From this a circular outgrowth projects into the bladder at the vesical orifice of the urethra, which it nearly surrounds.

Commentary.—In order to arrive at the indications of the treatment of such a case as the foregoing, it is necessary to trace the sequence of events in the series of morbid changes which has been set forth. As regards the urinary bladder: After the continued formation of an increased quantity of urine—the result of daily draughts of a mineral water—there occurred frequent need for the evacuation, at the same time that there existed extreme difficulty in attaining the object. In consequence, forcing efforts to overcome the difficulty supervened. The discharge of urine being effected as far as was possible, there still continued the feeling that a good deal remained behind. The obstacle to the free passage of urine from the bladder was obviously caused by the outgrowth from the middle lobe of the prostate. That outgrowth, as it has been already stated, besides obstructing the flow of urine by the urethra had another evil effect—it contributed to the detention of urine in the bladder by deepening its fundus. To the frequent forced

expulsive action of the bladder, the thickened and prominent condition (hypertrophy) of the muscular structure was owing.

The formation of the vesical sac is to be thus accounted for: The bladder exercises strong pressure on the fluid within it—a pressure increasing in force in all likelihood with the increasing thickness of the muscular structure; and the natural outlet for the escape of the fluid being interrupted, the membranes yielded at a weaker point, as at an interspace of the muscular fibres. Yielding to the fluid pressure, the fibro-cellular and mucous membranes were gradually protruded, and constituted the sac; which thus differs from the bladder in structure by the absence of muscular fibres. In some cases several are formed. The size such formations attain is often considerable. The increase of the size is attributable probably to the fact that, whatever the size the sac may have attained, the force of the fluid pressure conveyed to every part of its circumference of like extent with its orifice, is the same as the force communicated to the fluid at the orifice itself.

The force, which we regard as accounting for the large and rapid increase of the vesical sac by fluid pressed by muscular contraction through a small hole, might be regarded, I presume, as analogous to that property of fluid pressure shown by a narrow column of fluid resting on a large base of the fluid, and known in physics as the ‘hydrostatic paradox.’

In the ureters and the kidneys the origin and progress of morbid change was, I apprehend, as follows: During the forced and frequent contraction of the bladder upon the fluid within it—the natural outlet for its discharge being often stopped—the entrance of urine from the ureters was impeded and delayed at their narrow terminal passages through the coats of the bladder, and necessarily became accumulated in the whole excretory apparatus above. The altered conditions of those structures—the dilated and

thickened ureters, pelvis, and small sub-divisions within the kidneys, with the shrivelled gland tissue—are, I believe, to be regarded as resulting from the pressure exercised by the fluid, and also from the prejudicial effect upon the structure of the gland produced by the mucous lining membrane rendered morbid with altered residual urine. That membrane is noted to have been ‘smeared with pus.’ The morbid alteration of the urine when residual and of the mucous membrane has been noticed in the statement of the condition of the bladder.

Treatment.—Now we have to determine the practical application of the facts recounted to the management of such a case—to removal of suffering, to the prevention of destructive disease. The object should be to hinder the efforts for evacuation, so injurious to the whole urinary organs; to prevent the need for the straining efforts; to remove at intervals urine not discharged naturally. The object would be attained with a suitable gum-elastic catheter used by the patient or by the surgeon.

The management for the attainment of the object ought to be begun as near the outset of the patient’s suffering as possible. Mr. R. had been under varied management for four years. During that time disease had existed and worked out its pernicious effects unchecked. At the outset of his distress he, in all likelihood, might have been enabled to accomplish his own relief. So also the disease of vital organs—the kidneys—would, in all likelihood, have been prevented.

We have had under consideration cases in which the prostate was the cause or was associated with the retention or difficulty in evacuating urine.

The same distress often results from disease of the urethra itself—stricture, as it is usually named. Examples are often met with in the practice of the hospital, among the ‘out-patients,’ and in the wards. Inasmuch as the management of ordinary examples is of common occurrence,

it is best learnt in the presence of the case. I shall here notice only examples of rare forms of such morbid affections of the urethra.

Retention of Urine—Injury of Perineum—Stricture of Urethra—Puncture of Bladder from Rectum—Division of Stricture in Perineum.

Case 44.—Stephen S., æt. 38 years, but looking older, a groom, was admitted to hospital on account of inability to pass urine.

Eight years ago, in leaping on horseback over a fence, had a 'severe jerk' on the saddle and felt faint in consequence. The perineum was bruised. From that time the stream of urine continuously became less; and, two years ago, he then 'having a cold,' it was diminished very notably. Afterwards had much straining in order to evacuate, together with scalding in the passage. On the day of admission here, while driving a van, the man, feeling pain in the pubic region, attempted to pass urine, but was unable to do so. A surgeon introduced a catheter, but failed to reach the bladder with the instrument.

Upon the man's admission here, the house-surgeon, after attempting unsuccessfully to pass a catheter—even the smallest had been tried—had the patient placed in a hot bath. A degree of relief of pain, with the evacuation of some urine, was the result. But in a few hours afterwards the inability to evacuate returned. The passage of a catheter being again found impracticable, full doses of opium were given by direction of the house-surgeon. The medicine, however, was not effectual either in enabling the patient to pass urine or in rendering the urethra free for the passage of an instrument.

Having seen the patient and found enlargement with hardness in the perineum, and the urethra impassable to any instrument, I punctured the bladder with a canula and

trocar through the rectum. Relief of pain immediately followed, which the evacuation of a distended bladder always affords.

But, pain having ceased, another difficulty arose. The patient had speedily—in an hour afterwards—the symptoms that result from an overdose of opium. He became very drowsy, his pulse numbering 120, respiration 7. It then required careful recourse to the usual management of that complication, in order to hinder the patient being injured by the medicine; which during the continuance of pain was innocuous.

Subsequently, the enlargement of the perineum, treated with the application of leeches and fomentation, not subsiding, but being rather increased in size, a free incision was made; urine was soon evacuated through the perineal opening. Gradually, it took the natural course. Gum-elastic instruments were used, and the long existing hardness about the urethra, with the accompanying slender stream of urine, was altogether removed. Catheter No. 9 then passed easily. Being restored to health, the man returned to his home, with instructions as to the passage of a gum-elastic catheter at intervals.

There was, in this case, a bad form of stricture, the result of an injury—hardness in the urethra and around it, consolidated during several years. If any small instrument—grooved staff or director—could have been made to pass along the strictured part of the urethra, an incision through the condensed structures would have been resorted to at once.

The intensity of the suffering occasioned in this case, when admitted to the hospital, by the urgent need and inability to evacuate urine, is illustrated by the fact that, though opium had no apparent effect while pain still existed, the influence of that medicine brought the man—being relieved of pain—into the condition of a person who had taken a large overdose of the drug. The facts give some measure of the suffering that may exist in other cases;—may be

taken to account for the extreme desire sometimes observed, as in a case before recorded, to hinder or to shorten the duration of the suffering, if an attack of inability to evacuate should occur. (Case 38, p. 151.)

Retention of Urine—Stricture—Catheter used—Sinus and Abscess formed between Bladder and Rectum.

Case 45.—George C., æt. 30, had gonorrhœa several years ago. Has had during some years, at intervals, difficulty in evacuating urine, with at times retention. Attributes the malady and the liability to its return to exposure to wet and cold in his employment, standing in water making drains. Is now a railway labourer in the country. For relief of the retention of urine, he has been in habit of taking ‘gin and water.’

Two days ago, after having drunk largely of beer, he became wholly unable to pass urine; was twice relieved with a catheter by a surgeon in the country. On the following day, the same surgeon failed to accomplish the object. The man states that the efforts of the surgeon were continued a long time; that the instrument was passed ‘up to the handle.’ But that only blood escaped through it.

On his admission here, a hot bath was used and laudanum was given twice. When I saw the patient, straining efforts to evacuate were violent. The abdomen was distended to the umbilicus. It was very painful to examination. The catheter, at the place of the stricture, slid easily into a long sinus between the bladder and the rectum, which felt rough to the point of the instrument. The instrument, withdrawn from the sinus, was guided along the upper surface of the urethra to the bladder. Thick, muddy, urine was drawn off.

Urine was removed with the catheter at regular intervals.

An abscess of considerable thickness, the effect of injury

with the catheter, was felt from the rectum. Pus escaping freely by the wound—one apparently of no small size—in the urethra, the tumour was soon diminished, emptied of its contents, and disappeared. Urine, at the same time, passed in full natural stream; the stricture divided, we suppose, by the wound made with the catheter, no longer impeding its discharge. No inconvenience remained in the urinary organs, and the patient was restored to health.

This patient's speedy recovery was, probably, due in good part to his youth. At an early period of his disease in the urethra, an incision through the stricture, from the perineum, would perhaps speedily have removed the obstruction to the flow of urine. That condition he accidentally reached, after having undergone the peril of laceration with the catheter and consequent free suppuration.

But what was to be the man's condition after he left the hospital? He was addicted to strong drink. If that habit continued, its evil influence on the urine and on the newly-healed local malady, as well as its effect in lessening the means of obtaining healthful residence, and other needs of healthful existence, has led, it must be feared, as in many other of our hospital cases, to a pernicious return of disease.

*Difficulty in Evacuating Urine—Stricture of the Urethra—
Bougie Broken: Part remaining in Urinary Bladder—
Operation.*

Case 46.—The patient, a young man, had during three years suffered from stricture of the urethra, which originated with gonorrhœa. For a large part of those years he himself had been in the habit of passing a bougie. The instrument finally broke in the canal, and he felt the fragment slip back into the bladder. He came from his home in Devonshire to be relieved of the result of the misadventure. The journey to London was a long one. Three days had

elapsed from the occurrence of the accident when the patient came under my care.

An effort was made to withdraw the foreign body through the urethra; but, though grasped by the instrument, yet, apparently from being taken hold of in the transverse direction, it slipped away when drawn to the vesical orifice of the urethra. The idea of removing the bougie in that way was abandoned, and all the sooner because of pain increased by any pressure, which was felt in the left renal region, added to the fact of the disease—a stricture—existing in the urethra.

The operation as for the removal of a foreign body was determined on, but it was delayed because of the lumbar pain. Leeches were applied over the seat of the pain, and hot hip baths were used. Under that treatment, with rest in bed, the patient was relieved of tenderness to pressure in the renal region, as well as altogether improved in general health. The operation for the removal of the broken catheter was performed two days later; it was on the sixth day from the accident.

The Operation.—The incision in the perineum was a short one; the prostate gland was not incised. With the finger passed onwards to the bladder the bougie was found placed transversely above the vesical orifice of the urethra, behind the pubes. From that position it was hooked down with the finger and seized with a pair of straight forceps, one that had been used for children. The wound healed rapidly. At the same time the urethra was so completely restored to a healthy condition, free of any narrowing—the result of the incision through it—that a bougie, No. 11, was passed into the bladder after the wound had been healed. The patient felt well in every way.

The operation was in fact similar in its effect on the old stricture to the operation which we have often carried out to cure the stricture only. The outer part of the broken bougie was brought from his home by the patient. From its

length (eight inches) the length of the fragment removed from the bladder was inferred to be about four inches. It may be added that the examination of the two pieces when put together at the broken ends showed that no fragment remained which might become the nucleus of a concretion.

The facts of this case prove the prudence of the rules we give, that each person advised to pass such an instrument for himself should always be provided with more than one, and that an instrument which is defective in any degree should at once be put aside. The patient in this instance, being closely questioned, admitted that when last used the bougie was 'cracked' where it afterwards broke entirely off.

As to the previous management of the case some suggestions may be added. The young man had been in the habit of passing a bougie during three years. I have no doubt that if at the outset a gum-elastic catheter had been introduced and continued in the bladder for a very few days—the size of the instrument being suitably increased at proper intervals and the patient at the time lying in bed, with any medicine that seemed desirable and restrictions as to food—the use of the bougie during those years would have been made unnecessary.

Accident: Fracture of Leg—Congestion of Lung—Death—Difficulty of Micturition long continued—Urethra narrowed and rough—Abscess in Prostate—Kidneys atrophied—Excretory Apparatus dilated.

Case 47.—James Harlow (Book 16), æt. 50 years, of moderate conformation, a plumber's assistant, was brought to hospital quickly after an accident on the roof of a high house, in which one of his legs was extensively broken: the limb was largely swollen, with widely spread ecchymosis.

The Family History.—Father died of 'diseased bladder and urinary canal'; mother of 'cancer of the breast.'

Previous History.—The man has suffered long and continuously from difficulty in evacuating urine. He states that about seventeen years ago, while bearing a burden on his shoulder, he was pushed from behind, and he believes it was ‘on account of the effort then made to save himself from falling that he was subsequently seized with stoppage of the urine.’ At the time was relieved by hot bath and some medicines. Is not aware of having had gonorrhœa. Has had no treatment since except the use of nitre (nitrate of potash) in large doses, which, he says, ‘always did him good.’ Has been ‘rather given to drinking.’ The further report will have reference mainly to the facts of the urinary disease, the subject now under consideration.

A week after admission here the patient complained much of difficulty to pass water and of pain in the effort. An ordinary full-sized catheter could not be used; even the orifice of the urethra was too narrow to admit its entrance to the canal. An instrument, No. 6, was passed. With it an obstacle was met at two inches from the outer orifice, and a degree of obstruction was felt all along the canal. Instead of its natural smoothness, the urethra felt rough to the end. A large quantity of fœtid puriform fluid, with ropy sediment containing triple phosphates, was removed. Some urine naturally passed was clear. A few days later the urine removed was at each evacuation the first part clear, the greater part puriform and tinged with blood; the smell fœtid. So the urine continued.

A severe attack of bronchitis supervened in a few days.

Death occurred in less than three weeks from the time of the accident.

Examination after Death.—Fracture of leg, subcutaneous extravasation of blood coagulated and extending along the whole leg and a third of the thigh, especially on inner side. Blood in less quantity beneath the fascia and amid muscles. Both bones much fractured above the ankle. The inner

malleolus separated. Swelling in the ankle-joint and on tarsus.

Lungs extensively congested; a little dark fluid in pleural cavity. The kidneys small, shrunken, each weighing $1\frac{1}{2}$ oz. Substance rough, pulpy; ureters twice the natural size; other parts also of the excretory apparatus, including that within the gland, much dilated. Glandular structure compressed, atrophied. Urine foetid, with ropy sediment. Bladder enlarged, inflamed, thickened; on inner surface muscular substance columnar, like ventricles of the heart. The whole of urethra, after an inch from its orifice, contracted, at two points more than elsewhere. The mucous lining membrane yellowish and rough, apparently strewed with small deposits of lymph. The tissue of the penis enlarged, congested. In one side of prostate, an abscess, size of a horse-bean; the gland generally slightly enlarged. (Plate XXIII.A.)

The case illustrates some of the evils that arise out of continued obstruction to the evacuation of urine. The laboured evacuation led, as we have seen in other cases, to disease—dilatation and thickening of the excretory apparatus—bladder, ureters, and tributary tubules. While by pressure of accumulated fluid was produced atrophy of the secreting structures of the kidneys. The necessary failure of these organs, the kidneys, rendered inefficient to carry on their important function, worked its pernicious influence on the system.

The local injury of the accident was probably more extensive than it would have been in the absence of disease of vital organs—the kidneys. By the same cause the system was rendered incapable of carrying out the reparation of the immediate effects of the accident, or of removing the malady of the lungs.

We have then in the case another illustration of the precept taught by other examples of continued obstruction to the natural discharge of urine or defect in its evacuation,

namely, that the cause of the obstruction ought at an early period to be followed as far as possible to its cure, or that the accumulation of the evil should be hindered by suitable mechanical substitutes for the natural evacuation.

*Frequent desire to Micturate—Polypoid Growth in Urethra
(female)—Pain during Evacuation of Urine.*

Case 48.—Miss L., æt. about 35 years, whom I saw with Dr. Stokes, states that for ten years she has endured acute suffering connected with the urinary evacuation; and that she had previously suffered inconvenience for several more years from the same cause.

Is an assistant in a draper's shop. In changing the position of the body, as in walking or sitting down, the patient feels, she says, a painful 'indescribable thrilling all over the body, even up to the brain.' In a carriage, being unable to sit straight, she 'turns on to the hip.' Desires to urinate many times a day, but being unable to be absent from her occupation, 'suffers agony' in resisting the inclination. Pain is suffered also during the evacuation, which, however, ceases after a short interval. Urine has not been tinged with blood at any time.

There have been intermissions of suffering. Thus, patient has been three months at a time entirely free of pain, as if there were no disease. But as the continuance of the malady has been prolonged, there has been much less of intermission, and the recurrence of extreme pain has been more frequent. During the last twelve months there has been almost continuous pain.

Miss L. came to me on account of the suspicion that her suffering had been caused by stone in the urinary bladder. I found a firm, vascular growth in the urethra. Its removal was effected by excision, followed by the application of nitrate of silver. The discharge of blood in drops required

attention. With the operation, all suffering ceased permanently.

Four months afterwards Miss L. called to see me, and in speaking of her former condition and the relief she now experienced, she became very sensibly affected by recalling her long-continued distress and its removal.

Three years later Dr. Stokes informed me that Miss L. was wholly free of all her former suffering.

Frequent need of Micturition, and much pain—Tumour in Female Urethra—Removal of the Tumour—General nervous feelings continued afterwards—Recovery.

Case 49.—Mrs. H., æt. about 60 years. Three months ago, in a lengthened 'pleasure excursion' in Germany, 'was much jolted during part of the journey, and afterwards sat resting on the grass in a forest.' Soon felt pain, with frequent need to pass urine, and a distressing pain during its evacuation. Unable to travel in the sitting posture, the lady travelled lying in a carriage to her temporary residence. Was treated with 'emulsive medicine and hot fomentations.' Subsequently she returned from a distant part of the continent, being constantly in the horizontal position during the journey to her home in London.

Here the sufferer was seen by Dr. Rigby, who gave, with much benefit to his patient's general condition, some active aperient medicine; and, having detected a morbid growth in the urethra, applied nitrate of silver. The application caused a degree of relief, but did not diminish the tumour. Suffering soon returned. There was frequent need to micturate; but the inclination was usually restrained for three hours at a time. There was no interruption to the discharge of urine but that resulting from voluntary effort. Pain was increasing.

Having seen Mrs. H. with her physician, I removed with

a small bistoury the urethral excrescence. It projected at the orifice of the urethra, and extended backwards a considerable distance in the canal. The texture was firm, not vascular; when touched and taken hold of with a forceps there was no bleeding.

The healing process went on favourably. But a couple of weeks afterwards, as the patient then again began to feel painful irritation, I made an examination, with the result of finding some way down in the urethra a very small outgrowth, which had sprung up on part of the same surface. Nitric acid having been applied without benefit, the new growth was removed with the bistoury. Then Mrs. H. was again, and, as it proved, permanently relieved of the local suffering. The urine, it may be added, was for a time regularly removed with a catheter by the nurse in attendance on the patient.

Notwithstanding the removal of the tumour, and the cessation of the distress it gave rise to directly, Mrs. H. afterwards complained of a different form of ailment. There were uneasy feelings of general 'nervousness,' ailings which caused much discomfort. A visit to the seaside was now had recourse to. There health was fully restored. The feeling of being in good health was also re-established.

Commentary.—The removal of the urethral growths, in both cases, was effected with a small probe-pointed bistoury. The application of caustics had failed in one.

Probe-pointed scissors may be used for the same purpose. Caustic applied often hinders bleeding.

For the application of nitric acid in such cases, Sir B. Brodie used a tube the size of the urethra, closed at the end, an opening at one side of its circumference, so that the growth projecting into the tube was acted on with the caustic fluid.

Of the two cases the results were in the end similar. But the progress towards the result had, in each case, its special circumstances.

Miss L., case 48, recovered quickly and completely,

though the malady had been of many years' duration. The patient was, however, a youthful person, actively occupied with business. Her one anxiety was to return, free from pain, to her occupation, on which her income was dependent. The suffering in the other, case 49, was of comparatively short duration. This patient was, however, in advanced age; was in high social position; and had no needful occupation—even domestic concerns being carried out by members of her family. Yet this lady had been lying down for several weeks on a bed or couch, and lay in a carriage during long journeys. Though actual suffering had been removed with its cause, she afterwards 'was not well, did not feel well.' The habit of uneasy feeling which had been created by her malady, and the management of it, seemed to remain in what might be called a state of, in the language of society, 'general nervousness.' To restore the lady to health, a change of place and atmosphere was believed to be necessary.

Convalescent Residence.—We can scarcely avoid seeking to determine what the residence in London, and in another place selected for the purpose, involves, in order as far as possible to determine why such a change should have an effect, salutary as it was in this case, as it is in very many other cases, when the appreciable morbid condition is removed. Looking to the facts, the home of the patient was here in London. In this vast space covered with houses, and the accesses to houses, with but little apparent of the natural earth or its natural objects, the air we breathe is loaded with emanations around from millions of human beings, and from uncounted animals which subserve their varied wants; loaded still more and also tainted with the fumes from almost countless domestic fires. It needs unbroken health to resist continuously the evil influences around. To restore the enfeebled health of the lady suggested the removal from those evils.¹ Now, as to the change—the facts attaching to the

¹ 'In 1840, London contained 1,840,000 inhabitants; in 1880, 3,770,000.

change in this instance. These happened to be : residence on high ground—a cliff, one half the surrounding surface cultivated lands—comparatively few houses for a small population ; the other half open sea ; the atmosphere, then, we assume, little tainted with emanations from below. To the change of the physical conditions around should be added the objects of varied interest to engage attention on the earth and on the sea, with the easy resort to bodily exercise. Whether I have rightly interpreted or not the sources of the improvement that arose, the patient became speedily free of the distressing ‘nervous feelings,’ and was restored to the feeling that she was in good health.

The importance of a temporary change of residence, to complete the recovery of some of our hospital patients, has long been recognised and provided for. Convalescent hospitals have been established in healthy situations in the country and by the sea. You may notice that removal to one of those hospitals is the last order given as to some of our patients. In those cases, it must be added, the removal from the hospital air, believed to be specially injurious, is an important part of the benefits conferred by the change.

Incontinence of Urine—Morbid growth deeply placed in the Urethra.

Case 50.—Mr. D., æt. 28, a master-printer resident in a large county-town, underwent in early life an operation for phymosis. Several years ago had gonorrhœa. At that time retention of urine occurred. It was relieved by hot-water bath, after ineffectual attempts had been made to pass a catheter.

During seven years, the patient states, urine has escaped by trickling into handkerchiefs placed in his dress to receive it. Only at night does urine in any degree pass

During those forty years the growth of London largely exceeded its total growth during the previous thousand years.’

under voluntary effort, and then but a little at a time in a very small stream. Mr. D. mentions that some days ago, after having dined at a public entertainment, though he was temperate in the use of stimulants, his urine on the following morning was 'bloody.' The apprehension caused by that circumstance induced him to leave his home, with a view to the treatment of his malady.

He seemed a robust young man, in good health. Was free from pain on firm pressure being made on the loins over the renal region. A slight general turgescence of the penis was manifest, and a feeling of hardness with some enlargement was distinct for a considerable space upon the urethra behind the scrotum. Light pressure there gave pain. The parts around are generally moist from trickling urine. Five or six handkerchiefs which he places in his dress are, the patient says, wet daily with urine that escapes involuntarily.

A catheter introduced into the urethra was stopped about six inches from the orifice. The instrument, when arrested in its course, felt as if entering into a spongy substance, and blood escaped freely through the catheter. The urine was highly coloured—that which passed occasionally by voluntary discharge let fall a thick pasty deposit.

Now, to interpret these facts in *the diagnosis* of the disease:—Mr. D. suffered from obstruction in the urethra by a new formation—probably a vascular growth with surrounding congestion—some enlargement and tenderness evident in the perineum, together with, in a degree also, chronic inflammation of the mucous membrane of the bladder.

The treatment was as follows:—The patient was confined to the horizontal position for a few days in bed, afterwards on a couch. Stimulants in diet were altogether disallowed; food directed to be light and in moderate quantity. Leeches were applied to the perineum, followed by warm applications—spongio-piline pressed from hot water. Aperient medicine was used at intervals. In two days a clear

improvement was apparent, and was reported by the patient himself. The tenderness to pressure in the perineum had disappeared. On account of the disordered condition of the urine, hydrochloric acid in small doses with infusion of buchu was administered, and occasionally a little tincture of opium for recurring pain in the bowels. Urine soon lost its high colour and thick deposit.

There remained the obstruction in the urinary canal. In order to its removal, solid nitrate of silver was applied by means of the 'armed bougie,' four times altogether, at intervals of two or three days between the applications. When the caustic bougie was pressed against the obstruction there was none of the feeling of its penetrating a spongy structure, which has been mentioned as perceptible when the catheter was introduced. The difference was probably due to the action of the nitrate of silver on the substance of the new growth. After the second application of the caustic, the patient reported himself to be better than he had been for several years. There was then no external moisture perceptible. After the use of the caustic the fourth time, urine was passed naturally by voluntary effort.

A plain gum-elastic bougie was now used, and at first repeated every second or third day, beginning with one of small size (No. 3), gradually increased to 9, which in its turn went forward without difficulty. The patient now stated that he had not been so well for seven years. No urine, 'not a drop,' he added, escapes involuntarily. He returned to his occupation in the country.

Two months later, the report Mr. D. gave of his condition was very favourable in all respects. He had, as he had been directed, used a full-sized bougie at intervals, and had done so with ease. After the lapse of six months he came to apply for a certificate of health required for a business purpose.

Insufficient Evacuation of Urine long continued—Atony of Bladder.

Case 51.—In 1851 I saw the gentleman, Mr. H., æt. about 40 years, in consultation with Dr., now Sir William Jenner. The patient was a tall, spare, active-looking man, of dark complexion. Stated that he had been in good health until ten days before, when he had a shivering fit at night. On the following day his physician found that he passed urine which had a disagreeable smell and let fall a copious sediment. This by microscopical examination was found to be largely pus. The tongue was coated with a thick fur. There was no increase of the temperature of the body. There was no local pain in the loins, the abdomen, or elsewhere; but the patient said 'he felt all over unwell.' Had no appetite for food. Above the pubes there was dullness when tapped, but the outline of a distended bladder was not felt. The conclusion came to being that there was no evidence of disease except that given by the urine, which betokened a morbid condition of the bladder, it was necessary to remove the urine.

After Mr. H. had passed all he could by his own efforts, the catheter being introduced, a large quantity of ill-smelling turbid urine was removed. The fluid issued with little force, and by pressure on the abdomen more was evacuated. In a little time afterwards such manipulation was not needed in order to complete the evacuation. The erect position of the body did not help to empty the bladder.

When the instrument was in the bladder it could be moved far backwards, near to the back of the pelvis. The whole instrument was then passed up to the handle, and after all the urine that would pass while the catheter was far back, more followed when the instrument was advanced again towards or to the pubes. It seemed that the bladder did not contract uniformly to its neck, but dropped into compartments as it folded.

Afterwards the bladder was emptied twice daily. All the unpleasant symptoms with the feeling of illness soon passed away. Mr. H. learnt to relieve himself with a gum-elastic catheter. He regained his usual health, and needed no professional assistance. Still, however, he continued to use his catheter.

As to the exciting cause of the inability to effect complete evacuation of urine in this case, the direct evidence was not altogether satisfactory. There was no evidence of defect as regards the general nervous system, the nerve-centre, or the nerves elsewhere. No muscular paralysis existed except that of the bladder, to which the malady was wholly confined. The patient, when closely questioned by his physician, recalled the circumstance that on one occasion of some engagement in society, while travelling abroad, he deferred the evacuation for an unusual length of time, and he remembered that once afterwards the urine smelt badly; but as he had not felt actual pain and had not been put to inconvenience requiring special attention, the incident made little impression on his mind.

The loss of power in the urinary bladder to expel its contents—the source of this patient's suffering—was due, I apprehend, to the want of healthy nerve action. The process of change may perhaps be thus stated:—The urine became altered, disordered by remaining in the bladder unduly, and in that altered condition it caused disease of the mucous membrane, including the nerves of sensibility, which thus, we assume, lost their power to contribute to the reflected motor nerves influence required to control muscular action.

Condition in after-life.—The state of this gentleman's health in his after-life will be shown from communications made to me at long intervals. In a letter received in 1876, it is stated that during the whole of the time since he began to pass a catheter—twenty-five years—he has continued the use of the instrument, without interruption, twice daily,

morning and evening. He passes urine before the instrument is used, and several times during the day as well. The quantity voided naturally is about half as much as that removed with the instrument; and that proportion remains about as it was at the beginning. It is, however, liable to vary in quantity. 'Sometimes,' writes Mr. H., 'I have passed water more freely for perhaps a week; and this has been followed by a period of inactivity. Occasionally, though rarely, the bladder all but empties itself. I can in no way account for the change.' The general health is good. No pain or inconvenience has been in all those years at any time felt in the urinary organs, nor has any local damage whatever been once occasioned by his use of the catheter.

Near the beginning of the period now referred to—a few years after the first illness—he became a member of a yeomanry corps, and discharged the duties of that position for ten years without inconvenience.

Since the time of that statement Mr. H. has informed me that the urine soon afterwards became muddy and smelt badly. As that disagreeable condition, he thought, from his former experience, must be owing to too long a continuance in the bladder, he passed the catheter a third time in the twenty-four hours. The urine then soon became clear and natural, and it continues to be so. There has been one noticeable but quite natural result of the more frequent use of the catheter, namely, that less urine is passed independently, without the instrument, than previously. Meanwhile, health is very good—has been continuously good.—From report in 1881, thirty years after the use of the catheter was begun.

Had this gentleman sought professional advice with a view to the removal of the disability which went continuously on, the use of *nux vomica* internally, and probably of electricity locally, would have been resorted to.

Hæmaturia: Blood mixed with Urine, and unmixed after Clear Urine—Pedunculated Villous Growth in Bladder—Kidneys and Excretory Apparatus much Diseased.

Case 52.—James J., æt. 34, has been suffering for three years with urinary disease. His attention was first directed to it by passing blood. He observed that all the urine resembled blood, and that, after a little time, a clot was settled at the bottom of the vessel. The man was then admitted to a London hospital, and after a month he was free from the discharge of blood. Seven months afterwards the bleeding returned without apparent cause. On its return the urine passed off clear, and was followed by a discharge of blood varying in quantity. A month's intermission then occurred, followed, however, by a return of loss of blood.

Now, admission was obtained to another hospital. The patient understood that his disease was suspected to be caused by stone in the bladder. On examination with an instrument stone was not found. After the use of the instrument in that examination, a large quantity of blood was passed. The urine, for several days, was all bloody, but gradually became clear. Blood was then passed after the urine. The examination with an instrument, the patient states, caused him to suffer from the pain in the bladder, which lasted more than a month.

Since that time, urine has usually dribbled away. The man has not, he states, been able to feel as if he had emptied the bladder. A small quantity is passed, about a wine-glassful; and then the evacuation sometimes stops, with, however, the continual desire to pass more. Another change, first observed about the same time, is that he cannot pass urine while in the erect position. The evacuation occurs while he is lying down. Occasionally, clots of blood are voided.

Examination in Hospital.—When the patient first came under observation here (Nov. 1854), he was in low health,

very feeble, his face pale, waxy, puffy at the eyelids. The tongue pale all through. Urine at first examination clear, a few clots of blood following after it. Pain, with tenderness to pressure, felt over the renal region, especially on the left side.

The remaining history of the case may be confined to points of importance in reference to the urinary organs, indicated by the condition of the urine. The quantity evacuated in a day varied considerably, but was invariably much larger than natural. Thus, it was found for a short time to range between 74 and 96 ounces; afterwards the quantity reached from 120 to 140 ounces, and later from 160 to 178 ounces. These variations in quantity, and the increase, occurred within a few weeks. The specific gravity was, when noted, 1010 or 1011.

There was, generally, an admixture of blood. Reports run thus:—For a week no blood was observed; but, frequently, the urine was distinctly and more deeply tinged, and deposited, after standing, a thick clot. When blood was passed in the urine—mixed with it during a few hours—pain and tenderness to pressure were much felt in the renal region; and at the same time the man was thirsty—drank largely of water.

Blood likewise escaped in another form. The urine evacuated was clear—without discoloration; and when it had ceased, blood was passed in a fluid state, occasionally also in slender clots. Under a microscope many aggregated cells with granular contents and round nuclei were observed. No casts of tubes to be seen.

The patient speedily declined in health, and he sank about three years and three months from the time at which blood first appeared in the urine.

In the Examination of the Body.—The kidneys are both very pale in colour, and seeming unusually large. The capsules are thick and easily removed; the surface of each irregular, with small tuberos prominences. The left kidney

being divided through its length, the greater part of the large mass is found to consist of urine, which fills the enormously enlarged pelvis and calices. The cortical part, pale yellow in colour, is thinned out. The interior of the large mass, representing the right kidney, is formed in greatest part of bloody urine, distending all the excretory part of the organ. The whole structure is pale. The cortical structure examined microscopically shows the tubes enlarged, and very full of epithelium.

The ureters are both very much dilated and tortuous. They are noted as seeming in size like the intestines of a child. That of the right side most so; and the pelvis on that side appears like a great added lobe of the kidney. The continuation of the ureter into the bladder very slender relatively to the ureters. (Plate XXV., Fig. 3.)

Urinary bladder much thickened; the inner surface in part fasciculated. A soft villous growth (Plate XXV.), in the interior, projects from near the orifice of the left ureter; bright pink in colour, finely lobulated, and arborescent. A pale membranous firm piece about two inches in length is the basis from which the vascular structure has grown. By one end of that fibroid structure the tumour is connected to the bladder, serving as a pedicle. Blood-vessels are found among its fibres. (Plate XXIV.)

In the viscera, generally, of abdomen and thorax, nothing needing mention was observed, with the exception that the heart was considerably enlarged.

Commentary.—In this case, you have noticed much loss of blood, the largest part mixed with the urine. The blood which was fully mixed with urine I assume to have emanated from the kidneys, which would seem to have lost blood with the urinary secretion, as the secretion was formed. While blood passed in that form, it was noted that there was much tenderness to pressure on the loins in the renal region. The right kidney was found to be distended

with bloody urine. That portion of the blood which was independent of the urine was discharged from the vascular growth in the bladder. There were then two diseases—that of the kidneys and that in the bladder. The record of the facts seems to show that the renal disease was first in a condition to be recognised, the first evidence of the disease having been that ‘all the urine resembled blood.’ It was seven months later when blood was again seen. Then ‘the urine passed off clear, and was followed by the discharge of blood unmixed.’ In this latter form the blood proceeded, we suppose, directly from the vesical tumour.

After the evacuation of urine, it is noted, the patient did not feel relief of the desire to evacuate. The straining distress that remained is to be accounted for by the presence of the new growth in the bladder, and its position there. Part of that structure passed, as you perceive in the preparation and the drawing (Plate XXIV.), to or towards the orifice of the urethra, resting on the sensitive triangular surface of the bladder. In that position it gave rise to the desire to evacuate, and to the expulsive action of the muscular fibres of the bladder, through reflex nerve influence. Moreover, a portion of the new growth was, in the expulsive efforts of the muscular structure, forced forward to the orifice of the urethra, and probably stopped, or rendered difficult, the further discharge of urine which is noted.

So the vesical tumour had the effect of a foreign body—one fixed in its place, and constantly exciting a degree of expulsive action or desire to evacuate. Hence the search for stone that has been mentioned. Hence the evacuation did not relieve the desire to evacuate.

As a result of that frequent almost constant forced action, the muscular fibres became hypertrophied, thickened, and a small sac was forced outwards. (Plate XXV., Fig. 3.) In addition the forced action by the muscular structure had, we assume, the effect of retarding the transmission of urine along the slender canal by which the ureter passes through the

bladder; so causing an accumulation of the fluid in the excreting apparatus of the kidneys, and, as a consequence of fluid accumulation, dilatation of every part of that apparatus; so causing also the compression and consequent atrophy of the cortical, the secerning portion of the organ. The process sought to be interpreted is another example of the effect of 'fluid pressure.'

Hæmaturia: Blood Mixed with Urine, and afterwards Unmixed—In Bladder extensive Vascular Growth—villous, sessile—Atrophy of Right Kidney: its Excretory Tubes Dilated.

Case 53.—Mr. S. T., a solicitor, æt. 60 at time of his death; of spare habit and small stature. Bent thigh-bone and high frontal development may be taken as evidence of feeble, rickety condition in childhood; since manhood health has been tolerably good.

History of Urinary Disease.—Eleven years ago, while playing at cricket with his sons, Mr. S. T. had for the first time an indication of urinary disorder. He then passed from the urethra some blood, which he believes to have been unmixed with urine. From that time he has had a renewal of the escape of blood whenever any unusual exertion was made. As examples of the exertions he mentions rising with an effort to reach to something on a high shelf in his room, or mounting to the outside of a carriage. During some years, in which an intermixture of blood with his urine existed, the general health was not impaired. Gradually, however, pain in the loins grew to be troublesome; and the desire to pass urine became more and more urgent. For weeks at a time the urine was coloured with blood, and the last part of each evacuation contained blood evidently in largest quantity.

During nine years from the beginning of his ailment, Mr. S. T. was under the care of the same physician.

He then applied to a surgeon, who passed a sound into the urinary bladder, to ascertain if calculus were in it. The result of the examination was negative. Under the use of gallic acid and buchu the loss of blood was now much diminished. Afterwards the patient had rheumatic fever while he was at his country house.

The urinary distress subsequently returned with severity. The evacuations were forced and very frequent—every half hour during the day and at night also, except only when the patient was under the influence of an opiate. At the same time all the urine was coloured with blood, and drops of mere blood often followed after urine had ceased to be discharged. The patient groaned with pain from the scalding felt during the evacuation, and expulsive efforts were so strong that fæces at times passed involuntarily during the efforts.

When in that condition, about ten years from the first indication of urinary disease, Mr. S. T. is stated to have been for a year under the care of a physician known to have devoted special attention to urinary diseases. Under his direction, the patient passed a catheter for some time twice daily; but he was obliged to relinquish the use of the instrument on account of the severe pain, and the increase of hæmorrhage it caused.

It was after those events that I saw the patient with the surgeon then in attendance on him—to whose notes I am indebted for the previous record. The symptoms then were extremely bad—hopeless as regards any expectation of beneficial effect of treatment beyond the relief of suffering.

Extreme emaciation was manifest. Frequent vomiting, *subsultus tendinum*, and somnolency soon supervened, with much pain and frequent micturition. Urine contained blood and a large quantity of ropy mucus with pus globules—the evidence of diseased kidney and bladder. That was the climax of the patient's suffering. Life soon ceased.

Examination after Death.—While the left kidney seems

nearly natural in appearance and size, that of the right side is reduced to a mere sac, measuring $2\frac{1}{2}$ inches by $1\frac{1}{2}$. A thin layer of renal substance is recognised on the exterior. The left ureter is of natural size, and the lower end within the wall of the bladder has the normal oblique direction. The ureter of the right side has much more than the natural bulk.

A vascular villous growth widely spread surrounds the neck of the bladder in its interior, except on a narrow interval on the lower surface (Plates XXVI. and XXVII). The new growth is more extended on the right than on the left side. On that, the right side, it extends from the orifice of the urethra to the opening of the ureter, which it covers. An extension of the morbid growth is found within the ureter, where it continues through the substance of the bladder and ascends half an inch further upwards into the ureter (Plate XXVII., Fig. 2). A few small rudimentary outgrowths are seen further back on the bladder. The bladder generally is thickened and congested—in a state of inflammation long continued. Near the neck it is also shaggy from projecting outgrowths of the mucous membrane.

Besides the long-continued losses of blood and extreme pain occasioned by the vesical outgrowth in this case, we must assign to its effect the atrophy of one of the kidneys. The presence of an extension of the morbid growth within the lower end of one of the ureters had doubtless the effect of retarding the passage of urine on that side into the bladder. The resulting accumulation of fluid explains the enlargement of the ureter and likewise the condition of the kidney, reduced by the pressure of accumulated fluid to a mere sac.

Commentary.—We shall now seek to make some practical application of the facts to the management of similar disease, taking the facts of the two cases separately.

The symptoms of the former case (52) having been prominently those of a foreign body in the bladder, and a calculus

not being discoverable, it might be assumed that the symptoms were the result of a tumour. The urgent continuous need to evacuate urine, with the obstruction to the evacuation, would be taken to indicate the position of the outgrowth. At the same time the want of evidence of the existence of the tumour felt from the abdomen, or by the rectum, would prove the absence of much enlargement of the vesical growth. Some assistance might be given in the investigation by the use of a sound bent at the end. An opening as for the division of stricture of the urethra, or the lateral operation for lithotomy would be required to determine the position of the tumour and the extent of its connection with the bladder, as well as to effect its removal.

Obviously, however, an operation could only be undertaken at an early period after the beginning of the disease, before the organic disease of the kidneys and other parts of the urinary organs had been largely produced, before the general health had been depressed. While the removal of such a tumour is delayed, the progress of disease in vital organs goes steadily, in all likelihood rapidly, forward. In a similar case, then, the operation, if undertaken, should be carried out as soon as the diagnosis has been effected. The disease and the pernicious results had been advanced before the case came under our observation—advanced beyond a degree that would have reasonably admitted of an operation.

The circumstances of the second case (No. 53) differed from those of the preceding. The characteristic symptoms of the presence of a foreign body in the bladder do not seem to have been clearly present at any time. The vascular growth was not on the lower or back part of the bladder behind the urethral orifice; it was not connected by a pedicle. The connection with the bladder was spread out above the orifice of the urethra and at each side of it, and extended on one side within the ureter. Considering the wholly vascular structure of the tumour, its position and diffusion on the surface, an operation for its removal

could, I apprehend, have been undertaken with hope of a favourable result only at an early period of its growth. If the form of the growth were distinguished at an early period, the question might arise if a wire passed into the bladder above the pubes, heated by electricity when being withdrawn, might be advantageously used.

Incontinence of Urine—Polypus in Urethra—Epithelioma in Bladder—Disease of Heart—Anasarca.

Case 54.—Mary Ann C., in one of Dr. Russell Reynolds' wards, was seen by me on account of disease in the urethra.

The patient stated that twenty-five years ago she kept a street stall for four years, and being exposed often to bad weather she caught many 'colds;' has not felt well since that time. In the last two months the woman's face and legs have been swollen. During a month she has lost control over micturition, and 'pieces of gravel having been passing,' she has suffered much pain.

The aspect was one of very depressed health—it was pale and wasted as by long illness. The examination by her physician determined the existence of much disease, affecting especially the heart and the lungs. The abdominal viscera were not free of disease. The incontinence of urine was attended by much pain.

I removed a polypoid growth from the urethra. Afterwards, as the involuntary escape of urine attended with pain still continued, while no disease was discoverable in the urethra, the canal was dilated slowly while the patient was under the influence of chloroform, with the view to ascertain if the continuous micturition were due to the state of the bladder. With the finger passed through the dilated urethra, a tumour of considerable size was felt, spread out and largely fixed to the back part of the bladder. (Plate XXX., Fig. 2.)

After some lapse of time the patient died.

In the autopsy the body was seen to be extremely emaciated; and much disease, as had been anticipated in detail by Dr. Reynolds, was found in the heart and the lungs, with some also among the abdominal viscera. We shall here restrict attention to the report respecting the urinary organs. Within the bladder, on its upper and back part towards the left side, was a large tumour, measuring nearly three inches by one inch, the surface nodulated, connected in its whole extent with the bladder. On immersion in water, the surface at many parts was found covered with outgrowing flocculi. The tissue of the tumour was vascular; the surface minutely injected. On section and scraping a large quantity of juice exuded, and the cut surface was soft, pulpy, brainlike in character. It was on examination determined to be epithelioma.

The vesical mucous membrane around the openings of the urethra, with that of the urethra, was minutely injected; its surface thickened with rugæ.

Kidneys.—Cortical substance of both in part finely vascular, otherwise not diseased. Pelvis of each largely dilated. Both ureters dilated, especially that of the right side. It was filled with urine, which did not descend into the bladder.

Lumbar lymphatic glands swollen. In those of left side are small patches contrasting with the rest of the structure—the glands generally very vascular, the patches found to be cancerous.

In the actual state of the general system of this patient, a surgical operation was inadmissible, except such a small one as was performed with a view to the relief of urgent suffering. But, even if the vital organs generally were wholly healthy, the removal of the tumour from the bladder, considering its nature and the broad connection with the bladder, would, I apprehend, scarcely admit of discussion.

*Retention of Urine—Prostate Enlarged and Inflamed—
Mucous Membrane of Bladder Congested, Thickened, and
a Tumour (Epithelioma) projecting on it.*

Case 55.—William G., æt. 67, an artisan. Two years before admission to the hospital began to suffer from difficulty in passing urine, which at the end of the evacuation dribbled away. The difficulty soon increased. A year afterwards he was unable to pass any urine. At the same time the desire to micturate was more frequent, and was attended with much pain. At the hospital a large silver catheter was used, and the man was taught to relieve himself with a gum elastic instrument. He has been in the habit of doing so, he states, six times in the night, and more frequently during the day, and as time goes on the need still increases in frequency. Evacuation always gives relief.

After exposure to cold, the patient's difficulties have been invariably increased. During the last year there has been much pain in the urethra and in the glans penis. This distress, too, has usually been relieved by the catheter. Within two or three months the sufferings have been greatly aggravated. The pain during that time is described as of a 'cutting and stabbing' character; and the catheter has been used still more frequently for the relief it affords.

On admission to this hospital the patient was obviously in very weak health—pale, anxious in appearance, and with poor appetite for food. With examination by the rectum the prostate was found to be much enlarged, extending up beyond the reach of the finger, and spreading widely from side to side. It was also tender to the touch, and during the examination much pain was felt in the urethra up to the neck of the bladder. The pain was almost completely relieved when urine was drawn off by a catheter, but it soon returned. Any walking increased the pain. There was no tenderness on pressure being made above the pubes or over the renal region. Sleep very scanty, on account of

the necessity the patient felt to leave bed often in order to pass the catheter.

Urine high coloured, alkaline, depositing a copious muco-purulent ropy sediment. It was so for some time before the patient came to the hospital, and, the man says, it then often 'blocked' the catheter. The diagnosis was inflammation of the prostate and of the bladder.

The treatment was as follows :—The patient was kept in bed as much as possible. 'Cupping' was used once on the perineum. Opium was given at bed-time, and the bowels were acted on from time to time. Afterwards nitro-hydrochloric acid was given twice a day. The result was clearly beneficial. Pain was much diminished. The need for evacuating urine was lessened in frequency; the patient, it is recorded, rising from bed to remove urine three times during the night instead of six times or oftener as before.

After that interval of improvement a severe rigor suddenly occurred, followed by slight attacks of delirium. The man then soon succumbed.

Examination after Death.—Lungs crepitant throughout; no cavity of pleura, the lungs being adherent to parietes of thorax, to diaphragm, and to pericardium. Heart substance healthy; aortic valves partly calcified; bronchial glands studded with calcareous matter.

In left kidney a large cyst; otherwise both kidneys moderately healthy. Ureters enlarged. Bladder much thickened; mucous membrane thick, much congested, very dark in colour; contains thick, dark, stringy muco-pus, especially behind the prostate. This gland enlarged in all directions, reddened by inflammation; a projection bending the urethra upwards towards its end; and a whitish deposit from the bladder covers and closes the opening into the canal. The back of the prostate forms, as it were, a barrier against the discharge of urine from the base of the bladder (Plate XXX., fig. 1).

A tumour (epithelioma) projects from the mucous membrane near the entrance of the left ureter (Plate XXIX.).

Now to connect the indications of disease with the morbid condition which caused them. The difficulty in the evacuation of urine, and the increase of difficulty to total retention, was due to the condition of the prostate. The gland, naturally enlarged in the advanced age of the patient, having become inflamed, was further increased in size, and the projection behind the vesical orifice of the urethra hindered the escape of urine (Plate XXX., fig. 1).

Further, the pain and frequency of the desire to empty the bladder, and the disordered condition of the urine, were caused by the congested, the inflamed state of the vesical mucous membrane. A not infrequent cause of such symptoms is the presence of a stone in the bladder. But here the presence of a foreign body was negatived by the fact noted, that the removal of the urine gave immediate relief to pain, as well as, though for a short time, to the desire to evacuate.

How are we to account for the short duration of the improvement in the man's condition, which occurred repeatedly within a few weeks under medicinal treatment? The answer may be that the morbid changes that had grown in strength during two years—especially, perhaps, that affecting the mucous membrane of the bladder—were aggravated by the tumour referred to. By its local effect and by the constitutional state, of which its presence afforded possible evidence, the reparative processes might have been stopped.

*Epithelioma filling the upper part of the Urinary Bladder—
Calculus removed (Plate XXXI.).*

Case 56.—George L., æt. 50, has been employed from his youth as an agricultural labourer, except during six years that he acted as groom and plumber's assistant. Married twice; first wife died in childbed, second childless.

Has lived in a healthy situation, in a comfortable home, with good food and clothing. Has been temperate, seldom exceeding a pint of beer in a day. Is compact in form; disposition cheerful. Father and mother died in advanced age—each over 80 years. The former was ‘long subject to gravel.’ Brothers and sisters were eighteen in number, of whom twelve are living. One sister and two nieces died of consumption.

The patient himself has frequently had rheumatism in the hips and knees. He once had gonorrhœa, which soon passed away spontaneously.

When fifteen years old he was kicked by a donkey on the genital organs. The swelling caused by the injury subsided in three days. But, a couple of days afterwards, blood passed in little clots with the urine, and since, at intervals, blood has continued to pass, ‘interrupting a state of otherwise good health.’

About eight years ago the patient had frequent and sudden desire to pass water; so urgently did it occur that he had scarcely time to make the necessary arrangement of his dress for the evacuation. Urine passed at first in full stream with force, but soon and suddenly subsided into drops. The discharge afforded no relief. It was, on the contrary, succeeded by much pain, which was referred to the glans penis, and ‘caused him to pull the foreskin and to jump about.’ The suffering became progressively worse.

At the beginning of the present year he was obliged to give up employment for a time. In the last months he passed urine four times in an hour. While working at field labour has been obliged to seek relief very often. Sleep has been much disturbed. He resumed his occupation till two months since, when he was compelled again to abstain from work. Now, medical advice was obtained. A sound was passed, and was repeated after an interval of a few days, in order to decide respecting the presence of a stone in the bladder. The use of the instrument, the man

states, caused 'almost insufferable pain' in the penis, with a considerable discharge of blood, followed by retention of urine. He was relieved by a hot-water bath.

Examination in the Hospital.—The patient was in much suffering, probably occasioned by the journey of some hours by railway. He passed water very frequently; complained of severe pain. The urine was alkaline and loaded with thick, stringy sediment, and some clots of blood. Little sleep. Bowels constipated.

[Further examination deferred till the man's general condition should be improved.]

Constipation relieved by castor oil and enema. Hydrochloric acid then given in small doses, with morphia at bedtime—quarter of a grain of the sedative as a dose at first, afterwards increased to half a grain for the night draught. When those medicines were used the patient had, the report states, 'refreshing sleep at night; he felt much improved—comparatively comfortable.'

On examination by the rectum, a hard, large mass was found, extending up beyond the reach of a finger and spreading wide at each side. Dulness to slight percussion over lower part of abdomen near pubes.

By a sound passed through the urethra a stone was struck. At the same time the instrument gave clear evidence of much disease of the bladder. When it passed the vesical end of the urethra it was at once actually in contact with the posterior wall of the bladder, which was felt to be solid and rough. A stone was struck while the outer part of the instrument was in the vertical position, the patient being on his back in bed. The handle of the sound was not brought down from that position towards the perineum: when it was sought to do so the point was arrested, being fixed against the back, or what represented the back, of the bladder; and the patient expressed much pain during that movement of the sound. There was, in fact, no cavity of the bladder to allow of the movement of an instrument.

Here, then, was clear evidence of two diseases: 1st. Stone in the bladder, the presumption of its presence suggested by frequent painful desire to micturate, and by the fact, especially, that the pain was not relieved by the evacuation. Its presence proved by the instrument—the sound. 2nd. Disease of the bladder shown by the character of the discharge for many years; and still more completely by the morbid condition of its substance, as found with the instrument; shown also by the presence of a tumour behind the prostate, as well as by some dulness to light percussion—tapping above the pubic bone. The removal of the stone seemed expedient, even imperative, for the almost constant pain during eight years; although it was certain that the much more serious incurable disease must remain.

The stone, a small one, was removed by the ordinary lateral operation. It may be mentioned that when, for the purpose of the operation, a grooved staff was passed into the place of the vesical cavity, its point, in an examination made by the rectum, was felt between the prostate and a large tumour.

Lithotrity was inadmissible, on account of the want of space for the use of an instrument with a needful quantity of fluid.

After the operation the reports show that the patient for a time went on fairly well. They frequently ran thus:—Slept well; free from pain; skin cool; slight moisture of skin; asked for additional food. Of the wound, too, the reports are favourable.

In five weeks there was a decided decline in the man's condition. Increased dulness with tenderness and hardness on pressure above pubes. Recti muscles at the lower end, that of the left side especially, became tense, while the remainder of those muscles was quite soft—pliable. The general state became much deteriorated. The man died seven weeks after the operation.

Examination after Death.—Main facts in abdomen and

pelvis: omentum adherent to urinary bladder; pus in both ureters. Much vascularity of both kidneys; on left side small elevations containing puriform matter. Lumbar lymphatic glands much enlarged, their size varying from that of a walnut to double that size. When incised a creamy fluid escapes.

A large mass of disease involves the urinary bladder (Plate XXXI.). It extends from three inches above pubes to the hollow of the rectum, to which the tumour adheres, spreading out largely on each side. The coats of the bladder involved in the morbid mass are destroyed, except the lower part—the base and neck of the bladder. It was in that remaining sound part of the cavity that the calculus had been lodged. In the sound part of the bladder are the orifices of the ureters and the opening into the urethra. The prostate is not diseased.

The acute disease in the abdomen affecting the kidneys, after the operation, together with the extension of the vesical morbid growth to lumbar lymphatic glands and the effect on the system, caused the death of the patient; which, indeed, the disease in the urinary bladder had long rendered inevitable.

It would be inferred from the large size of the mass that the cancerous disease was of long duration, and the evidence in the history of the case leads to the same conclusion. Soon after the injury sustained in boyhood, 'clots of blood continued to pass at intervals, interrupting a course of otherwise good health.' The discharge of blood in that form continued, it is recorded, from the age of fifteen years to fifty. The pain, with frequent, urgent need to pass urine which existed for eight years, was attributable to calculus in the bladder.

How may the continuance of life during that long period, with power to engage in a workman's labour, be explained? In answer a few facts may be stated. The principal function of the urinary bladder is the reception of urine and its

transmission outwards. Another important, though for the support of life less essential office of the bladder, is that it serves as a reservoir to hinder what would be the extreme inconvenience of frequent micturition. The passage for urine into the bladder and that for its escape outwards were, in the case of George L., unaffected by disease. The part of the bladder in which openings exist was sound. To that fact—to the fact that the disease did not interfere with vital functions—is probably to be assigned the long duration of life. It may perhaps be added, as contributory to that result, that the upper portion of the bladder, serving naturally as reservoir, is not connected with other organs, and in it the disease remained encapsuled by the altered tissues of the bladder.

It may be added that the presence of malignant disease for lengthened periods has been observed in other organs. In his able work on cancer Dr. Walshe states:—‘Carcinoma may exist for a length of time in the most important organs—witness the brain, the liver, the lungs—without producing the least functional derangement. Experience even proves that two-thirds of the surface of the stomach may be destroyed by cancerous ulceration without, provided the orifices are left intact, producing any general or local symptoms of sufficient intensity to direct the attention of the patient or his medical attendant to that important viscus.’¹

¹ *The Nature and Treatment of Cancer.* By Walter Hayle Walshe, M.D.

HERNIA: RUPTURES.

STRANGULATED INGUINAL HERNIA.

You witnessed, gentlemen, two operations for strangulated inguinal hernia upon the same afternoon a few days ago. These cases, which are still under our observation, will serve, without engaging in elementary details, to illustrate several points of interest in a subject every example of which has a degree of practical value. The history of each of the cases is as follows :—

Strangulated Inguinal Hernia—Stricture between the External and Internal Inguinal Rings.

Case 57.—George Fife, a horse-keeper, æt. 43, married, is of rather small stature and slight conformation ; has usually been healthy, but says he has never been a strong man.

Previous History.—About five years ago, immediately after falling down a step, he felt what he terms a weakness in the right groin. This, he says, passed off gradually. According to the man's statement, he has never since felt anything wrong in the part. But, upon strict interrogation afterwards, he admitted that there had long been a fulness in the groin. That some enlargement must have been there was proved during the operation by the condition of the omentum found in the scrotum. Discrepancies of this kind between the report of patients and the facts are so common, that I habitually place but little reliance upon the accuracy of their statements in reference to any details of the previous history of the hernia. The same may be said of most other

maladies ; and I have long noticed that in order to extract anything useful in the way of information, there is need of a return to inquiry, and of some management as to its form. It may be that the suffering produced by the disease is in a measure the cause of many patients being unable, when brought to the hospital, to give any satisfactory account of their previous state. The report continues thus :—

On the morning before his admission to the hospital, the patient, while walking, fell upon his nates, and he immediately felt a lump in his right groin. He soon became sick and vomited ; he began to feel much pain in his belly about the navel ; and he found lying upon his back to be less easy than sitting up. The swelling in his groin became hard. He squeezed it tightly, in order to lessen it, but ineffectually.

On admission here a swelling is found upon the right side, extending from the external abdominal ring to within half an inch of the testis, at the lower end of the scrotum. The tumour starts into considerable size suddenly from the wall of the abdomen. There is a degree of fulness in the inguinal canal, accompanied with tenderness on pressure. On its inner side the tumour reaches to the middle line, pressing aside the penis. The wall of the abdomen is not tense, but it is tender to the touch, and the tenderness extends over towards the left side. The tumour is very tense and sensitive to the touch, the greatest sensibility being at its upper end. The patient was put into a warm bath for half an hour, and the effort then made for a short time to reduce the hernia being ineffectual, chloroform was given. When the patient was under the influence of the anæsthetic, the scrotal bag was compressed in the hand, in order if possible to unload the bowel of air, and, at the same time, to ascertain the exact position of the stricture hindering its ascent. This was determined to be between the two rings in the inguinal canal. The hernia was determined to be strangulated.

Operation.—In the first incision, which was made over the outer end of the inguinal canal and the upper end of the

tumour, to the length of about two inches, two veins of larger size than usual were laid bare and divided. To these ligatures were loosely applied, to prevent inconvenience from the escape of blood during the operation. The ligatures mentioned were removed after the reduction of the hernia. As it had been ascertained that the external abdominal ring did not oppose the reduction of the hernia, the tendinous fibres of the external oblique muscle were parted, and some few were divided over the inguinal canal. The deep muscles were notched. Pressure was now made upon the hernia below, and it was found still not to swell upwards through the inguinal canal. The immediate cellular investment of the sac was, therefore, divided. The sac, thus laid bare, appeared very thin and diaphanous, except at one point situated about half an inch above the external inguinal ring. Here was a deep narrow transverse depression, by which the hernia, when pressure was made upon it with the hand, was stopped from moving higher. The thickened structure—by which the hernia, when pressure was made upon it with the hand, was stopped from moving higher—being divided, the sac was opened for the length of about a quarter of an inch. A knuckle of intestine was now easily replaced with slight pressure, and a portion of a considerable thickness of omentum was brought into view. This, at the lower end, was found to be thickened and extensively adherent to the sac, but the remainder was nearly natural. It was left undisturbed in the sac. The bowel was discoloured, but not deeply. During the latter steps of the operation a large quantity of serous fluid slightly coloured escaped from the abdomen, and a good deal of the same kind of fluid was removed from the sac when pressed upon. In fact, the lower part of the tumour was formed of this fluid. The operation actually performed in the case of Fife and others was different from the ordinary form, in that the stricture was divided from without—from the surface inwards, and while each part of the proceeding was under

view : whereas in the usual form the superficial structures are incised below the external inguinal ring and the stricture is divided from within outwards by means of a probe-pointed bistoury carried upwards under the guidance of the director or of the finger. The change in the plan of proceeding was made with a view to arrive at the stricture directly, so as to have the division of the peritoneum (the sac) made to the smallest possible extent.

To the further incidents in the case of George Fife I shall return presently ; meanwhile the second case now under observation shall occupy our attention. It was as follows :—

*Hernia Existing Twenty Years—Strangulated—
Truss worn out.*

Case 58.—Henry Wood, a shoemaker, æt. 40, many years ago had syphilis, and has since suffered from various later forms of that disease, including sore throat and caries of the bones of the nose. His complexion is sallow, his nose is flattened, and his breath is very offensive. Altogether this man's appearance is unhealthy. Twenty years since he had a swelling in the groin, a hernia doubtless, on the left side, which he attributes to a fall down the hold of a ship, though he states that the swelling did not occur for some time after the fall. In about a year after this he first wore a truss, and he continued to wear it till within the last two or three weeks, during which time he has omitted to wear one, the truss he had being worn out. The hernia has not been 'down' during the last eight or nine years until yesterday. Before that time it occasionally descended, and he used to reduce it by his own manipulation. About a year ago he first observed a swelling on the right side likewise ; he cannot in any way account for its occurrence.

Yesterday, he was engaged working in his garden, when, without making any strong exertion, 'he felt a sharp cutting pain' in the lower part of the abdomen ; and he

then discovered a swelling in the left groin. This he tried to reduce as he had done formerly, but without success. About two hours after he first observed the swelling in the groin, vomiting occurred, and since then everything he has taken in the way of food has returned, as well as two doses of Epsom salts.

Examination after Admission.—When brought to the hospital, there is found occupying the inguinal canal and the scrotum, on the left side, a large pyriform swelling, four and a half inches long by three inches transversely. The testicle is felt at the lower end of the mass. The swelling is very tense and tender to the touch, and the tenderness is most marked towards its upper end. The abdominal parietes are not tense, but there is some general tenderness over the abdominal cavity, and it is particularly marked near the inguinal canal. The patient feels, occasionally, paroxysms of severe pain, which are most intense about the umbilicus. He lies with his legs drawn up, and says that position relieves the pain. On the right side there is a small reducible hernia. Pulse 92, sharp and small; tongue dry and slightly furred. He was placed in a warm bath, which had no effect in aiding the reduction of the hernia. But the whole condition of this patient rendered much effort to replace the bowel by the taxis inadmissible.

Operation.—Chloroform administered. The integuments over the outer part of the inguinal canal and the upper end of the tumour were divided from within outwards, to the extent of about two inches, and the external oblique tendon was laid bare. The external ring was found, by compression of the scrotum, not to obstruct the ascent of the hernia. The tendon of that muscle, and the two deeper muscles, were divided to a very small extent. When the latter muscles were brought into view, a pellet of fat projecting at the lower end of the wound was taken away. After the deeper muscular structure had been notched, an attempt was made to replace the tumour, but without avail. There was plainly

in view at this stage a narrow, elongated tube of membrane. Pressure over the scrotum now did not soften the tumour. The tube of membrane referred to was, therefore, divided; and it proved to be the sac amalgamated with its cellular investment. An opening of half an inch in length being made (the constriction being so long), the omentum was seen; and now the bowel was returned into the abdomen under the influence of slight pressure over the swelling below. The intestine was not seen, being concealed behind the omentum. This structure was in small quantity, and was unaltered. It was left in the sac. When the intestine was returned to the abdomen, some reddish-coloured serum escaped from that cavity.

Taxis.—For the restoration of the hernia to the abdomen, the relaxation of the muscular and membranous structures about the passage from the abdomen is needed. That relaxation is effected by the bent position of the body, and is aided by the influence of the anæsthetic. Those means with the required manipulation were ineffectual to attain the object in Cases 57 and 58. While the hernia in such a case as either of those remains protruded, the mass becomes enlarged. The enlargement is the result of two causes, namely, the production of air in the bowel, and the accumulation of blood occasioned by interruption of the circulation in the blood-vessels. In order to replace the hernia it may be necessary to lessen by pressure one or both sources of enlargement.

No prolonged effort to replace the hernia was made in either of the two cases. I abstained from doing so because the patients had, each of them, tenderness of the abdomen—most severe in the neighbourhood of the hernia, and gradually decreasing in intensity towards the opposite side of the abdomen. In each, too, the tumour was very tense as well as tender to the touch, and there was considerable pain on pressure being made over the inguinal canal, outside the prominent part of the swelling. Moreover, one of the

patients, who had himself repeatedly reduced the rupture during several years, and who, therefore, had acquired some skill in the mode of manipulating in order to effect that object, was obliged, upon making trial on this occasion, speedily to desist *on account of* the pain he suffered.

Tension of the tumour, as well as *tenderness to pressure*, which have been adverted to, require some further notice. It has frequently happened that, when a patient has been admitted here, the feel of the hernia, with the condition of the patient generally, has at once decided whether I should continue at the hospital or commit the case for a time to the house-surgeon. The practice adopted may be illustrated by brief reference to other cases.

Scrotal Hernia incarcerated for Four Days.

Case 59.—Not long since a man was admitted (Gilbert, Case-book 14) for a scrotal hernia, upon whom Mr. Morton had formerly operated for strangulated intestine, at the same site. This patient was at times afflicted with an almost incessant cough, and the efforts of the cough brought down the hernia during the night. The tumour was nowhere tense, and from that fact I concluded that, in all probability, it would be replaced without operation. The reduction was effected without operation, but only after the lapse of several days. Careful observation at short intervals is needed.

Strangulated Inguinal Hernia returned to Abdomen after Operation, without division of Sac.

Case 60.—The same point is still further illustrated by a case of strangulated inguinal hernia in a large and aged man, a tradesman, whom I saw with Mr. William Arrow-smith. An operation having become necessary, I made a short incision through the integuments from a little below

the external ring upwards and outwards, divided the tendon of the external oblique muscle—mainly by separating its fibres—and notched the margin of the deeper muscles. There was no evidence of any rigid thickening of the underlying sac. With the aid of pressure upon the swelling, the bowel was now emptied of flatus, and it became flaccid ; but I found it impossible to complete the operation by restoring the intestine to the abdomen. Still, as I regarded it of especial importance to avoid wounding the peritoneum in this patient, the efforts to replace the bowel were for the time discontinued, in the confident expectation that, with some aid from other means, the bowel would be restored to the abdomen without further interference in the way of operation. The patient, it is to be understood, had been freed from all distress by the operation performed. The strangulation being at an end, he might be said to have been brought into the condition of a person suffering from irreducible non-strangulated (or, as it is often termed, ‘in-carcerated’) hernia which had not been operated on. On the following day the bowel slipped back after an enema. Under the careful management of Mr. Arrowsmith the patient did well.

It must be added that there is need of caution in using the taxis. It is certain that from injudicious pressure—*i.e.* pressure too forcible or too long continued—upon the bowel, with the view of restoring it to the abdomen, even very serious consequences have from time to time arisen. Of one case, the most marked illustration of the evil which has fallen under my own observation, the circumstances were briefly these :—

*Large Femoral Hernia Strangulated—Forced return to
Abdomen by Patient—Death.*

Case 61.—A female (Williams, Case-book 7) was admitted with a large femoral hernia, one of the very largest

that I have seen of that kind of hernia. It covered, literally, the fore part of the thigh, reaching outwards close to the anterior spine of the iliac bone. Efforts to reduce the hernia having failed, I left the bedside of the patient while preparations were being made for the operation. On returning, after short delay, I found that the large thin covering of the hernia alone remained, and it was fallen into loose folds. The sac had been emptied of its contents by the efforts of the patient, who had been accustomed to replace the hernia. Symptoms of acute abdominal disease soon supervened—indeed, they scarcely remitted for a moment. Death was the result.

Upon examination, post-mortem, in addition to the usual evidences of active peritonitis, about four feet in length of the small intestine—the part, doubtless, which had been strangulated—were found studded over at intervals with patches of ecchymosis. That condition must have resulted from excessive pressure and consequent rupture of the congested blood-vessels.

Even a greater amount of injury than that has been inflicted under like circumstances, for the bowel has been actually burst by the pressure of the patient's own hands. An instance is recorded by Mr. Travers.¹ In such cases as these the evil effect of the compression is obvious; but the amount of injury produced by pressure, as it is commonly used, for the replacement of a hernia, is not ascertainable, for, in smaller degrees of injury than those above cited—supposing some to have been inflicted—it is not possible to assign to the pressure, apart from the strangulation, its due share in the evil result seen in an examination after death. Nevertheless, there cannot be a doubt that strong compression of the bowel, if there be any tendency to inflammation, is calculated to augment the evil.

In the cases that are now under our observation, the

¹ *Med.-Chirurg. Trans.* vol. xxiii.

presence of tenderness was taken as the contra-indication to the continued use of the pressure required to replace the bowel in the abdomen. It was not, I may add, expected that any material benefit would follow the use of the warm bath, which was resorted to in both cases; but, apart from other considerations, it is not unimportant to show patients that there is a strong desire on the part of the surgeon to avoid resorting to an operation. In this, as in other diseases where an operation becomes necessary, it is well that the patients should be led to form for themselves—to feel a conviction of its necessity.

Use of Anæsthetic: Ether or Chloroform.—In each of the cases now in hospital, as well as in others requiring operation—perhaps universally in late years—an ‘anæsthetic’ was used. I would point to circumstances, however, in the condition of the patient which, in my opinion, render extreme caution necessary, perhaps even make it more prudent to omit the use of the anæsthetic.

*Strangulated Hernia—Death soon after use of Chloroform—
No Operation for the Hernia.*

Case 62.—A woman was brought to the hospital after midnight, suffering from strangulated femoral hernia, and obviously requiring speedy relief. The effort for taxis being ineffectual, the operation was decided on.

The resident medical officer of the hospital, the able and careful Dr. Hillier, gave chloroform. While it was being administered, and in a very short time, the patient died. By close inquiry it was ascertained that the poor woman had been sick for several days, and therefore had been virtually without support. To the depressed condition of the patient and too long delay of sending the sufferer to the hospital I attribute the disaster in this case—the only one I have witnessed in like circumstances. In such a case—sickness so long enduring and depression considerable—I

would omit the use of the anæsthetic. The pain of the operation is not considerable. The integuments are divided from within outwards. The underlying structures are membranous, thin, and small in extent.

The Stricture and the Operation come next for comment. The evidence in favour of conducting the operation so as to avoid, if possible, opening the peritoneal covering (the sac) of the hernia is to my mind conclusive. When performed upon that plan, the operation might be considered as undertaken in aid of taxis; and objections to the one would apply with nearly equal force to the other. The first incision was made differently in each of the two cases. The integument was divided over the point at which the stricture was expected to be found. It is worthy of remark that, in both cases, the obstruction to the return of the hernia was in nearly the same place; and that in both it was caused by an adventitious structure—a deposit in the substance of the peritoneal sac, or upon it. The narrow circular constriction in the first case resembles that which I now show you (presenting a preparation). This condition, probably, arises from increased action of the capillary vessels in and around the neck of the sac, while it is compressed at the internal ring under the weight of the herniary tumour. More than one, even several such constrictions, have been formed in the same sac, all doubtless being produced by the same cause and in the same place. The number of the constrictions and the position they occupy are sufficiently accounted for by the successive forcing downwards of the sac, as the hernia is enlarged and protruded further from time to time. The more extensive thickening of the sac in the second case is attributable, most probably, to the pressure of the truss during a series of years. In recent hernia, 'the stricture' is not of the same kind as in either of these cases, for the peritoneum when first protruded being very thin and extensible, the obstruction—the stricture—is commonly owing to the muscular or tendinous structure of the abdominal wall.

Perhaps a chief point of interest in the cases that have been narrated is, that they afford a good illustration of a condition which renders it impossible to replace the hernia without opening the sac, for, you will observe, when the hindrance to the return of the bowel—the narrowed or rigid neck of the sac, ‘the stricture’—was fully divided, the sac was actually open.

Here I would remind you that a little time ago another and very different source of obstruction, which likewise rendered it necessary to open the sac in order to replace the bowel, was presented in an operation.

Inguinal Hernia Strangulated by a cord-like coil of Omentum.

Case 63.—Frederick Roberts (Case-book 19). In this instance, even after the sac had been opened and its neck was found to be sufficiently widened, the operation was not completed till the bowel had been made free from a narrow strip of omentum, which was in some sort coiled about it. The obstacle here was the less easy of discovery from being of an unusual kind and slender—cord-like, as well as placed deeply in the inguinal canal, a very narrow passage.

But, although the opening of the sac was unavoidable in the cases now under our observation, it is to be remembered that the extent of that aperture was as small as was possible, consistently with the object of the operation—the removal of the hindrance to the replacement of the intestine, the division of the stricture only.

To recapitulate briefly as regards the operation:—The precept would be (1) avoid wounding the peritoneum (the sac), if possible; (2) if division of that membrane should be absolutely necessary, the wound must be as small as will be consistent with the restoration of the protruded intestine to the abdomen. In pressing this rule upon you, I use the name *peritoneum*, not *sac* only, because I apprehend that the latter designation leads away from full apprehension

respecting the wounds of the structure. I have the impression that if we suppose a portion of peritoneum disturbed from its natural position within the abdomen, and forced outwards with the protruded intestine, we cannot anticipate that it will be less susceptible of evil resulting from incision than when not removed from its natural position. But when in that natural position, the danger to the person of any wound of the membrane, and the greater danger of a large than a small wound, would not need discussion. Now to return to the cases in the wards.

Progress after Operation.—The wounds in both the cases healed very nearly by ‘the first intention,’ but both had subsequent appearances which require notice. They may be abridged as follows:—

H. Wood, Case 58. A small abscess was formed immediately under the skin, close outside the upper angle of the incision made in the operation, and pus was discharged through an opening made for the purpose; the abscess then was soon closed up. The abdomen the while was free from pain. The health was unaffected. The other patient (George Fife, Case 57) had a return of tenderness of the abdomen, but it was confined to a narrow space immediately above the seat of the hernia, and extending in a line upwards towards the ribs. He was likewise troubled with hiccough, which lasted several days, and he vomited much of what he took into his stomach. The distress subsided after the application of a few leeches, followed by free evacuation from the bowels caused by two doses of calomel and enemata. Subsequently a small abscess formed in the scrotum. This being punctured and evacuated soon disappeared, leaving the patient convalescent and quickly gaining strength, but with a painless, elongated, and narrow induration in the groin, resulting from the omentum which had undergone a degree of thickening.

In the formation of pus—the abscess in the case of Wood—there was nothing very material. The patient had

previously been an unhealthy person, suffering from syphilis and some of its results, including sore throat and caries in bones of the nose. In such persons pus is more freely formed, and usually diffuent as seen in this case. Moreover, the formation of purulent matter in connection with the sac which has been opened is not an infrequent occurrence. But the other patient, Fife, suffered from symptoms which are assignable to the omentum. The pain was clearly over it; and to the inflamed state of that structure, of that part of it, too, which was in the sac, and its continuation up towards the stomach may, I think, the hiccough, and perhaps in a measure the sickness, be assigned. With those exceptions the cases went prosperously on.

Omentum.—The circumstances just narrated lead to inquiry respecting the proper manner of treating that structure when it forms part of a strangulated hernia. In discussing this important part of our subject it will be most convenient to proceed from points of practice which are more certain and settled to others that are less so, and which it is, therefore, desirable to help to fix. This process will bring us, by easy transition, to the cases with which we have been engaged. The discussion may be arranged under three heads, according to the nature of the circumstances, thus:—

(a) In a case of hernia consisting of intestine and omentum, we are, in treating it by taxis, satisfied with replacing the intestine; that is to say, after having accomplished so much, an operation would not be performed in order to restore the omentum also to the abdomen.

(b) So, likewise, after having obtained the same result in the operation—*i.e.* the bowel being restored to the abdomen by division of structures covering the sac, but without opening the sac itself—it would not be justifiable to proceed further, not justifiable to open the sac in order to act more immediately upon the omentum, with the view of replacing it in the abdomen, as well as the bowel which had been already replaced.

(c) To the next class, the case of Fife and that of Wood belong. In these the sac was opened, but only as far as needful to divide the actual constriction. The question occurs, What is the best mode of managing the omentum here? The cases under observation have direct bearing upon the answer to the question. The omentum in one—Wood, Case 58—was laid bare in a very small degree, and was seen to be unaltered in texture. The edges of the wound in the integument became joined by adhesion; still, an abscess was formed; but the abscess might have been formed, and I have repeatedly seen it formed, without any omentum being contained in the sac. Moreover, the abscess was not in the position of the omentum. It was only under the integument, in which position small abscesses often form after injury or incision of an operation. In the case of Fife the omentum was somewhat more exposed than in the other case. It was adherent to the lower part of the sac, and elsewhere was but slightly altered from the natural state. The wound of the integument here, too, was closed immediately by adhesion. But the tenderness that occurred over a narrow space in the direction upwards in the abdomen from the omentum in the sac, and the continued hiccough, led me to refer the distress this patient suffered to partial inflammation of that structure. Having mentioned in the ward this view to my colleague, Dr. Walshe, he suggested that auscultation would probably aid the diagnosis. Accordingly, the stethoscope being applied, a distinct ‘rubbing sound’ was heard in the abdomen. The question now arises, Would the removal of the omentum in this case have been a protection against the inflammatory action? To me it seems pretty certain that the free division of the sac—the peritoneum—which is necessary in such an operation, and the presence of the ligatures used to prevent hæmorrhage, together with the manipulation and the exposure of the structure to the air during the process, might—probably would—have led to a considerable amount of

inflammatory action ; and that for this reason the course actually pursued was, on the whole, the safer course. Hence, then, the strangulated bowel being restored to the abdomen with a very small wound of the sac, a wound of the structure only, and without exposure of the omentum, except in the slightest degree, I would prefer to leave that structure with its peritoneal covering undisturbed.

(*d*) When, on the other hand, the sac has been laid freely open in the operation, the practice is different. In such circumstances the omentum, being largely laid bare, would, in all likelihood, if left in the sac undergo inflammation, and would suppurate freely. All such inflammatory action is prejudicial, both in itself and in consequence of augmenting the probability of inflammation in the general cavity of the abdomen. In the circumstances now supposed—the sac being, I assume, necessarily laid freely open—if the omentum be in small quantity and unchanged in texture, it is best to replace it in the abdomen, provided, however, that the restoration can be effected without much manipulation. But should the omentum be altered—thickened or agglutinated into a mass, as it is sometimes found to be after a protracted continuance in the hernial sac—there can be no doubt that it should not be replaced in the abdomen. I once witnessed a case which forcibly illustrated the injury that results from doing so. In the case I now refer to, after the bowel had been returned to the abdomen in an operation for strangulated scrotal hernia, a thickened piece or lump of agglutinated omentum was likewise passed up. The patient died of peritoneal inflammation, and the mass of altered omentum was found embedded in a quantity of lymph which its pressure had caused to be effused around it. In short, the omentum, when in the condition adverted to, might well be considered a foreign body, and its presence in the abdomen would be productive of similar consequences. But if not restored to the abdomen how is it to be disposed of? The best course is to remove with the scalpel the

mass when thus altered. And when the omentum protruded is in large quantity, or, though not in large quantity, still does not admit of replacement in the abdomen without much manipulation, it is on the whole best to pursue the same course. If left in the sac, the omentum—when exposed as we have supposed it to be—whether changed or unchanged, commonly takes on an inflammatory, it may be even a suppurative, action; and in addition to the immediate and local evil, the inflammation is prone to extend upwards to the abdomen.

Hæmorrhage from the vessels necessarily divided in the operation for removing the omentum, is prevented by tying the individual bleeding vessels. In one instance, however, a case of femoral hernia, in which the mass of omentum removed was very large and the number of vessels was so great that it would have required a multitude of ligatures, I applied a small pad to the cut edge of the omentum at the upper end of the sac, and made it accessible with a string, by which it was drawn away upon the following day. The pad was beneath the large compress and roller required for the hernia. Mr. Morton, at my suggestion, adopted the same expedients in a case of inguinal hernia. Both cases ended favourably.

Treatment after the Operation.—After the operation in our present cases, reliance was placed at first on some small doses of opium. On the third day, an enema was administered. In the case of the patient who had continued vomiting, advantage was derived, after the use of leeches, from two or three doses of calomel followed by enemata. Sufficient time must be allowed for the recovery of the bowel before any remedy calculated to excite intestinal action is used; and the occurrence of peritoneal inflammation is to be constantly and carefully watched for. The necessity of the latter injunction will be understood when I state that I have not, during a series of years, seen that inflammation wanting in a single instance of *post-mortem*

examination after an operation for strangulated hernia had been performed. During the first two days the patient must be seen at short intervals. Bear well in mind that it is at the outset that the peritoneal inflammation admits of most successful treatment. The test of its approach is the presence of tenderness over the abdomen. Heat of skin and quickness of pulse will, of course, be looked for. When there is any indication that inflammation is arising, leeches are applied, and the degree of tenderness, taken in connection with the strength of the patient, determines the number to be used. In aged or feeble persons, even a very small number will be of service.

Application of Leeches—Venesection—Opium.

It is to be noted that the degree to which blood is abstracted in this and other cases has been much diminished in recent years by all practitioners. Take as an example, this case:—Gilbert had been operated on a few years since. The record of the case at that time contains a statement of much-recurring pain in the abdomen with quick pulse and much heat of skin. On the first day after the operation the man was, by direction of one of my colleagues, bled to 24oz.; on the second day twelve leeches were applied on the abdomen, and venesection was repeated to 18oz. twelve hours afterwards.

The patient did well and soon returned to his employment. Now, our recourse to leeches is in very small number, and venesection seems to be almost abolished.

Opium.—After the operation for relief of strangulated hernia—indeed, after other serious operations also—the administration of opium is usually beneficial; and for the same purpose, namely, to relieve the shock mental and bodily which the system undergoes—to procure rest if not sleep. There is, moreover, after the operation for hernia, a special local object to attain by the administration of the

medicine. The strangulated part of the bowel has undergone, in most instances, a morbid change; and, in order that time should be allowed for its regaining a healthy condition, it is important to stay the action of the intestinal canal for a short time—a day or two, perhaps. The object is attained by the opiate in small doses at intervals. It is noticeable that when the action of the bowels has been so interrupted, the faecal matter then evacuated is altered from the usual condition, becoming comparatively hard. How is this fact to be interpreted? To aid our answers to this question we may turn for a moment to another case—to an ailment of common occurrence in which the facts are not infrequently under observation and more easily observed. Many healthy persons, after exposure to cold wind or to damp air, are troubled with excessive formation of adhesive mucus in the throat and perhaps in the large air tubes, which it requires effort to remove. That inconvenience is generally relieved by a few small doses of an opiate. With the cessation of the troublesome excess of secretion in the throat there may come a cessation of the action of the bowels. To the opiate both effects are due. While the mucous follicles of the throat cease to form the excess of secretion, the glands which carry on the effective action of the bowels are likewise interrupted in their functions, and the intestinal evacuation is impeded. But that interruption of alvine evacuation, which was not sought for—which is, in fact, an inconvenience in the throat affection—is the object it is desired to attain in the management of strangulated hernia after the operation. In seeking to explain the mode of action of the opiate in these instances, we may attribute its influence to the effect on the nervous system. We know of the sedative effect of the medicine on the great nerve centre, the brain. Here we are disposed to attribute its effect on the secretions of the alimentary canal to a like influence on the nerves of the blood-vessels in the glandular structure of the canal.

Further Treatment of the Patient.—Afterwards, in two or three days, it is desirable to relieve the constipation, whether resulting from the effect of opium or not. The object in our cases was attained at first with the enema, which unloads the lower bowel without disturbing the part that had been injured by the strangulation. That part may still need rest for restoration to a healthy condition. A little later, when anxiety about the strangulated bowel had ceased, some general discomfort, due in all likelihood to inaction of the liver, rendered inactive like the intestinal glandular structure by the opiate, still remained. That condition was evidently relieved by medicine—calomel or blue pill with an aperient.

The Cases—57 and 58—which have formed the bases and the connecting links of these observations, went on satisfactorily. We have now arrived at the last stage in the management after the operation for strangulated hernia—the application of the truss.

The Truss.—It is no unimportant fact in the history of both cases under observation that neither of them wore a truss at the time when the hernia descended. Fife, Case 57, had never worn one. Indeed, he seemed ignorant that he ever had a rupture, and he spoke merely of having had ‘a weakness’ at one time. Still, though without a truss, he remained for years without a return of the hernia. On the other hand, the second patient—Wood, Case 58—had worn a truss for nearly twenty years; but he had discontinued it for the space of two or three weeks. It must be noted, too, that neither patient was engaged, at the time the rupture formed and became strangulated, in any active exertion, such as is calculated to force the bowel from the abdomen. One of them, indeed, had a fall, and may have instinctively made an effort to save himself. It was to an attack of tormina of the bowels that the descent of the intestine seems to have been owing in the second case.

From such facts, and they are typical of what is often met with in practice, the plain inference is that no com-

promise must ever be allowed as regards the use of a truss in the case of persons who have once had a hernia. It is equally plain that, to be of any service, the truss must be placed accurately over the orifice of the canal by which the hernia descends; and that the apparatus must, at the same time, be well fitted to the part, and to the person, and must also be of strength adequate for the object. The adaptation of the truss is too often left entirely to the seller of the instrument and the wearer of it, though we often have practical proof how careful the surgeon should be in looking to the matter himself. You have seen that one of the two patients at present under care in the hospital, even though he had worn a truss for several years, was found to have placed a new instrument altogether below the inguinal canal. To you it would be a useful exercise in the dissecting-room to dissect out the inguinal and femoral canals, and to adapt the respective trusses to the parts, for in this, as in most other practical matters, precept and general views, however sound, are not enough.

In common cases an ordinary truss, applied with some care, will prevent the protrusion of the intestine after its replacement; but when the hernia has attained to a large size, the openings in the abdominal walls being proportionately large, there is often a great tendency to the re-descent of the bowel after it has been returned to the abdomen. In some of these cases the proper adjustment of the apparatus becomes a matter of considerable difficulty. Much here depends upon the apparatus used. There are before you a number of varied construction. (Several trusses were shown with an outline of their advantages, real or supposed.)

Difficulties occasionally occur which require special arrangements, thus:—

Case 64.—A man (Johns, Case-book 14), suffering from old and very bad stricture of the urethra, with several sinuses opening behind and before the scrotum, had a very large hernia in consequence of violent forcing to evacuate

the urine. After an operation, by means of which the sinuses were closed and the urine was easily evacuated by the natural canal, the hernia still descended very forcibly. In this patient, who was, it should be added, a corpulent person, with abundant deposit of fat above the pubes, I succeeded in having the hernia supported by means of a carefully formed pad, fitted by means of a screw to a slit in the fore-part of the truss-spring. By this arrangement the pad admitted of being moved a little in or out, as well as of being altered in its direction; and a sufficiently accurate and effective adaptation of the pad to the inguinal opening was obtained. I mention this case in order to impress upon you that it will now and then happen that apparatus constructed upon a general plan will not suit certain cases. These require special contrivances on the part of the surgeon, and of the mechanic acting under direction of the surgeon.

But a further difficulty may arise from the pressure of the spring, which, though adequate to overcome the tendency of a large hernia to descend, is at the same time so strong as to cause ulceration of the skin. An example of this difficulty occurred in the patient Kenney (Case-book 11).

Case 65.—He was a stout, corpulent man, and I had operated in his case for a large strangulated scrotal hernia without opening the sac. The truss was well fitted by the maker, and was found to be strong enough to support the hernia; but it soon caused irritation of the skin. The expedient recommended in books for this complication is the application of astringent lotions to harden the skin. But a special mechanical arrangement has been contrived to meet this difficulty by Dr. Neil Arnott. The object and effect of Dr. Arnott's truss may be thus explained. In the ordinary truss the amount of the pressure is the same at all times; so that if much force or strong pressure is required at any point of time, as when exercise is taken or cough is troublesome, the same strong pressure is continued, though not required at all other times. It is to remedy this evil

that the truss has been constructed, which may be made to exercise slight pressure against the surface to which it is set, and comes to exercise very powerful resistance when subjected to any influence that tends to separate the ends of the spring beyond that degree at which it has been set, or by pressure from within the abdomen. This result is gained by a wire placed on the convex side of the spring of an ordinary truss and fixed at one end by a rivet, while the other end acts as a screw in an offset from the spring. The wire by the action of the screw admits of being tightened, and it is tightened by a key made for the purpose. The pressure inwards of the ends of the spring by the arrangement mentioned is restrained and fixed at any required degree of force. Supposing now the spring adjusted upon the abdomen, it exercises but the permitted degree of force upon the inguinal ring and canal. But should a hernia tend to enlarge the space between the ends of the truss—in other words, should it tend to press the pad outwards—the descent of the bowel would be resisted by the whole force of both the metals of which the spring of the apparatus is constructed. To the inventive genius of the same distinguished man we are indebted for several other applications of the principles of natural philosophy to our purposes. I need only mention the water bed constantly in use, which has relieved as well as prevented much suffering.

CONGENITAL HERNIA.

Before parting from the subject of the truss, it is necessary for me to refer to a question suggested by the case of congenital hernia lately under your observation. The term congenital is not in this instance to be taken to apply strictly to the time of the formation of the hernia, which appeared first only when the patient was arrived at mature years, but to the condition of the parts—*i.e.* to the unclosed condition of the tunica vaginalis of testis, by which the hernia was encased instead of being clothed with a separate serous

membrane brought down at the time of its descent. This person had not worn a truss, and the important question suggests itself, What advice is to be given, as regards the use of that apparatus, when the testis has not reached the scrotum? In such cases it is desirable that there should be no impediment by band or truss of any kind to the descent of the gland; on the other hand, it is of still more importance that the greater risk of strangulated hernia should be guarded against. In our patient the testes had each reached as far as the external abdominal ring. A truss might have been placed above the testis, and if so placed, it would have prevented the evils which occurred without directly interfering with the gland.

I have at present under my observation a little boy who has had during four or five years a hernia, which, I have no doubt, is formed in the tunica vaginalis, the testis being, as I believe, close above the internal abdominal ring. The child suffered pain whenever the hernia descended into the groin, and it used to descend whenever he engaged in play with his brother and sisters. In this case I applied a truss, even at the risk of preventing the gland from descending, but I have done it with the view of avoiding the far greater evil of strangulated hernia. I would act in the same way if hernia had formed, the testis being in the inguinal canal, modifying of course the truss so as to avoid compression of the gland.

Lastly, as regards the truss, it would be prudent that every person who wears one should have a second to resort to at once in the event of that in use being injured:—

Case 66.—A respectable artisan, admitted to the hospital for strangulated inguinal hernia, stated that two days before, the truss he had long worn was broken. The accident happened on the preceding Saturday, and on the following morning (Sunday), while he was walking in his little garden to look to some plants, the hernia descended; it soon became large and very painful. The operation for strangu-

lated hernia was performed soon after the man's admission here. He made a good recovery.

UNUSUAL CIRCUMSTANCES IN OPERATIONS FOR STRANGULATED HERNIA.

Strangulated Inguinal Hernia—Unusual Position.

Case 67.—A gentleman of middle age, who from having been a corpulent person became lately much reduced in size, had not had before the present attack any symptoms of hernia, and was not conscious of the presence of any enlargement in the groin. While walking in one of the parks he was seized with pain in the abdomen and sickness. He had suffered more or less for three days, when I was summoned with a view to an operation for his relief.

The patient had the common indications of strangulated hernia. The tumour had fully the size of an ordinary egg. It was in the groin of the right side, above the inguinal groove, covering the internal inguinal ring and the inguinal canal, entirely clear of the inguinal groove. It had none, therefore, of the position of a femoral rupture. Regarded as an inguinal hernia there was one peculiarity, namely, that the mass admitted of being grasped between the fingers more completely than is usual in bubonocoele—a hernia in the inguinal canal, almost as completely grasped as a mass of enlarged glands might be.

Operation.—After the integuments had been divided, a tumour was met with imbedded in the subcutaneous fat, the most prominent part reaching very nearly to the skin. At first, it occurred to me that the tumour might be fatty, and that the hernia was beneath it. But, upon examination, it proved to be the hernia itself, out of the usual position—protruded through the external oblique abdominal muscle. The edge of the opening in that structure being notched at its upper part, the bowel was readily returned to the abdo-

men, without division of the sac or any further interference with other coverings of the hernia. The patient did well.

Strangulated Inguinal Hernia—Part Protruded through the Tendon of the External Oblique Muscle—Part Immediately under that Tendon.

Case 68.—In an operation very recently performed for strangulated inguinal hernia, like that in the preceding case, but the patient being a young, robust female, I found a considerable portion of the protruded mass—which was large and composed of omentum—consolidated into a thick lump, with but a small knuckle of bowel separated from the subcutaneous fat by only a thin membrane; while the rest, the outer part of the rupture, was still bound down by the tendon of the external oblique muscle. The result of the operation was altogether favourable.

In this case, it seemed obvious that the protruded omentum must have lain long in the unnatural position, and that the symptoms of strangulation had been induced by the recent protrusion of a small portion of intestine.

The partial projection of the mass through the tendon of the muscle was probably the result of gradual separation of the tendinous fibres by pressure of the omental mass from beneath. The approximation of the hernia to the surface in the former case is not to be accounted for in the same way, as in it there was no omentum, and the tumour was only recently formed. In that, the first of those two cases, it might be conjectured that the protruded bowel had followed after one of those small pellets of fat which occasionally form over the peritoneum and gradually proceed towards the surface, drawing a tube of peritoneum behind, which is then ready to receive a hernia. I had not, however, hitherto seen anything bordering on this condition, except in the usual place of femoral hernia, and, on the whole, I believe it to be most probable that the tendon of the

external abdominal muscle—enfeebled as it occasionally is, in the same situation, by the wide separation of its fibres, which are then held together by thin transparent membrane—had given way to the hernia opposite the internal abdominal ring, instead of compelling it to follow the course of the inguinal canal towards the external ring, as happens in an ordinary case.

Strangulated Femoral Hernia covered by a Cyst containing Coloured Fluid.

Case 69.—Lydia Dixon (Case-book 8), of spare habit; health habitually good, and with healthful aspect; a needle-woman by occupation; a widow with three children. The woman states that her father and her son had rupture.

Twelve years ago, while standing on a chair to take a picture from the wall of a room, in her effort to reach upwards the chair gave way, and the woman fell to the ground on her back. At the time she was unconscious of any evil result except some pain in her back. Two months after the accident, she perceived a small swelling in the groin on the right side. The swelling disappeared when she lay down. Medical advice was not sought. A truss has never been used. No inconvenience was suffered from the recurring lump in the groin, and there was occasional increase of its size, but patient herself was always able to remove it till the day before her admission to the hospital. On that day, making some exertion, the woman found the swelling to have suddenly become larger than usual. The change was attended with much pain, and violent vomiting of fluid resembling gruel.

On admission here the following day, a tumour was found in the usual place of femoral hernia. There was difficulty in detecting any elongation or approach to a continuation of the swelling into the saphenous opening. But a little fulness was felt at that opening, and pressure over it

caused a degree of tenderness. Over the abdomen there was no tenderness to pressure. Efforts to remove the swelling—to replace the hernia—being ineffectual, the operation to effect that object was performed.

Operation.—When the integument and the cellular membrane containing fat had been divided, a serous cyst was in view. It was the size of half a hen's egg; contained coloured serum, reddish. There was no covering as a *fascia propria*. The cyst being emptied of its fluid contents, a small sac came into view. This was flat, thick in texture, except at one point where a nipple-shaped projection existed. At the projected point the membrane was very thin and had nearly given way. When that thin part of the sac was divided, a knuckle of highly-coloured intestine was laid bare. It had a streak of lymph over it, and in front of the bowel was a little altered omentum. The bowel was returned to the abdomen without difficulty.

The after treatment consisted in the use of three small doses of laudanum, one taken night and morning; and in forty-eight hours after the operation, an aperient enema. The wound was wholly healed in five days. The patient left the hospital, in good health, on the seventh day.

Strangulated Femoral Hernia covered by Cyst containing Fluid.

Case 70.—A female, aged upwards of seventy years, was admitted into the hospital with the common indications of strangulated hernia. It was ascertained that the patient first had rupture in the same place more than forty years ago, and that she had been troubled with a return of the swelling from time to time, but had not required surgical interference, though she had never worn a truss. The tumour was immediately below the groove of the groin, upon the thigh at its middle, and spreading inwards towards the pubes. It had the size of an orange, but

was flattened, flaccid, and painless to pressure. The manipulation for the taxis had no effect whatever in reducing the size of the mass, which resembled in most respects an incarcerated hernia, that is to say, a hernia which though not reducible was not strangulated. From the absence of any present symptom of strangulation an operation was not suggested. Under the use of small doses of opium the symptoms were much abated, and for two days the patient was troubled only with belchings of air.

But, on the third day from the first occurrence of the symptoms, vomiting returned; at the same time constipation still continued, and some abdominal tenderness had arisen.

In these circumstances *the operation* for strangulated hernia was performed. After an ineffectual attempt had been made to diminish the mass, when the fibrous structure was divided on the inner side of the sac in the usual position of the neck of a hernia, the large sac which had been felt upon the surface was laid open towards the inner side; it contained serum, but not a hernia. Satisfied, however, that the existence of a hernia was the most probable cause of the suffering of the patient, I made a minute examination of the cavity of the sac. No communication was found to exist between it and the interior of the abdomen. Instead of that a narrow circular depression was found in the situation of the femoral canal. Within this depressed circle the membrane, which there felt elastic, was divided, and the surface of a knuckle of bowel came into view. It was of dark brown colour, and was separated from its immediate investment by recently effused lymph. The operation was completed in the usual way. Some days afterwards, and while this patient was going on quite favourably as regards the hernia and its effects, she was seized rather suddenly with a severe attack of bronchitis, under which, and the feebleness of seventy-five years of age, she soon sank.

The matter of chief practical importance in this case

was the fact of the hernia being altogether masked by the large serous bag, which, not partaking in any degree in the inflamed condition of the strangulated bowel, was calculated to mislead as to the real nature of the cause of the patient's suffering.

Femoral Hernia covered with an Acutely Inflamed Serous Cyst.

Case 71.—This case, which was sent to the hospital by Mr. Bryant, agreed with the preceding in the fact of an unusual serous bag being present, and yet differed from it in some not unimportant particulars.

These were the facts :—

A female, aged forty-two, was attacked with violent vomiting, and, during the forced straining, a tumour was formed at the right groin. There had been a hernia several years before in the situation of the present swelling, and a truss had been worn, but not with regularity.

The tumour, which was the size of a walnut, had the usual position and all the characters of femoral hernia ; it was nearly round, was prominent and tense. To the touch it was remarkably tender, so that an attempt to effect the taxis produced much pain. The abdomen generally was tender. The operation, therefore, was immediately performed.

The whole prominence was found to consist of a thin membranous bag filled with bloody serum. The inner surface of this membrane was of a dark brown colour, and it was highly vascular. There was no communication with the abdomen. Suspecting that the inflamed condition of the little serous cavity, though in all probability the cause of the tenderness of the tumour, would not account for the general symptoms, and that there still might be a hernia, I incised a slightly prominent part of the serous bag within at its upper end, and thus came upon a small piece of strangu-

lated bowel. After the replacement of the strangulated bowel a large quantity of deeply-coloured serum escaped from the cavity of the peritoneum, the discharge being encouraged by pressure of the hand over the abdomen. The patient had a severe attack of peritonitis, but she was restored to good health.

These were the only examples of hernia, complicated in the way described, that I have hitherto met with. The complication must be very rare, for neither Sir A. Cooper nor Mr. Lawrence have mentioned any case of the kind. Nevertheless, a few examples have been placed on record. One is recorded by Mr. Chevalier,¹ and others are described by Breschet² from the practice of Dupuytren. In Chevalier's case, which occurred at St. George's Hospital, in the practice of Mr. Gunning, 'John Hunter assisting him in distinguishing the condition of the parts,' the hernia, with its proper sac, was pendulous in the unusual serous bag; while the arrangement in Dupuytren's cases seems to have resembled that of the second case which I have narrated, except that when the first sac was opened the presence of a hernia seems to have been in those cases more apparent than in our case. Now, where the hernia with its peritoneal covering is actually under view in the first opened sac (as it was in Mr. Chevalier's case), the only mistake likely to be made is that of taking the proper sac for the bowel; but where the hernia is not in view, but is to be sought for after the first sac has been opened, the nature of the case may be altogether overlooked, and the oversight is the more likely to occur should the outer sac be large, as in Case 70.

Strict attention must be given to the symptoms, and strict examination must be made of the upper end of each empty sac, if the symptoms indicate any of the characteristic constitutional disturbances of a hernia.

¹ *Medico-Chirurgical Transactions*, vol. iv.

² *Thèse de Concours sur la Hernie Fémorale ou Mérocèle.*

Although it is only in a surgical point of view that the presence of the unusual serous bags or cysts, that have been referred to, is really important, still we can scarcely avoid conjecture as to the manner of their production. The question then arises, Is the cyst independent of hernia or not? In reply I would say that I have not seen any such formation in the same position, independently of hernia; and I am not acquainted with an example recorded by any other surgeon. The cyst, moreover, seemed in Case 71 to resemble very closely a peritoneal sac. It was inflamed, too, like the proper peritoneal investment of a hernia. In that case likewise—and the same may be said of those recorded by Chevalier and Breschet—the cyst was so small and so completely in the position of the hernia as to seem a dependence of a hernia. One could scarcely separate it, in idea, from a hernial protrusion. It is, indeed, different as regards Case 70. There the cyst was large while the hernia was small, and it was wholly free from the inflammation which affected the strangulated bowel. Still, even as regards that case, it is to be borne in mind that, in a careful dissection, carried from the cavity of the larger sac to the protruded intestine, there were not two membranes, as would probably be the case if the femoral bag and the sac of the hernia were separate structures, originating the one from below, the other from above. Considering, then, that so far as I have observed or learnt by the recorded observation of others, the cyst does not exist without a hernia, and also that it has been met with only in cases in which hernia had been formed a considerable time before the operation which brought it to light, I am inclined to regard the structure in question as an old hernial sac, closed at its neck in the crural canal.¹

¹ Since these Clinical Lectures were first published an operation for the radical cure of hernia has been devised and carried out.—*On Rupture, etc.*, Prof. John Wood.

SOME DISEASES OF TESTIS.

WE have now under observation examples of diseased testis, to which I wish to direct your attention in some detail. I shall, as usual, first refer to the history of the cases abridged from the report in the Case-books.

CHRONIC ORCHITIS.

Both Testes Enlarged—General Health Impaired—Pain in Abdomen.

Case 72.—A. Tucker, æt. 30, of stout conformation, has usually had good health, interrupted, however, by two or three attacks of gonorrhœa and syphilis. Of the latter disease he has still indication on the skin—some liver-coloured stains over the thorax. He has been in the habit of drinking large quantities of beer daily.

About fifteen months ago, immediately after jumping from a wall twelve feet high, having been previously for a considerable period in good health, the man felt a sudden pain in the back. A short time afterwards he observed a swelling of the right testis, small at first but quickly increasing, till the gland reached the size of a small gourd. The swelling, it is said, has remained stationary for the last four months. Now it measures ten inches in circumference, and six from the upper to the lower end. Upon the anterior surface the skin is reddened, in consequence, the patient states, of the application of iodine. The swelling is generally hard, but it yields in a slight degree to the pressure of the

finger ; and upon the fore part, near the upper end, fluctuation is felt over the extent of a shilling. The reddened skin is adherent to the tumour, and at the upper end of this the fluctuation exists. No trace of the epididymis is to be distinguished. There is apparently a degree of thickening of the vessels of the spermatic cord, and the vas deferens feels somewhat enlarged. No pain is caused when any of the parts are manipulated.

Some three months ago the left testis also began to be enlarged much in the same way as its fellow ; than which it is now considerably smaller. This—the gland of the left side—is hard to the touch over its whole surface, and is of uniform density ; but there is a degree more of firmness at the back part, in the situation of the epididymis, than elsewhere. The skin on this side is natural ; it has no adhesion anywhere to the tumour. The vessels of the cord and the vas deferens on the left side are slightly thickened, but they do not seem in an unhealthy condition.

A few veins are plainly seen upon the posterior surface of the scrotum. They are not, however, particularly enlarged or numerous. There are none distinguishable in front. Sharp shooting pains are occasionally felt in the testes, and extending upwards to the groins. These uneasy sensations are usually but momentary in their duration.

The patient states that his health has been impaired since the beginning of the local disease ; and that he is now less able to do his usual work than formerly. He has, too, a feeling of sickness ; his face is sallow—‘has lost colour,’ he says. The eyes are tinged yellow, and the tongue is covered with a yellowish creamy fur.

There is no tenderness on pressure being made in either iliac fossa ; and there is neither tumour nor any appearance of fulness in the same situation, or in any other part of the abdomen. But the right rectus muscle is felt to be rigid towards its upper end. A degree of uneasiness likewise is produced by pressure over the muscle in that situation ; at

the same time the sound elicited by light percussion, made near to the margin of the thorax, is quite clear, except in the close neighbourhood of the sternum. The corresponding part of the rectus muscle of the left side is notably different from the muscle of the right side. It is soft and yielding, and no uneasy sensation is occasioned by pressure upon it.

Such the facts. We have now to inquire into the nature of the disease they indicate, so as to determine the course of management to be adopted.

Diagnosis.—Any morbid condition of the scrotum—the investing structure—is easily distinguishable by the appearance and feel of the part, the skin and subjacent cellular membrane being involved; and as these parts are free from morbid change in this patient, attention must be restricted to the diseases of the two subjacent structures, namely, the testis and its serous investing membrane, ‘tunica vaginalis testis.’ It is necessary we should refer to both these parts, because some of their diseases are liable to be confounded.

Inasmuch as the diseases of the gland itself are more or less solid, while the serous membrane, when in a morbid state, contains fluid, we have in the first place to ascertain whether the tumour is due to the presence of fluid or to a solid deposit—in other words, whether it is a hydrocele or a sarcocoele. In ordinary cases hydrocele is easily distinguished from other diseases by its translucency, which is rendered apparent in the way commonly practised, namely, by transmission of the light of a candle in a darkened place. But the diagnosis becomes occasionally difficult, the difficulty depending on these circumstances—that the hydrocele may lose all translucency in consequence either of the fluid becoming opaque, as by the admixture of blood, or of the investing membrane being thickened to such a degree as no longer to transmit light. And, should the increased thickness of the membrane and the alteration in the colour of the fluid be present in the same case, the difficulty of the diagnosis is

increased; for the hydrocele thus loses its best distinctive character, while, on the other hand, all the remaining diagnostic marks—smoothness, shape, elasticity—may be very closely simulated by disease of the gland itself.

And now we return to the appreciation of the facts of the case before us. The translucency, the pyriform shape, the uniform yielding all over, or nearly all over, to pressure, which usually belongs to hydrocele, are not present; while the great comparative weight of the mass, the adhesion of the tumour to the skin, the general hardness, accompanied with fluctuation at one point, which are present here, are so many positive signs of the tumour being a solid one—of the disease, therefore, being seated in the testis itself; for the occurrence of any uniform solid deposit in connection with the tunica vaginalis is of very rare occurrence. Taken individually, some of the signs enumerated might lead to an erroneous conclusion, but in their combination they leave no room for doubt as to the seat of the disease.

In the next place it becomes necessary to decide upon the nature of the solid contents of the mass, to decide, especially, whether it is encephaloid matter (soft cancer), or one of the non-malignant formations to which the testis is liable—for instance, the commonest form of these, the simple chronic enlargement.

There is no certain sign by which encephaloid disease in an early stage of its growth may be distinguished. The narrative of some facts, however, will lead to the diagnosis for practical purposes. The leading indications of the most frequent form of malignant disease of the testicle may be stated thus:—The tumour is at first smooth and usually hard all over; after a time points of elasticity are found, increasing in time into a generally elastic condition. The disease usually affects only one of the glands. Medical treatment is wholly powerless to diminish or to hinder the advance of the new growth. Finally, the disease is borne

inwards, and affects the lymphatic glands of the abdomen; and the general health fails.

In the disease of the testis known as the 'chronic enlargement,' the tumour attains a large size, it may be with considerable rapidity; it is generally unyielding to pressure, but fluctuation often occurs at a point, and a part of the glandular substance may be protruded. Both the glands are in some instances enlarged, first one and then the other. Other organs do not become affected, and general health is not impaired as a consequence of this disease.

The tumour in our case has no feeling of elasticity; it is uniformly hard, except at one point where fluctuation is felt. Both the glands are enlarged. While, therefore, the physical signs which characterise encephaloid disease are wanting, those which belong to the 'chronic enlargement' are present.

But, on the other hand, our patient has materially suffered in his health. There is, we have seen, sallowness of his face, with loss of flesh and general depression. There is likewise evidence of disease in the abdomen, at its upper part; but no tumour is discernible in the lumbar region or elsewhere in that cavity. Still, the cause of the tenderness to pressure over the liver, or in its neighbourhood, must be cleared up. If the general ailment and abdominal symptoms be unconnected with the disease within the scrotum, they will, in all probability, yield to medical treatment; while, on the contrary, if they be the result of that disease, that is to say, an extension of it, no medicine that we know of is likely to produce any material temporary amelioration, much less a permanent benefit. In order that you should estimate strictly the evidence the local symptoms afford in favour of the non-malignant character of the disease, I should here mention that, though very strong, it is not so complete as to put aside all circumstances telling in the opposite direction. The facts of which it is made up, even when combined, do not afford conclusive evidence, such as, for example, the

single fact of translucency does respecting the presence of a hydrocele. For, to take one of the signs relied on, viz., the enlargement of both the glands at the same time—I have adduced this as a proof, among others, of the disease in Tucker's case not being 'malignant.' I have done so because no example of disease which may be so designated has been seen by myself to affect both testes at the same time, and its occurrence in both glands together or in succession is of very rare occurrence. The fact is valuable in aid of others, but it must not be implicitly relied on in the diagnosis. Observations of a similar kind might justly be made concerning other parts of the same evidence. We proceed, then, to the treatment of the case with the strong expectation that the abdominal symptoms will prove to be accidental—that they will prove to be independent of the disease within the scrotum.

Treatment.—The patient will for a time be kept in bed. This is no unimportant part of the management of this patient's case. It is adopted with these views, namely, to facilitate by that position of the body the return of the blood from the diseased organ; to remove, at the same time, the distress occasioned by the weight of so large a mass appended to the body by only the slender cord and a small fold of integument; and likewise to gain the advantage anticipated from a uniform warm temperature on the surface of the body. The use of mercurial medicine is indicated, and on these grounds, viz. :—

(1) There is some biliary derangement; (2) the medicine has a well ascertained effect in causing the removal of the deposit which constitutes the 'chronic enlargement' of the testis; (3) although the skin-stain, noticed in the report as probably remaining from syphilitic disease, is not in itself—that is to say, the person being in good health, and without any other indication of that disease—sufficient to require the administration of any medicine, I find it yield readily, in such circumstances, to an alkaline lotion. Still, the association

of syphilitic disease in this case with general want of health, and with other disease, rendering the administration of mercury advisable, is a reason the more for resorting to the use of that medicine.

Hitherto no medicine has been taken by this patient. He was now ordered to keep in his bed, or upon it, to have the testis supported properly, and to take blue pill and senna mixture as a purgative. After some preparation with reference to his stomach, the regular use of following medicine was then begun:—Two grains of calomel in a pill night and morning, with a small quantity of iodide of potassium in cascarilla infusion twice daily. This treatment having been continued for a fortnight, the improvement was very decided. Now the patient states that he has not felt so well for the space of twelve months as he does at present. His health evidently is much improved; countenance is more healthful; appetite is returned. But where fluctuation existed upon the scrotum, the skin has given way, and some curdy matter has escaped. In the breach of the skin a dirty yellowish substance of firm texture is seen. The gums being tender, the dose of calomel was diminished to one grain, to be given once in the day.

After the lapse of another week the patient requested permission to leave the hospital, in order to make some pressing business arrangements. At this period his condition is reported to be in all respects decidedly improved. His countenance has lost the former sallowness of hue, and the eyes have become free from the yellow tinge they had when he was admitted into the hospital. There is, moreover, no uneasiness felt upon pressure being made over the abdomen, and the rigid state of the rectus muscle of the right side has been altogether removed. At the same time the left testis is clearly diminished in size. The medicines to be continued after the patient's return home. The scrotum to be well supported.

The man showed himself subsequently from time to time

at the hospital. The opening in the skin over the right testis continued to enlarge, and the discharge to increase. The left testis went on to decrease in size. Iodide of potassium was still given. (Plate XXXII.)

A month later, Tucker is readmitted with the view of having the tumour on the right side removed. The scrotal tumour at that side was not diminished in size under the use of the medicine. The diseases there had lasted too long; had gone too far. The man is now in very good health. The opening in the integuments over the right testis has attained the size of a shilling. (Plate XXXII.) In the breach is seen the same kind of firm yellowish substance. This does not project beyond the surface. As it was ascertained that he had been living intemperately as to 'alcoholic drink' for some time, he was kept in the hospital several days, diet as usual regulated, and aperient medicine given as a preparation for the operation.

In the operation, which was performed while the patient was under the influence of chloroform, as little as possible of the skin was removed. The part removed was included with the ulcerated opening in the skin between two elliptical incisions. Several small arteries required ligature.

During the two following days the patient, after having vomited some bilious matter, was troubled with pain at the epigastrium, and frequent eructations. From this distress he was relieved by warm stimulating applications to the abdomen, and perhaps still more by a little lapse of time. The disturbance of the stomach, it may be added, was attributed, in all likelihood correctly, by the patient himself to the anæsthetic. With little interruption, however, the case continued to advance steadily to its favourable termination. Being unwilling to remain any avoidable length of time absent from his occupations, the patient left the hospital with a very small cicatrix marking the place of the operation. The left testis being still enlarged, he was directed to continue to attend as an out-patient.

Tucker has not attended regularly since his removal from the hospital. He came, however, after an interval of two months. His condition was then found to be in every respect satisfactory. His health appeared quite established—vigorous, in fact; and the left testis was still further diminished in size. Iodide of potassium, with liquor potassæ, to be continued as before, and at the same time a small dose of blue pill, with extract of henbane, to be taken every night.

The man's health having been much benefited, and the testis last affected and least involved in the disease having been diminished in size under the treatment adopted, any apprehensions which the previous state of the patient's health was calculated to excite had ceased. But why was the operation necessary? Could not the disease be removed by remedial means? The answer to the questions may be thus stated: The 'chronic enlargement' of the organ (of which disease we anticipate this case to be an example) consists in the deposit of plastic matter in the substance of the testis and in the epididymis. At an early period the secretion of this deposit is arrested, and the absorption of that already formed is best promoted by the use of medicines such as those administered in this case. But when the disease is far advanced, the natural structure of the gland is destroyed, and the accumulation of the adventitious substance is such that all hope of its removal by a natural process is at an end. To this condition the larger tumour in our patient had, it is assumed, arrived; and this judgment respecting it was borne out by the circumstance that the medicine already used had, as has been stated, produced no material effect upon it. On these grounds I determined to extirpate the tumour of the right side, and then to return to the use of medicine, with a view to restore, if possible, the remaining gland to a healthy state. Here I may anticipate so far as to say that unfortunately the patient, feeling himself in good health, and suffering no inconvenience from the local disease, has neglected to attend at the hospital, and it is not unlikely that this neglect

will continue until it may be too late to check the progress of the disease in the remaining organ.

Upon the operation, the only remark I think it needful to make at present has regard to the fact that it was necessary to dissect the integument from the tumour, or the tumour from the integument, almost at every point. It sometimes happens that the separation between the two may be effected with little trouble, even in great part with the handle of the scalpel. On the other hand, I have in some other instances seen the connexion between those parts equally close with that noticed in the operation upon our present patient. The difference as to the degree of connexion between the scrotum and the tumour results from the greater or less proximity to the former of that excited vascular action which attends the disease, and its nearer approach to the skin as growth increases. In Tucker's case the skin was adherent for some extent, and as we have seen ulceration had taken place in it.

Examination of the Tumour.—There is no trace of the tunica vaginalis. The morbid mass, which is covered with a cellulo-fibrous membrane, consists for the most part of two portions of yellow, rather tough substance, plastic matter. This substance is identical with that which forms the small yellow nodules deposited in the early stages of the chronic inflammation of the testis. Between the two masses into which this plastic matter is aggregated, there is interposed a quantity, varying in breadth from half an inch to an inch and a half, of whitish fibro-cellular tissue. (Plate XXXIII., Fig. 1.) Not a vestige of the glandular structure can be found. None of the seminal ducts beyond the vas deferens are discernible, even with the aid of a microscope. Doubtless the tubes have been altogether removed by absorption, the result of pressure, by the accumulation of the yellow substance, the deposit of which, in fact, constituted the disease.

A case which is now under our observation as an out-

patient, may be usefully placed in juxtaposition with the foregoing. The history is briefly this:—

Syphilitic Disease of Testis.

Case 73.—William S., æt. 71, states that eleven months before he became a patient here, venereal sores appeared on the penis, for the cure of which, after having neglected to adopt any treatment during six weeks, he took mercurial medicine under the direction of a medical practitioner, and was fully salivated. After two months' treatment he was considered to be cured. Subsequently, however, an eruption appeared on the skin. It was accompanied with sore throat. He then took pills again, and his mouth became a second time very sore.

When this patient came to the hospital, the remains of an eruption, apparently a papular syphilitic one, were distinguishable on his face. Both his eyes were affected with conjunctival inflammation; and the right eye with also well-marked iritis. The sight of this eye was so dim that with it only the light could be distinguished. The disease yielded steadily to the use of calomel and opium in small doses, administered after some blood had been taken from the temple by means of cupping glasses. The effect, however, of residence in the hospital must not be omitted from consideration, as contributing to the beneficial result of the treatment. He was dismissed in a month, as requiring no further treatment.

But six months afterwards William S. returned as a patient. The right testis had become swollen and painful. The enlargement went on very rapidly, the body of the gland and the epididymis being both involved.

In the following month, while the swelling on the right side was fast subsiding, the left testicle became enlarged, uneven on the surface, without pain or other indication of any degree of inflammatory action.

Both the glands have improved steadily under the use of mild mercurial medicine, in the form of blue pill, followed by iodide of potassium and sarsaparilla.

The disease of the testicle, as is customary, was a late effect of the attack of syphilis, commonly even later than in this case. The man had, it will be remembered, secondary disease of other parts—of the eye and of the skin; and after those affections and all appearance of syphilis had disappeared, apparently altogether disappeared, the testes became affected. The syphilitic taint must have remained in the system though the man seemed in good health, and was without any appearance of disease. The local or more general recurrence of syphilis in some form is liable to become manifest after the lapse of time, even a long time. It is, according to my own observation, most liable to become manifest after any severe attack of ordinary illness, in consequence, it is to be assumed, of the depression of the system occasioned by the illness, and the persistence of the constitutional malady though long wholly hidden from view, devoid of any manifestation of its presence. Hence, before passing from observation, the man William S. was cautioned, and persons in similar conditions must be cautioned, as to the importance of strictly avoiding all the common sources of general illness. Such illness complicated by the former disease, as it is liable to be, would be more deleterious than it would be if the constitutional malady had not existed.

Cholesteatoma Testis.

Case 74.—The next case differs altogether from those already noticed. It presents some points of peculiar interest. Joseph C., æt. 30, admitted for disease within the scrotum. A fishmonger by trade, native of London, married. He is of spare habit of body, of fair complexion, with very thin, delicate skin; has never had any enlargement of the lymphatic glands about the neck or elsewhere.

Had gonorrhœa eleven years ago. States that his father died of scrofula and erysipelas.

This is the history given of the local malady :—About a year and a half ago, matter formed in the upper and back part of the scrotum over the right testicle ; and the abscess was opened after the lapse of three months. The man then slowly recovered, but some swelling still remained where the abscess had formed. Subsequently he suffered much from pain, especially about the hips and back, and a swelling again appeared at the lower part of the scrotum. This likewise was opened and matter was evacuated.

At present this patient's health is much impaired from continued pain and discharge of pus, though this is but in small quantity. The pain darts from the right testis along the groin, and down to the back of the leg. When he moves, the man suffers from pain in the loins. There is slight tenderness to pressure over the gluteal region, more particularly on the right side.

The right testicle is enlarged to about the size of a large hen's-egg, and it is firm, even hard to the feel. The epididymis is indurated, and the spermatic cord is somewhat thickened. There has for some time been occasional difficulty in passing urine, and there has also been a puriform discharge from the urethra. By means of a bougie (No. 7) a slight stricture was discovered, but the instrument was passed onwards with little obstruction. The scrotum at its lower end and on the right side is indurated, and a thin discharge issues through a small ulcerated opening. Higher up, the scrotum is adherent to the testis. With the upper end of the epididymis of the left side is connected a small cartilaginous or fibro-cartilaginous nodule, larger than a pea. When this body is pressed, the same kind of pain is felt over the left side of the pelvis (the gluteal region) as that noticed in the right side. It is, however, less severe, and does not extend to the thigh.

Such the facts. In our inquiry into the nature of the

disease, we proceed directly to the testis and the epididymis, the outline of both these parts being at once distinguishable by the touch. If the tunica vaginalis contained fluid (the usual product of disease affecting it) in any quantity, the gland and its appendage would be shut out as it were from examination. The testis itself is enlarged, while the epididymis is indurated as well as enlarged; but, considering the length of time the morbid condition has existed (a year and a half) the alteration of the size is not considerable. In the same space of time, the disease mentioned in a former part of the lecture, namely, the 'chronic enlargement' or the 'encephaloid' disease would probably have attained a much greater size, and would have altered the gland in a greater degree. Passing away, then, from any more detailed reference to those diseases, I may state at once that the history of the case corresponds in many respects with that of the scrofulous deposit in the testis. The epididymis was first and chiefly affected; a small abscess formed in that part, and was discharged through an ulcerated opening in the skin. One such abscess being healed, another and another formed, and followed the same course. The progress of the morbid action has thus been altogether very slow: such is in fact the general course of events in scrofulous disease. With the characters and progress of the local disorder must be associated the general condition and appearance of the patient, which were those of a person likely to suffer from scrofulous or tuberculous disease.

In the treatment, the first objects sought to be attained were the improvement of the patient's general condition and the enlargement of the urethra. With a view to the former of these objects he took at different times, besides being allowed a nutritious diet, liquor potassæ, quinine, and a preparation of iron. During this treatment the health was decidedly ameliorated, and at the same time the condition of the urethra was much improved by the use of bougies. Still the disease in the scrotum and the pain over the hip

and along the thigh continued, with little or no abatement.

In order now to decide upon the course to be adopted, with a view to afford permanent relief, we must inquire if there be any connexion between the actual diseases, as well as between these and the great source of the patient's suffering. And first, did the condition of the urethra give rise to the disease of the testis? To this I would answer that the kind of this disease was not that which results from stricture of the urinary canal; and, at all events, it has been seen that the restoration of the urethra to a healthy state was not attended with corresponding amelioration of the disease within the scrotum.

Again, what is the cause of the extreme pain in the limb at a distance from actual disease? The following facts bear upon the question:—Where the pain was most sensibly felt there was no appreciable disease, and the pain was not generally augmented by pressure. It was accidentally found, moreover, that pain of the same kind, and in a corresponding situation, though less severe and less extensive, was produced upon the left side by compressing the small fibro-cartilaginous body connected with the epididymis of that side. Again, in most cases of acute inflammation of the testis—'*hernia humoralis*'—pain is felt beneath the ribs, and even upon the hip; but the suffering from this cause is usually not considerable, at least when compared with that experienced by our present patient. Still, even more severe suffering has been observed, very exceptionally, however, in the more short-lived malady. I have just now under my care a gentleman suffering from that complication of gonorrhœa—'*hernia humoralis*'—in whom the pain has extended over the loins, the pelvis, the thigh, and along the leg, even to the great toe; and it has been on two occasions so acute (first from one testis being inflamed, and then the other), that fits of what might be named hysterical sobbing have come on in consequence of the severity of the suffering. This patient

is a person of very nervous temperament, and he is so by inheritance. He was, it may be mentioned, completely relieved of each neuralgic attack by a dose of liquor opii sedativus. These considerations lead us to the conclusion that the diseased condition of the testis and scrotum was the original cause of the pain on the posterior aspect of the limb, the nerve connexions serving in this, as in many other cases, to explain the phenomenon by what is termed reflex nerve action.

As to the treatment:—If the patient had been able to follow his occupation without much suffering (as it generally happens with a like amount of apparent disease), I would have advised only a tonic and palliative plan of treatment, in the expectation that in this, as in other, in a measure, similar instances, the local disease would subside, leaving the testis, very probably, in a state of atrophy. But the man had already endured great suffering from pain during a protracted period—eighteen months. He had thereby been hindered from supporting his family. As it was not possible to afford him a well-grounded expectation that, by the use of any remedial treatment, his suffering would soon terminate, he was told that the testis ought to be removed. He eagerly assented to that course being taken.

After the operation the wound quickly healed, and the patient speedily left the hospital much improved in every way, and entirely free from pain.

Examination of the Testis.—The diseased testis is larger and somewhat firmer than natural. A longitudinal section being made, it is found that the rete testis and the greater part of the epididymis (all except its globus minor) are wanting. The place of the seminal tubes that belong to these parts is occupied with dense fibro-cellular substance, and in this structure are two detached masses of soft opaque yellow matter, to all appearance scrofulous. The skin of the scrotum is firmly adherent over this part.

The gland itself and the small remaining part of the

epididymis are thickly studded throughout with small rounded bodies which are white, opaque, and may be said to be pearly in appearance. These corpuscles resemble particles of very clear white wax or spermaceti, but they are not brittle like the latter substance. When moved they part entire from the seminal tubes among which they lie. (Plate XXXIII.; Fig. 2.)

From the statement respecting the testicle and its appendage, it is obvious that the restoration of the organ to a healthy state was impossible, the glandular structure being wholly separated from its excretory duct, which is, in fact, obliterated.

The morbid deposit seems to correspond with a substance first fully described by Cruveilhier¹ and Müller,² named by the latter by the term I have used. It is a peculiar fatty matter, and, when chemically examined, has been found to consist of cholesterine and stearine. Under the microscope, with a high power, it is seen to be composed of irregular cells. The preparation before you and the drawings, which were made for me under the superintendence of Mr. Quecket, at the College of Surgeons, illustrate the facts that have been mentioned. One of the drawings represents cells filled with granular matter, magnified 400 diameters. A portion of a healthy seminal tube, and another piece enlarged in consequence of proximity to the disease, are delineated in these two figures, both being magnified 170 diameters. (Figs. 3 B & 3 c.)

Cholesteatoma has been met with in masses of various sizes (some very large), and in many parts of the body, but most frequently in the brain. (See the drawings in Cruveilhier's work.) It has been found associated with other diseased formations, even with cancer; but it is not in the ordinary sense a 'malignant' substance. It seems to act injuriously on the organ in which it is deposited only by its

¹ *Anatomie Pathologique*. Liv. ii., pl. 6.

² *On Cancer and those Morbid Growths which may be confounded with it*. Translated by Dr. West, p. 155.

mass. The corpuscles, in the case before us, caused by their pressure a varicose condition of the seminal tubes. (Fig. 3c.) In time, and by its increase, the deposit would probably have led to the entire absorption of the gland. For a succinct account of this substance I would refer you to an essay by Dr. Walshe.¹

After he left the hospital, this patient had a return of the old pain over the pelvis and the thigh; but I have ascertained that, in consequence of some imprudence, the cicatrix had reopened at the time, and had assumed a somewhat angry appearance.

More recently he has come to the hospital to be examined, and the following report has been taken:—Now, nine months since the operation was performed, the wound is firmly cicatrised, and there is no pain whatever about the scrotum. But the man states that when the weather is warm the pain over the pelvis, from which he formerly suffered, becomes troublesome, though he is quite free from it while the temperature is cool. The uneasy feeling is not in the slightest degree augmented by pressure of any kind, whether light or heavy. The urethra admits the bougies Nos. 9 and 10 easily. The kidneys and the urinary bladder give no indication of disease. He is ordered to take a preparation of iron continuously, and in gradually augmented doses.

A month later, the report is that he has experienced much relief from the occasional pain, insomuch that he has been able to walk a long distance without inconvenience since he has taken medicine—iron sesquioxide, prescribed ten days ago.

¹ 'Products Adventitious,' in Dr. Todd's *Cyclopædia of Anatomy and Physiology*. Vol. iv., p. 98.

Encephaloid Cancer—Operation—Usual Health Four and a half Years afterwards.

Case 75.—George Sydenham, æt. 45, married, has two healthy children. His mother is said to have died of consumption during the patient's childhood.

Previous condition.—For some time his health has not been good; has long suffered from headache. He is naturally short-sighted; the sight of his right eye having become impaired, he was under the care of an eminent eye-surgeon. States that he was then treated with mercurial medicine, and under the use of that medicine his mouth became very sore. He afterwards underwent an operation for cataract. A shred of capsule is visible at the outer side of the eye that had been operated on. The iris is fixed; and the eye is devoid of sight. Suffers still from headache; is generally weak. The weakness, he says, began with the treatment he underwent for the disease of his eye. He has 'not at any time felt as if he had recovered from the depressing effect of that treatment.'

The man sought admission here for disease of the right testicle. The gland began to enlarge about two years ago. At first he used a suspending bandage to support the scrotum during three months, but then discontinued the bandage, thinking it, from the trial, to be useless. Three months ago he observed that the testis became enlarged more quickly than before; and three weeks since, after he had walked in one day twenty-five miles, the size of the testis was still further increased in size, and it became very painful.

Examination in Hospital.—The right testis is considerably enlarged. The veins of scrotum over it are large and full. The testis has a hard feeling. The density is uniform except at two or three points, at which a slight elasticity is felt. No enlargement is discoverable in the iliac region or in the abdomen.

The treatment of the patient consisted, in addition to his retaining the horizontal position in or on his bed, of the use of small doses of blue pill with extract of henbane, and the application of light pressure with strapping around the testis.

The pressure being found to be painful was soon discontinued. With the mercurial medicine the mouth became tender. The use of that medicine was not urged to any extent on account of the patient's statement of the severe treatment by mercury he underwent for his eye disease, and his impression as to the injurious result of that treatment on his general health. The malady of the testis being in no degree benefited by medicine, the patient was told that the removal of the diseased testis was necessary. He left the hospital, as he stated, to make some arrangements before undergoing the operation, and returned in a fortnight. The disease underwent an obvious change during the absence.

Where the testis was removed several blood-vessels required ligatures. Before the dressing was completed irrigation of the wound was used.

The man did well in all respects. He left the hospital in the third week after the operation.

The tumour was contained within the testis covered by the glandular substance, from which it was separated by a special capsule (Plate XXXV.). When divided it was brain-like in appearance and consistence, soft, pulpy, pervaded with spots of blood and with slight membranous bands which became more distinct while the mass was kept in spirit. The proper substance of the gland was flattened out over the new growth. It contained no unnatural deposit, and was unaltered except in shape.

After-reports.—From several the following are extracted:—Two years and a half after the operation, George Sydenham reports that his health in the interval has been as good as it was before. A few months ago he had pain over the loins. Lately there has not been any pain. Now

at the time of his visit there is none whatever. Pressure on the iliac region and elsewhere detects no enlargement and produces no feeling of uneasiness.

Four years and four months after the operation this is the note:—Saw him in his usual health, no pain, no swelling in abdomen or elsewhere. Visits to the hospital were made to get advice for his eye, and the last visit in order to ascertain if the disease for which he had undergone an operation would interfere with his effecting an insurance of his life.

*Encephaloid Cancer—Small Hydroceles in Tunica Vaginalis—
Operation—Death some months afterwards.*

Case 76.—James Wicks, æt. 30, a post-boy in the country, states that sixteen months ago he fell with his legs apart on the 'splint-bar' of a post-chaise, striking the left testis against the bar. In a week after a small hard swelling like a wart, as he said, was formed at the back part of the gland. During the last winter the testicle became painful to the touch, he at the time being engaged in riding much on horseback. Under medical direction he was for a time generally in bed; took medicine and used cold lotion to the diseased part. In the following summer the swelling became less. He now returned to his riding occupation. This did not give pain except when the testicle happened to touch the saddle. Afterwards blue ointment was applied and the mouth became sore. The treatment had no effect on the malady, which continued to increase in size.

Upon the admission of James Wicks to the hospital, the report runs thus:—The man is very thin, in a degree emaciated. The left, the enlarged, testis is round, smooth, and hard all over. Epididymis cannot be distinguished. Fluid is felt at the upper and back part of the gland, but is not movable from that position. On touching the abdominal wall immediately above Poupart's ligament, a

very small swelling is perceptible. The small body was determined to be situated upon the iliac artery, and to be in all likelihood a lymphatic gland. It is not painful to the touch. No other enlargement discernible and no pain anywhere in the abdomen. The spermatic cord seems natural, free from appreciable increase of size.

Looking to the leading circumstances—the man's apparent emaciation, his inability to continue his employment, the failure of the medical treatment, the increase in size of the local disease, the formation of a partial hydrocele, which might be taken to indicate that the morbid growth was making progress outwards—these facts were believed to render the removal of the diseased testicle absolutely necessary. The operation to effect it was the only possible remedy. There was, however, a question, Had it been deferred too long?

The operation having been performed, cicatrisation of the wound went on well. When it was complete, the patient returned to the country in apparently a favourable condition. The enlarged gland within the abdominal wall was no longer perceptible.

Examination of the Disease.—The testis when removed was found to be, as stated when it was covered by the scrotum, round, smooth, and unyielding to pressure. At the upper part of the tunica vaginalis is the partial hydrocele felt in the scrotum. Most of the fluid is contained in special cysts of varying size and differing in form; some formed between the tunica albuginea and its serous layer (Plate XXXIV.). One cyst was large, with a broad base. It is assumed that the change in the serous portion of the tunica albuginea is the effect of the morbid growth, not of the original injury against the 'splint-bar.'

The morbid growth (Plate XXXIV.), a tumour, is within the body of the testis, at the upper end chiefly, part of the natural structure being pushed down. The lobules of the tubuli seminiferi are altogether healthy. The diseased mass

is covered with a special capsule. This newly-formed capsule is at the upper end in contact with the capsule of the testis—tunica albuginea. Lower down the immediate cover of the tumour is separated from the cover of the testis by the glandular structure, flattened, thinned out by the pressure of the new growth.

The substance of the new formation seen in section (Fig. 1) is pulpy, brainlike. At the middle there is more vascularity than elsewhere. A few small cysts are observable, some of these embedded in the morbid growth; some are connected with its capsule.

In three months after his return to the country, the man died in consequence of a large tumour in the abdomen.

The case I propose to notice next has not been under your observation; nevertheless it will be useful, as some of the circumstances are unusual. The needful details of the history of the patient during the course of the malady for some years have been sufficiently recorded, and the diseased products, original and consecutive, are before us.

Encephaloid Disease of Testis—Medullary Cancer—Operation Declined by Patient—Death.

Case 77.—Rev. Mr. S., a clergyman, advanced in life, of slender conformation, pale countenance, not healthful in appearance, gave the following account of his ailment when I first saw him. Eighteen months before, after severe pain in the hip—'sciatica' it was called—he perceived a slight swelling of the left testicle, not confined to any part but involving the whole gland. It was relieved with fomentation of hot water. Six months later, in the summer of the same year, Mr. S. had much walking in an excursion on the continent of Europe, and in the autumn he suffered a good deal of fatigue in visits to the poor at his home. At the time, a slight general enlargement of the same testicle was apparent. Under medical advice a cold medicated wash and iodide of

lead ointment were used. While the ointment was used the sound testis became sensibly diminished in size; but the enlargement of the diseased one was undiminished.

Nearly twelve months from the first appearance of enlargement of the testis, under the advice of an eminent surgeon in London, leeches were applied to the scrotum, and grey powder (*hydrargyrum cum cretâ*), with Dover's powder, was taken at night. The medicine caused purging; and, after a few doses, a pustular eruption appeared on the forehead, attended with some fever. Afterwards iodide of potassium was perseveringly used for some months; at the same time pressure was made around the enlarged testis by means of adhesive straps. This treatment did not produce any improvement; the tumour continued to increase in size.

Eighteen months had elapsed from the appearance of an enlargement being perceptible, when I first saw this gentleman. The left testis was then round, smooth and hard, as well as enlarged. It was not painful to the touch. At a consultation with Sir B. Brodie the conclusion came to was that the disease was most probably malignant. But it was determined to try the effect of mercurial medicine, which was intended to meet the chance there might be of the disease not being malignant. It was used in the belief that, if not malignant, the deposit would be removed by absorption under the influence of the medicine. The patient was, however, informed that, in the event of the failure of the medical treatment, the removal of the tumour by operation would be necessary for his safety. Accordingly, mercurial ointment was daily applied to the scrotum. Under its use, no diminution occurred in the size of the diseased gland. Yet the medicine had an effect on the system; the general health was very decidedly improved. Living in a distant county Mr. S. came under observation only at considerable intervals of time. A few months after the last report, the tumour was found to have further increased in size. It gave

rise to no pain when pressed ; but was slightly elastic, yielding in a small degree to pressure at some points. No enlarged veins were visible on the surface. The general health was evidently improved, insomuch that he is, as he reports, 'congratulated by friends on his healthful appearance.' The patient's general condition being still thought to be not unfavourable for the removal of the tumour which its condition was believed to render necessary, the operation was urged ; but, and apparently on account of the feeling of good health, it was absolutely declined. The necessity for the operation had been previously stated to the patient.

On his next visit, and now two years from the time at which some swelling was first observed, a degree of change had occurred. The testis is somewhat larger than before ; elasticity of the surface is felt more generally ; several enlarged veins are seen on the surface. Nevertheless, health is still good, and spirits and cheerfulness are said to be as high as at any previous period of life.

In the early part of the third year of the malady Mr. S. had an accidental illness, eczema, apparently. When I saw him after an interval of seven months from his last visit, his feeling of good health still continued. The scrotal tumour was very decidedly larger than when I last saw it. During another tour abroad he had become unwell with diarrhœa, which was attributed to bad food. He is said, however, to have soon recovered after his return home. Health was again good ; but a great change was imminent.

When seen three months later, the patient had for some time been able to take food in only very small quantities. He was emaciated and very feeble. He is said to have become perceptibly thinner, even at short intervals of time. A tumour is now readily felt in the abdomen, at the left side of the vertebral column. At the upper end the tumour passed behind the ribs, seeming connected with the liver, for no intestine was perceptible in front of it here ; but, lower

down near the umbilicus, there was discernible a narrow strip of intestine which gurgled when pressed. During the rest of his life—about two months—the patient suffered intensely from the inconvenience occasioned by the large mass suspended, as such tumours are, only by the few nutrient vessels and the excretory duct of the gland covered by the fold of integument, stretched and thinned out by the size and weight of the mass. So slenderly supported, the cumbrous mass caused painful difficulty to the sufferer in changing his position. The general distress and the troubled sleep were relieved only by the use of morphia. From the desire to be rid of the great local inconvenience—‘the agony,’ he said, that he suffered—Mr. S. urged at this time the performance of the operation he previously, more than once very strongly, declined. His desire could not be acceded to because it was thought that the operation, by its influence on the disease within the abdomen, would probably hasten his death. Afterwards, so grievous was the distress—the continuous sense of a necessarily destructive, cumbrous mass, a hindrance to every movement of the body—that the patient desired to have the question considered, if the influence of the sedative medicine might not in some form be continued permanently to the end of life.

Death occurred after the lapse of four years from the first appearance, in any form, of enlargement of the testis.

Examination after Death.—The scrotal tumour is, you notice, very large, soft, pulpy, in colour whitish with red patches disseminated. No trace of the glandular structure of the testis is discoverable. At the upper end is a small sac—remains of the tunica vaginalis. It contained blood, the result of a puncture to evacuate some serous fluid made a couple of weeks before the death of the patient. (Plate XXXVIII.)

The new growth in the abdomen was very large—the size of a melon elongated. Lying against the vertebral column

towards the left side, it extended up beyond the margin of the ribs. In front of it, in the region of the umbilicus, was the transverse colon which was very small—shrunk. There was no part of the alimentary canal in front of the tumour immediately below the margin of the thorax, for the stomach, reduced to size of small intestine, lay quite concealed under the ribs. This fact explains a circumstance noticed in the examination of the abdomen in the latter part of the patient's life. In structure the abdominal tumour is very soft, pulpy, in colour whitish, and at intervals bloody. Its characters are apparent in the distempered, in part almost diffuent, mass before you.

Cystic Cancer of Testis.

Case 78.—James Hill, æt. 17, employed as a clerk in a goods yard, has been occupied in walking about 'in all weathers from early morning till evening.' Has had, however, he states, continuous good health; has always been comfortably lodged and well fed. No traceable tendency exists as to hereditary malady of any kind.

Respecting the disease for which he had come to hospital, he first noticed that the lower end of the right testicle, without previous hurt of any kind, became hard and round, the size of a hazel nut; but was not tender to the touch or painful. The hardness gradually extended upwards till it involved the whole testicle. At the time, he was in good health. He cannot account in any way for the swelling.

At the end of two months from his first noticing any change, the testicle had acquired a bulk, he says, much greater than that of its fellow. The only uneasiness he felt the while was from the weight of the scrotum, which caused pain in the loins. There was no pain in the diseased part. A medical practitioner ordered a slate-coloured ointment (mercurial, doubtless) to be rubbed every night over the

scrotum. This blistered the skin. The enlargement continued to increase. Two points of fluctuation felt at the time were punctured, and about a teaspoonful of thin bloody fluid escaped from each.

About four months from the onset of the disease, the lad was obliged to give up his employment, which required much standing and moving about, and to take a clerkship, the work of which employment was done while he sat. The medical treatment was continued all the time. Another and larger fluctuating point was formed in a month after that already noticed, and, being punctured, a larger quantity (tablespoonful) of bloody fluid escaped.

During the last month before his coming here, the disease had been increasing in size more rapidly than before. The only pain felt occurs when the patient is lying down at night, the scrotum, the diseased part, being unsupported. Pills—mercurial, we may assume—have been taken night and morning by direction of medical attendants, but without beneficial effect.

Examination at Hospital.—In person the patient may be said to be stout; complexion dark, countenance healthy. He walks with difficulty, on account of the large size of the scrotal tumour. The scrotum on the right side is very large, measuring in length eight inches, in circumference fifteen. It feels heavy. The shape is oval. The upper end being the larger. The mass is firm and elastic. Near the lower end projects an elevation nearly the size of an egg. That projection and one other were the most elastic parts of the mass. On the surface the veins are turgid (Plate XXXVI.). A small ulceration of the skin is seen near the middle in front. There is no tenderness to pressure on the tumour. No pain is felt on pressure being made in the iliac region, or on any other part of the abdomen. The left testis is natural.

Now what are we to suppose the nature of the disease to be? and what the remedy?

The tumour (Plate XXXVII.) is large, is heavy; has grown in size very rapidly. The whole duration of the disease was less than seven months. The veins on the surface are turgid; the spermatic cord is in a degree thickened. Those facts point to a growth of malignant character—a cancer in some form. But, besides the facts which have been recalled, there are others distinctive in character to be taken into account, namely, the uneven surface, the elastic feel generally, with fluctuation at some points or places; and these, seeming to indicate the contents of the mass being separated one part from another, point to the presence of cysts. While that additional or special diagnosis may be erroneous, the malignant, or, in common language, cancerous condition of the tumour cannot be doubted. The remedy is the removal of the tumour. Considering, however, the rapidity of the growth, its softness, and the condition of part of the spermatic cord, the fear remains that the operation has been too long delayed, notwithstanding the actually short duration of the disease.

Operation.—The tumour with a short portion of the adjacent part of the spermatic cord was removed. The arteries requiring ligature were seven in number,—four in the cord, three in the scrotum.

The morbid mass, you will observe, consists of an accumulation of cysts, varying much in size—from that of a millet seed to a marble, and soft—some containing fluid which escaped when section was made, and a reddish substance, brainlike or softer in consistence and deeply tinged with blood. (Plate XXXVII.)

During nine days the patient did well. After the ninth day some febrile symptoms were manifest; and on the fourteenth day from the operation, the fever with loss of appetite was much increased. Speedily the rectus muscle of the abdomen on the right side felt rigid, and there was a little tenderness to pressure over it. The unfavourable symptoms became, from day to day, more aggravated; and

the patient died before the expiration of the third week after the operation.

Examination after Death.—The viscera of the abdomen and of the throat were found to be healthy. So, too, was the brain.

In the cavity of the abdomen, in front of the vertebral column on its right side, was a large mass of new formation two or three times as large as the closed hand.

It was in great part semi-fluid, creamy in consistence, in colour brown, with a portion of firmer consistence—brainlike.

Within the thorax was some matter of the same consistence, in quantity the size of a closed hand. It lay near the œsophagus and the end of the trachea. All the morbid formation was in connexion with the lymphatic glands and vessels.

The history of this case has been detailed to you at some length especially because of the progress of the disease—the growth of morbid deposit having been extremely rapid. Though the young patient was in favourable circumstances at his home, apparently, too, in good health, and without hereditary blot, yet there was the evil, that the youthful person (æt. 17) ‘walked in a goods yard every day, all day in all weathers, exposed to currents of cold air.’ That may have caused the mischief.

Review of the Cases.—In the last three cases cited, the evidence of the characters of the disease is what might be named clinical. The clinical evidence consists in:—The history of the case; the rapid growth of the tumour; the characters of the morbid structure before its removal from the scrotum; and above all, the ‘malignant’ course of the disease, viz., the progress inwards to the abdomen and even to the thorax with the masses newly-formed in those cavities, and the destruction of life.

The duration of Encephaloid Cancer is very various. In our cases it was as follows:—

Case 75.—6 years and 4 months. Then in good health.

76.—19 months.

77.—4 years.

78.—7 months.

I shall now refer to the results of the examination of the leading circumstances connected with the morbid growths, and to the management of the cases in detail.

Diagnosis of the Tumour.—At an early period of its growth the nature of the disease of the testicle can seldom be accurately determined. The disease is then deeply placed, and covered by the fibrous investment of the gland. The tumour—supposing it to be the malignant disease of most common occurrence in the testis—does not at an early period of its growth communicate to the touch any manifestation of the actual softness of the morbid structure. The mass is felt even to be hard, uniformly so at first, the hardness being due to the tension of the firm outer covering, tunica albuginea, with its septula, and the increase of its contents.

In the cases cited the cancerous matter was distinguished, or sought to be distinguished, as has long been the custom, from the result of chronic inflammation by the use of mercurial medicine. This caused the removal of the fibro-plastic matter of the chronic inflammation (Case 72); while it had no influence on the malignant disease (Case 77).

It has happened that when the cancerous disease has been allowed to attain a large size before being brought under notice, it has been mistaken by surgeons of large experience for hydrocele or hæmatocele. Sir Astley Cooper, treating of the diagnosis of some of the diseases of the same organ, wrote thus: ‘But still the distinction (between fungoid disease of the testis and hydrocele) is sometimes difficult, and all candid persons will confess they have erred; and, when they have believed it water, have found it solid. Mr. Pott, Mr. Hunter, Mr. Cline, and many others have been thus deceived, and I am ready to confess that I have

more than once been mistaken.'¹ The mistakes mentioned in this extract appear to have consisted in a disease of the gland being taken for a hydrocele.

The converse of that error is illustrated in a case which occurred in this hospital. Mr. Liston extirpated hæmatocele under the belief that the tumour was a diseased testis. I happen to be aware, too, that Mr. Liston had previously inquired closely into the nature of the disease, for, when I held the tumour to assist in the operation, I remarked how much it had the smoothness and the oval shape of a hydrocele; whereupon Mr. Liston pointed out the puncture-mark of an instrument upon the scrotum, intimating also that he had with the same impression looked into the case. He had, in fact, a short time previously tapped the tunica vaginalis, and it was in consequence of the examination then made that the extirpation of the part was judged necessary. The preparation which is before you shows the tunica vaginalis enlarged and much thickened; and within it is contained some fibrinous matter with a clot of blood, the remains of what had been in it when removed from the scrotum. The testis, free of disease, is laid bare at the back part of the preparation. The error would probably not have occurred in any one of the examples of error referred to, if they had come under observation of the surgeon at an early stage of the disease.

The progress of the morbid growth, as shown in our cases, may be indicated as follows:—Deposited within the capsule of the testis—tunica albuginea—and also within another, an immediate fibro-cellular covering, the new growth with its special investment occupies in part the place of the glandular structure of the organ. That structure pressed out and flattened more and more as the tumour grows larger, remains at first free from admixture of the new growth.

A form of further progress is illustrated in Case 76, Plate XXXIV. The morbid structure is, in that instance, nearer

¹ *Observations on the Structure and Diseases of the Testis*, p. 128.

to the upper end of the glandular space than elsewhere. Its special cover touches the tunica albuginea. This latter being involved in the pervading excited vascular action attendant on the morbid process in progress, some fluid has been effused in patches between its serous and its fibrous layers. Independent broad serous cysts have likewise been formed, and bands of adhesive matter elsewhere connect the two layers of the tunica vaginalis. (Plate XXXIV.) The two capsules investing the gland and the tumour respectively, being for the most part still entire and unchanged in structure, the scrotal mass remains smooth and hard; remains so till a further change of structure has been effected. That change is then not remote. If the cystic serous fluid of the tunica vaginalis, which has been mentioned, should be felt by the surgeon in the examination of the scrotal mass, the rapid advance of the malignant disease might be anticipated.

When the morbid growth has become more largely increased in size, and as it becomes so, the glandular structure is further spread out, and afterwards wholly removed, by absorption, we suppose. At the same time the investments—that of the testis and that of the tumour—being spread out and thinned with the augmentation of the mass, become blended. Now the distinctive characters of the morbid growth—its softness, a certain yielding to pressure and elasticity—become manifest to the surgeon who has to examine an example of the disease, when unfortunately it has been allowed to attain a large size. (Case 77.)

In its advanced stages the progress of the disease to the abdomen is very rapid. (Case 77.) The rapid formation of the abdominal tumour is to be accounted for by the fact that when the original morbid structure has passed beyond the tunic of the testis, it reaches the large lymph vessels of the spermatic cord, and, being taken up, is quickly transmitted along their course, unconnected with those of other tissues, to the lymph glands within the abdomen, upon the lumbar part of the vertebral column—the same position

which the testis and its vessels occupied during early growth.

The disease being passed into the lymph vessels and glands, and there further grown, is rapidly diffused through the patient's system. The change is marked by emaciation, with the aspect of all-pervading disease. Cessation of life speedily follows. (Cases 77 and 78.)

Treatment.—No available medicinal treatment for the removal of the malady or the arrest of its progress has hitherto been discovered. The terms cancer, carcinoma, malignant disease, imply in all minds that art is wholly powerless as to the removal of disease so designated, unless by surgical operation, where that is admissible. It is on account of the acknowledged powerless state of medicine to accomplish the object that much deception is practised—promises of cure held out which are broken—which must be broken. Yet such promises will continue, and will be largely received—‘Ere hope sensation fails.’ The feeling affects not only the sufferer, but still more, to my own knowledge, members of the family and friends.

We must hope that the defect of medicine in this regard will be gradually lessened if not removed. While by microscopical observation the intimate structure of those ‘malignant’ growths has, within a few years, been skilfully brought into view, their varied constituent ‘cells’ exhibited, and the natural elementary tissues traced from which their various forms respectively spring, we may expect that progress shall be made in the healing art. We may expect that, with similar skill and industry, the creative structures from which all takes origin, shall also be submitted to strict investigation; we may expect that the deviations from the natural healthy condition shall be made manifest; and that, if possible, means shall be discovered which shall be effective to restore that healthy condition.

In the meantime, while progress, in such or any other investigations likely to attain to a salutary result, is awaited,

I would suggest that the local malady being removed as by surgical operation, the endeavour ought to be made, that the source whence the morbid structure has emanated—the general system of the sufferer—should be improved, or so strengthened in health as to hinder or to retard the reproduction of the malady. At the same time it should be added, that if the object—the invigoration of the system—should in any degree be accomplished, care to maintain that result ought, as far as possible, to be continuous. Examples often occur of constitutional and local diseases being reproduced when the general health is depressed or when an attack of general disorder happens to arise. (See, as illustrating the reproduction of local diseases, Cases 13 and 18.)

The object more immediately in view may be illustrated, in a measure, if I return for a moment to a very few of the facts recorded in the history of two of our cases of the disease under consideration. In both the cases mercurial medicine had been used with the same object—to effect the diagnosis of the tumour. Mr. S. (Case 77) while using that medicine was improved in health, insomuch that ‘he was congratulated by friends on his healthful appearance;’ and he in consequence, it seemed, of that improvement of health resolutely declined to submit to the surgical operation for removal of the local disease. From that fact—the improvement in his general condition—it may be inferred that, notwithstanding the presence of a disease which continued to increase during the use of the medicine, and which from the history of events afterwards was proved to have been malignant, the general system, at that time of its exceptionally healthy condition, was free of any taint of the actually existing malignant disease. The improved state of the system at that period must, I presume, be assigned to the influence of the medicine. Again, in Case 75, the same medicine was administered when the patient came under observation here. It had also previously been used for disease of the man’s eyes, and probably to a large extent,

since he stated that he felt out of health in consequence of its use. May it not be inferred that the freedom of this patient from a recurrence of the disease during at least four years after the removal of the malignant tumour—the time over which our knowledge of his history after the operation extended—was in all likelihood owing to the influence on the system of the medicine referred to?

The benefit resulting from such influence on the system generally may be shortly illustrated in another malady in different circumstances. The details of the case to be referred to are given elsewhere—No. 79, page 271. The patient was largely affected by secondary syphilis; health much depressed, and several outward manifestations of the disease. The treatment consisted solely in the use of means calculated to give strength to the system—viz. change from unhealthful residence, use of good diet and some invigorating medicines—and without the administration of medicine supposed to have specific effect on the disease. Under that treatment health was restored, and all the local appearances of disease disappeared.

I would notice also an example of the protection against disease gained by the use of a medicine. A naval surgeon (Case 21, page 101), his ship being ordered on the coast of Africa to a district in which malaria was known to be very prevalent, causing much fever attended with large mortality, gave to every man on board the vessel in early morning—in fact, while in his berth—a full dose of quinine with this result: up to the end of the ship's stay in the malarious district, over two years, no man became unwell with the prevalent fever of the country.

Lastly, as a summary of treatment—to the precept that the removal of the tumour in all such cases as we have been concerned with should be effected as soon as the disease is believed to be malignant, I am disposed to add the suggestion that, after the operation, the general health of the person should be carefully attended to. The sources of illness

ought to be strictly avoided. In addition, we might advantageously aim at altering the condition of the patient's system under which the cancerous tumour was formed, and strive to restore, if not to increase, its natural strength. To attain these objects medicines would, probably, even in the present state of knowledge, be useful. Some such medicines are indicated in the foregoing remarks. Some one or more will, I hope, be suggested by scientific knowledge, will be proved by trial, by experience, to be much more useful, more effective, to attain the object we must have in view.

The growth of the secondary tumour in the abdomen as detailed in our cases, with its destructive effect on health and life, gives the clinical proof of the disease being, as it is technically named, 'malignant' or cancerous. The 'malignant' action of the morbid growth is in such circumstances a fact.

By pathologists in recent years, with the aid of much modern improvement in the special apparatus used for observation, characteristic microscopical appearances of tumours after their removal have been, as before stated, carefully made and represented. Such observations very materially assist the deductions drawn from the characters of the tumour during the progress of its growth in the living person, and its 'naked-eye' appearance after removal. The added observation, however, though needed for scientific use of the pathologist, loses practical value when the disease has been clinically proved to be 'malignant.'

At the same time it should be stated that microscopical observation seems not to have yet attained to complete accuracy as regards the diagnosis of tumours in the testicle. A recent observer¹ of large experience states the difficulties in determining by microscopical observation the nature of some of those tumours; and he mentions his own inability in some instances to effect the object. His observations

¹ 'Malignant (?) Tumour of the Testis' in 'Clinical Surgery,' by Dr. T. H. Bilioth, translated by C. T. Dent. New Sydenham Society, 1881.

conclude thus:—‘It is most desirable that the subject should be thoroughly worked out.’

The case now to be placed before you is to be considered supplemental to observations lately made (p. 269).

It is adduced to show the removal of the appearances of a constitutional disease by the power of the general system when rendered healthful. It may be added that the form of treatment resorted to was begun because of the depressed condition of the patient's health and want of appetite for food. But having been early found to produce a beneficial effect the plan of treatment was continued.

Tumour of Lip—Syphilitic Disease.

Case 79.—Elizabeth M., æt. 45, is a native of Devonshire; has lived in London six years. She is married, and has three children. Enjoyed good health till ten weeks ago, when, for the first time, she perceived a hard swelling in her lower lip, of about the size of a pea, which subsequently turned to a sore. It increased in size; and, in a fortnight afterwards, the glands beneath the chin began to enlarge. She was advised to use poultices and fomentation, which she did, but without benefit. At the same time the throat became painful, and there was difficulty in deglutition. She then applied at this hospital, and was admitted April 1859.

Present State.—On the anterior surface of the lower lip projects a tumour, of about the size of half a marble; it extends from the middle line to the left side. The whole of the prolabium is involved, as well as a little of the skin below it. The substance of the lip is engaged in the disease, so much so that only a very thin portion of mucous membrane covering it is free from induration. The outer surface is fissured in one or two parts, and is generally slightly rough. Beneath the symphysis of the chin, and a

little behind the anterior part of the curve of the lower maxillary bone, is a tumour, two inches in breadth from side to side, and of about the thickness of the thumb. The skin over it is free from disease; and it is found to be divided into several small masses, evidently consisting of enlarged glands. The glands at the root of the neck above the clavicle are not enlarged; but there is a suspicion of fulness of those on the right side.

The patient being questioned admits that there are at present small sores about the vulvæ, but no enlargement of the glands in the groin; that she has had a brown eruption over her whole body, and also small sores about the head. There are at present the remains of a liver-coloured eruption slightly marked, on the forearms, especially the left, evidently *maculæ syphiliticæ*; also slight remains of a papular eruption on the breast. The tonsils on both sides are enlarged; and there is some superficial ulceration. Behind the left mastoid process are two enlarged lymphatic glands.

The patient was ordered to use a gargle of alum and honey, and to take the following:—

Acid. sulph. dil. ʒij; liq. cinchonæ ʒij; mist. camph. ʒvj. Sumat ʒss ter die Full diet was allowed.

May 4 to 10.—Is much better. The countenance is less earthy. The blotching on the forehead is scarcely distinguishable. On examination, no sores are discovered on the pudendal organs; the patient says they have disappeared since her admission into the hospital. The tumours are apparently diminished in size. The cutaneous eruption is certainly much less perceptible. The throat is better; the tonsils, however, are still enlarged.

11 to 20.—The patient's health has been somewhat disturbed. The bowels are relaxed; the appetite is bad; and she has a good deal of sickness. The countenance is flushed; the soreness of the throat is increased. But the swelling of the lip and glands is steadily decreasing, and the cutaneous

eruption fading rapidly away. The following prescription was now ordered:—

Acidi nitrici dil. $\mathfrak{m}x$; decocti sarsæ $\mathfrak{z}j$. ter die.

24.—She feels well again. The tumours are still decreasing; the soreness and ulceration of the throat are gone.

30.—Nothing now remains but a thickening of the cutaneous surface of the lip, while the glands under the chin are reduced to their natural size. The eruption has quite disappeared. She was discharged as out-patient, to continue taking the same medicine, as during its exhibition the tumours had rapidly subsided.

June 30.—All traces of the disease have now completely disappeared. The patient was ordered to take four grains of iodide of potassium in an ounce of decoction of sarsaparilla three times a day.

In the clinical lecture on the case, the following observations were made:—

This patient came into the hospital for the purpose of undergoing an operation for the tumour on her lip. It was supposed to be a cancer. Upon inquiring into her history, I found that the enlarged glands beneath the chin had formed after the lapse of a very short time from the date of the disease above it. I found, too, that the tumour of the lip had been very rapid in its growth. In looking, moreover, carefully at the face of this patient with a good light, there was much of an unhealthy aspect—a paleness and an ‘earthy’ appearance of skin, with, on close observation, a slightly mottled look. These circumstances led me to make inquiries, which soon made it manifest that the disease of the lip was not cancer, but was part of a syphilitic complaint.

The subsequent progress of events fully justified the diagnosis as to the nature of the tumour. The patient improved under nutritious diet and the treatment adopted; the tumour of the lip became soft, and gradually diminished in size. The aspect of the patient was remarkably improved,

and she gained flesh. Meanwhile, the slight cutaneous eruption entirely disappeared.

I would fix your attention on the fact that the patient did not use any of the medicine—mercurial, generally known to exercise a beneficial effect on the disease with which she might be said to have been affected in her whole system. The treatment may be said briefly to have consisted in the use of general means calculated to invigorate the system—removal to a healthful residence with the use of nutritious food and tonic medicine. Yet all appearance of disease was cast off by, as it seemed, the system itself invigorated by those means.

CLINICAL OBSERVATIONS.

Aneurism of the Radial Artery on the Carpus.

Case 80.—Mr. Ryton, æt. 67 years, a tradesman in respectable position, applied to me in October 1848, in consequence of a small pulsating tumour on the wrist of the right hand. It had existed for a month, and had steadily increased in size. Mr. R. being a slender person, of very spare habit, the examination of the parts was the more easily and completely made.

The swelling was about the size of the ungual joint of one of the smaller fingers. It lay on the outer and back part of the carpus, above the first metacarpal interspace, in the hollow formed by the tendons of the extensor muscles of the thumb; which hollow is made evident when those muscles are thrown into action. It was therefore in the position the radial artery usually occupies after it has turned backwards from the front of the forearm to penetrate from behind between the first two metacarpal bones to become the deep palmar artery. In assigning, as is virtually done here, a metacarpal bone to the thumb, that which seems to be the common though not strictly accurate custom of anatomists is followed.

To the touch the tumour was smooth, and equally so over the whole surface. It was very elastic, as it might be if formed of fluid within a thin covering. It was not lessened in size by pressure. It pulsated when first observed, and afterwards continuously. Pulsation was now felt equally on every part of the little swelling; it was diminished by compression of the radial artery in the forearm, and ceased when the ulnar artery was compressed at the same time. Then what was the nature of the tumour? Was it a bursa over the artery, or a protrusion of a carpal synovial membrane, or was it a dilatation—aneurism—of the radial artery? In order to aid the facts already stated, and to determine the diagnosis as far as might be done, I passed a small needle into the tumour at different points—at the middle, and at the circumference—and only unmixed arterial blood followed. I concluded that the disease was an aneurism of the radial artery.

The treatment was twofold:

Firstly. Pressure was made directly on the tumour by means of a graduated, extemporaneously made compress fixed with adhesive plaster and bound on with a narrow roller around the hand and wrist.

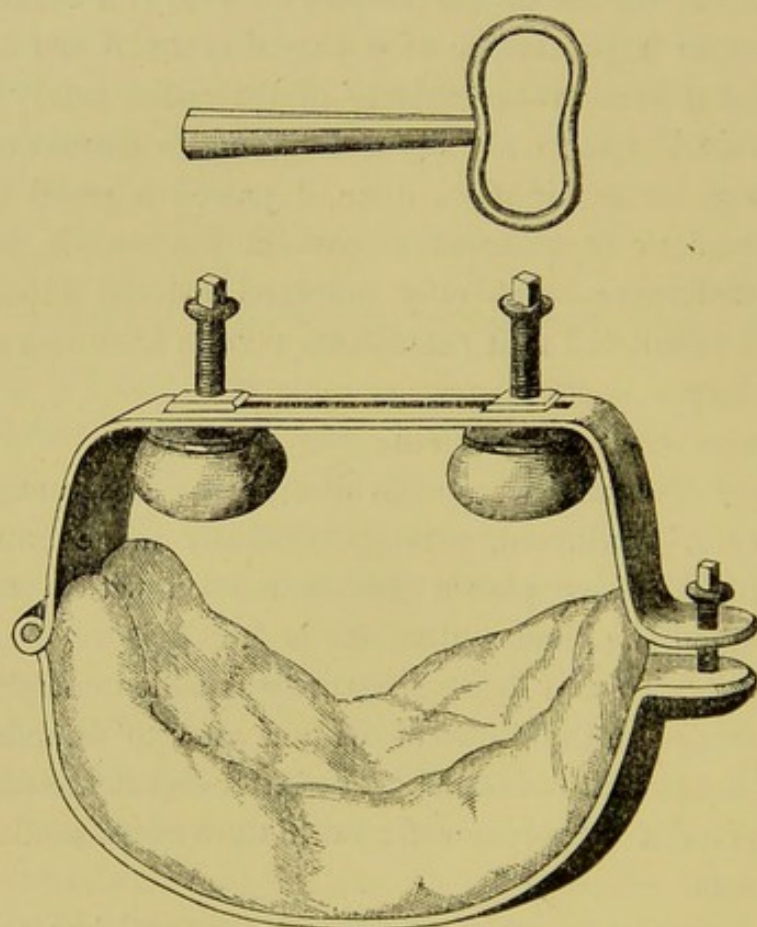
Secondly. To that direct pressure was added compression of the arteries on the forearm, with a view to diminish the force of the impulse of blood. The latter object was attained by means of a compressor for both the vessels made to fit the forearm.

The cure was soon effected; and then neither swelling nor pulsation existed. The artery at the seat of the disease was obliterated. During the treatment, the skin, it may be mentioned, was not damaged.

The compressor with which the radial and the ulnar arteries were acted on is represented in the appended sketch. It was constructed for me by Mr. Coxeter. I am indebted for the drawing to Mr. Ford.

The apparatus consists of two parts, intended to be

placed, one in front, the other behind the forearm. The pieces are connected at one side with a hinge, and, when applied, they are bolted together at the opposite side with a screw. The part behind the limb is covered with a cushion, while in front two screws bearing small oval pads project. These are movable laterally, to admit of accurate adjustment to the vessels. The screws of the bolt and of the artery-pads are worked with the same key.



Once afterwards I saw an instance of aneurism of the radial artery in the same position on the carpus as in the foregoing case; but I did not see the patient again. The circumstances were these:—

Mr. S., engaged in business in the north of Ireland, called on me in August 1873, being then, as he stated, on his way to Harrogate.

In six months afterwards (February 1874) a letter from

Mr. S., then at Belfast his place of residence, informed me that when in Harrogate he had obtained from the maker this apparatus (shown in the drawing), and that he had suffered much pain from the application of it by a surgeon whose services he had employed. I further learnt, by letter dated April 1874 from Mr. S., 'that he had complied with advice I had given him by letter to place himself under the care of a surgeon to a hospital in Dublin' (easily accessible to him). He had seen, he said, two hospital surgeons in Dublin, Dr. Stokes and Dr. Porter, the former of whom removed the aneurism by a surgical operation.

There is this material difference between the circumstances of the two cases: in the first the pulsatory tumour had existed one month before the treatment was begun; while in the second case the disease existed six months, besides the time it had been growing before his visit to London. Moreover, the tourniquet only had, I understood, been resorted to at Harrogate.

A Rare Form of Fracture of the Leg.

Case 81.—Robert Langley (Case-book 19), a well-built, healthy-looking lad, 17 years of age, was admitted into hospital in October 1851 on account of an injury above his left ankle which occurred on the same day a short time before his admission. The patient stated that, while dragging a piece of iron about twelve feet long over a heap of earth in the street, he slipped and fell. The iron falling by his side, his left foot was doubled under him and was turned outwards. No further account of the position of the limb in the accident could be got.

The entire injury was found to be at the lower part of the leg. The tibia there visibly projects forwards; and there is a depression below the prominence between it and the foot. The projection of the bone is an inch and a half higher than the lower margin of the fibula, and three-

quarters of an inch above the lower edge of the malleolar process of the tibia. The space between the prominent tibia and the end of the great toe on the injured side measures three-quarters of an inch less than between the lower edge of the tibia and the end of the great toe on the other foot—the measurement in both being respectively $6\frac{3}{4}$ and $7\frac{1}{2}$ inches. The ankle-joint was uninjured.

Two other facts I looked upon as peculiar to this injury—diagnostic of it, namely : 1. The edge, so to call it, of the displaced bone was rounded, and the end or lower surface was felt to be smooth and as it were rugous—very unlike the hard, angular, almost sharp, feel of actual broken bone ; but it corresponded well with the condition of the bone not fully developed, where the epiphysis is connected with it by cartilage. With the presence of the epiphysis the age of the patient should be associated. He was seventeen years old. For ossification of the junction between the epiphysis and the shaft of the bone a few more years (two or three ?) added to the age of this patient are required.

2. There was an absence of the soft swelling which surrounds the broken ends of actual bone where any displacement exists—the swelling occasioned by the effusion of blood from vessels torn by the sharp bone at the seat of fracture. Swelling likewise accompanies the displacement of bone at a joint. In that case, however, the swelling results from increased secretion of synovia. It was, no doubt, the freedom from swelling which permitted the outline of the prominent bone and the hollow below it to be so clearly defined as they were. The same circumstance permitted the easy examination of the edge and the end of the bone where it projected.

The diagnosis was :—separation and displacement forwards of the shaft of the tibia from the epiphysis.

The replacement of the bone and the treatment (by means of starched apparatus) presented no difficulty and no circumstance requiring notice.

Acute Pain in the Foot during several Years.—Removal of an Osseous Growth from the Interior of the Popliteal Nerve.

Case 82.—Elizabeth Moore, æt. 32, was admitted into the hospital in September 1845.

Previous History.—Is married; has had two children, the younger born two months before her admission here. The patient is of fair complexion and nervous temperament. A little time ago she was received as an out-patient, having applied for relief on account of intense pain in the sole of one of her feet. The pain was at the fore part of the foot behind the toes.

The first sense of discomfort occurred six years previously, when twitching was felt at the inner side of the foot. At that time the pain lasted a few minutes only at each seizure. But the fits of pain soon lasted each for an hour and upwards; and its duration gradually increased till suffering became constant, not ceasing night or day.

At first the patient could by an effort of the will divert her attention from the pain, and, when occupied, she used for a while to forget it; but, during the last four months, she had been wholly unable to do so. Indeed, she stated that during those months she was not conscious of having slept. She had not suckled either of her children, there never having been (according to her own statement) 'an appearance of milk.'

In the several years during which she has been suffering pain, the woman had taken many medicines, at home and from hospitals. Of all those medicines she states that only one seemed to have any influence over the pain: that one was arsenic. When that medicine was first used for a time, the suffering ceased during two or three weeks. After that intermission, however, pain returned again as bad as ever it had been. The arsenic then failed to produce any beneficial effect.

Having observed that this woman was to all appearance healthy; that likewise she was an active-minded, energetic person, most anxious to get relief, and to do all that might be thought necessary to effect it; I thought it likely that there must be a local cause—that is to say, an appreciable local cause—for the great suffering she had so long undergone. In the appearance of the limb there was nothing noteworthy; and nothing unwonted was discovered during the manipulation of the foot and the leg; but, while pressure was made upon the back part of the thigh in the course of the large nerves, a small enlargement, not discernible upon the surface, was somewhat obscurely distinguished. It was situated at two inches' distance above the level of the upper end of the patella, and, being covered by one of the hamstring muscles, was but indistinctly felt. Still, when the muscles were relaxed, the outline of a swelling was pretty well made out; but its condition could not be determined, on account of the thick covering of muscle. Pressure over the tumour gave rise to the usual pain in the sole of the foot. Here, then, obviously, was the real cause of the suffering. There was no more than a soreness in the seat of the tumour, and that was felt only when pressure was made over it. The patient now for the first time, and upon being closely questioned, mentioned that she had felt a soreness when this part now under enquiry was accidentally struck; even before the pain arose in the foot.

The course indicated by the circumstances seemed plainly to be that of laying bare the tumour, and, if possible, separating it from the nerve. The woman was admitted into the hospital.

Operation.—The patient being under influence of chloroform, when, after free incision, one of the hamstring muscles had been turned aside, the tumour came into view. It seemed an enlargement of the nerve—the internal popliteal (posterior tibial),—immediately after its separation from the great sciatic. The enlargement did not affect the nerve

equally all round. It projected chiefly on the deeper side. Upon the surface, the nerve-fibres were seen to continue uninterruptedly on. The tumour was therefore within the nerve. To reach it, the strands or fibrils of the nerve were separated by division longitudinally of the connecting cellular structure; and, when they had been turned aside freely, the subjacent mass was pushed out without any difficulty. None of the nerve fibres were injured.

The tumour, which seemed a mass of bone, was partially grooved upon the surface, doubtless by the fibres of the nerve. It was the size and shape of a good-sized walnut, weighed 228 grains, and, when analysed, was found by Mr. Campbell of the clinical laboratory to consist of phosphate and carbonate of lime, with a trace of sulphate of lime.

On the day of the operation there was some local inflammation, accompanied with fever, which in a couple of days subsided. The patient left the hospital in a short time, entirely relieved. There remained only a little numbness in the cicatrix when it was pressed on.

Five years afterwards, in January 1850, Elizabeth Moore came to the hospital, to ask advice on account of a child born since the operation—whom, it may be stated, she had suckled. She herself had gained flesh considerably. Since the operation she has not suffered pain or any inconvenience whatever in the foot or elsewhere.



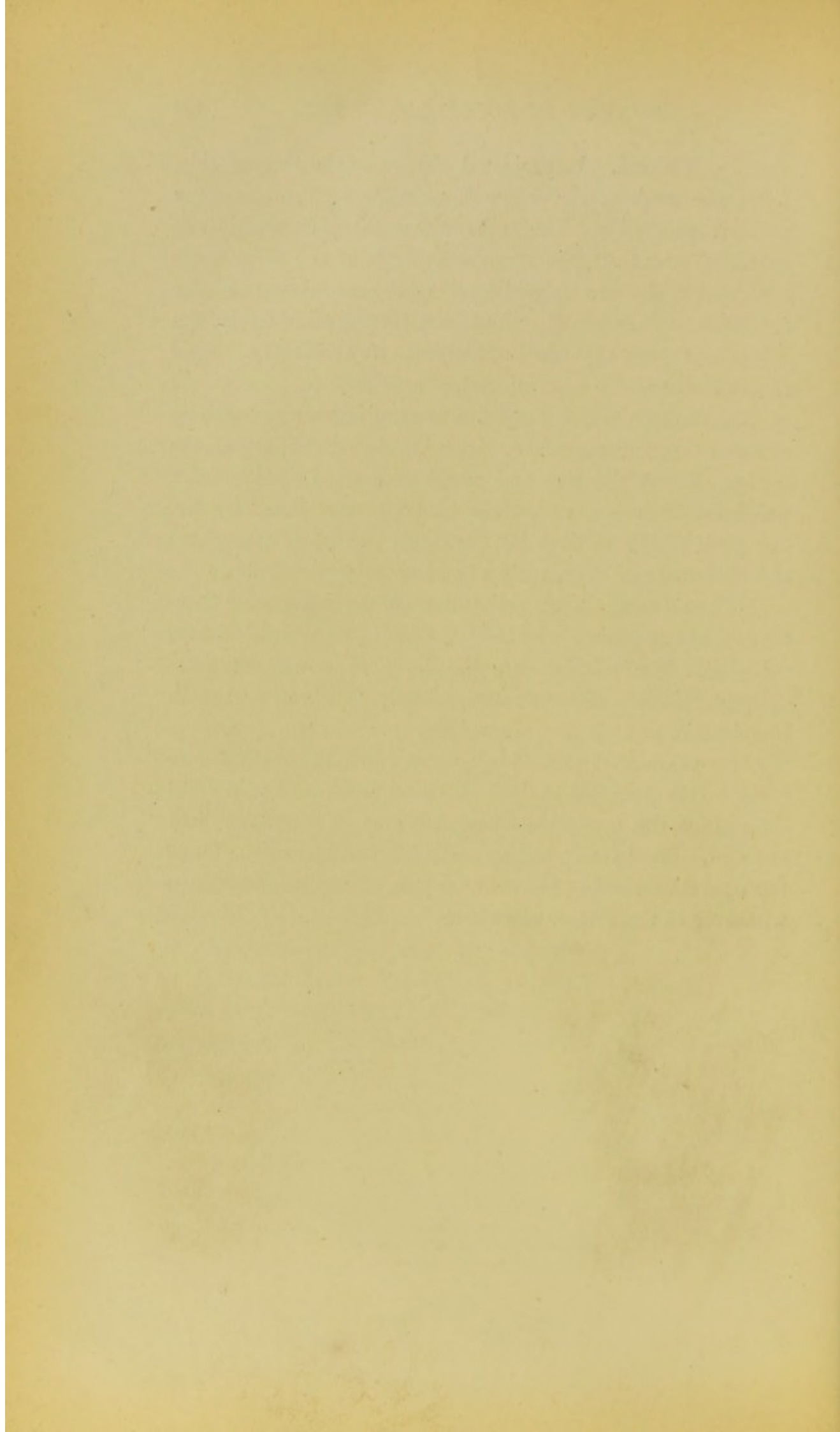


PLATE I.

OSTEOID CANCER.

CASE 1. Page 7.

FIG. 1.—A longitudinal section of the lower two-thirds of the left femur removed by amputation. The primary tumour surrounds and infiltrates the shaft of the bone.

- a. Portion of the tumour continued round to the front of the femur.
- b. Line of junction of the epiphysis, above which the cancellous tissue of the bone is replaced by a dense ossified extension of the tumour. The growth within the bone reaches to within an inch and a half of the sawn upper end of the shaft. The epiphysis is unaffected.
- c. Large vessels of the tumour divided in the section.

MR. S. G. SHATTOCK, *del.*

FIG. 2.—A longitudinal section of the clavicle, nearly surrounded by a similar tumour.

- a a. Portions of the shaft of the bone lying in the new growth, which has in places destroyed the original tissue so that the outline of the clavicle is no longer traceable.
- b. Periosteum continued over the new growth.

R. MINTERN, *del.*

FIG. 3.—A microscopic section of portion of the tumour of the clavicle.

- a a. Vessels of which the wall is formed by the cells composing the growth.
- b. Imperfectly formed bone produced by calcification of the intercellular substance and modification in the shape of the cells.
- c. Uncalcified portion of the tumour.

MR. S. G. SHATTOCK, *del.*

FIG. 4.—Half of the secondary growth connected with the ribs and vertebræ; its substance is almost wholly bone-like.

- a. Portion of lung left attached to the tumour.

R. MINTERN, *del.*

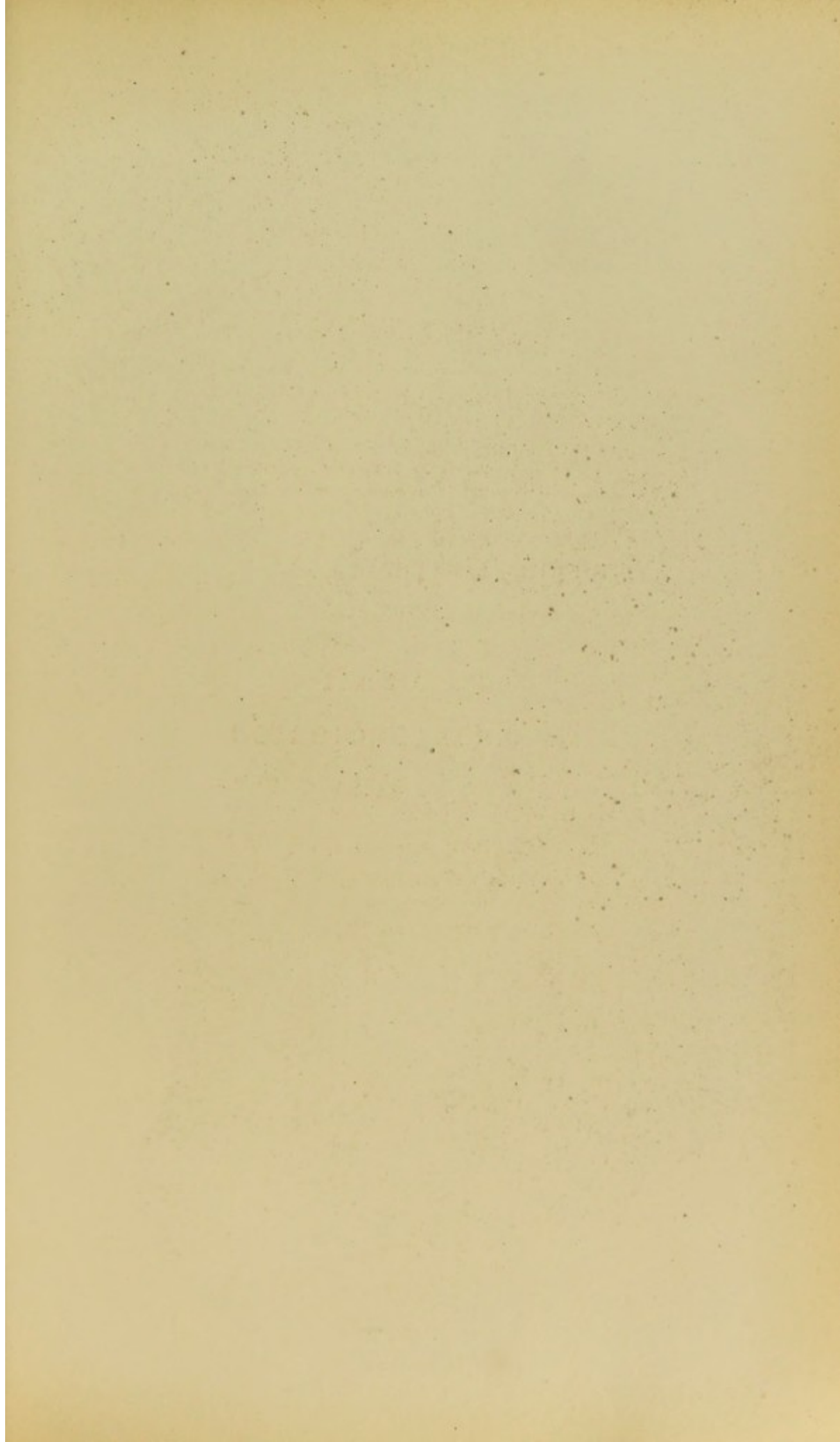


Fig. 1.

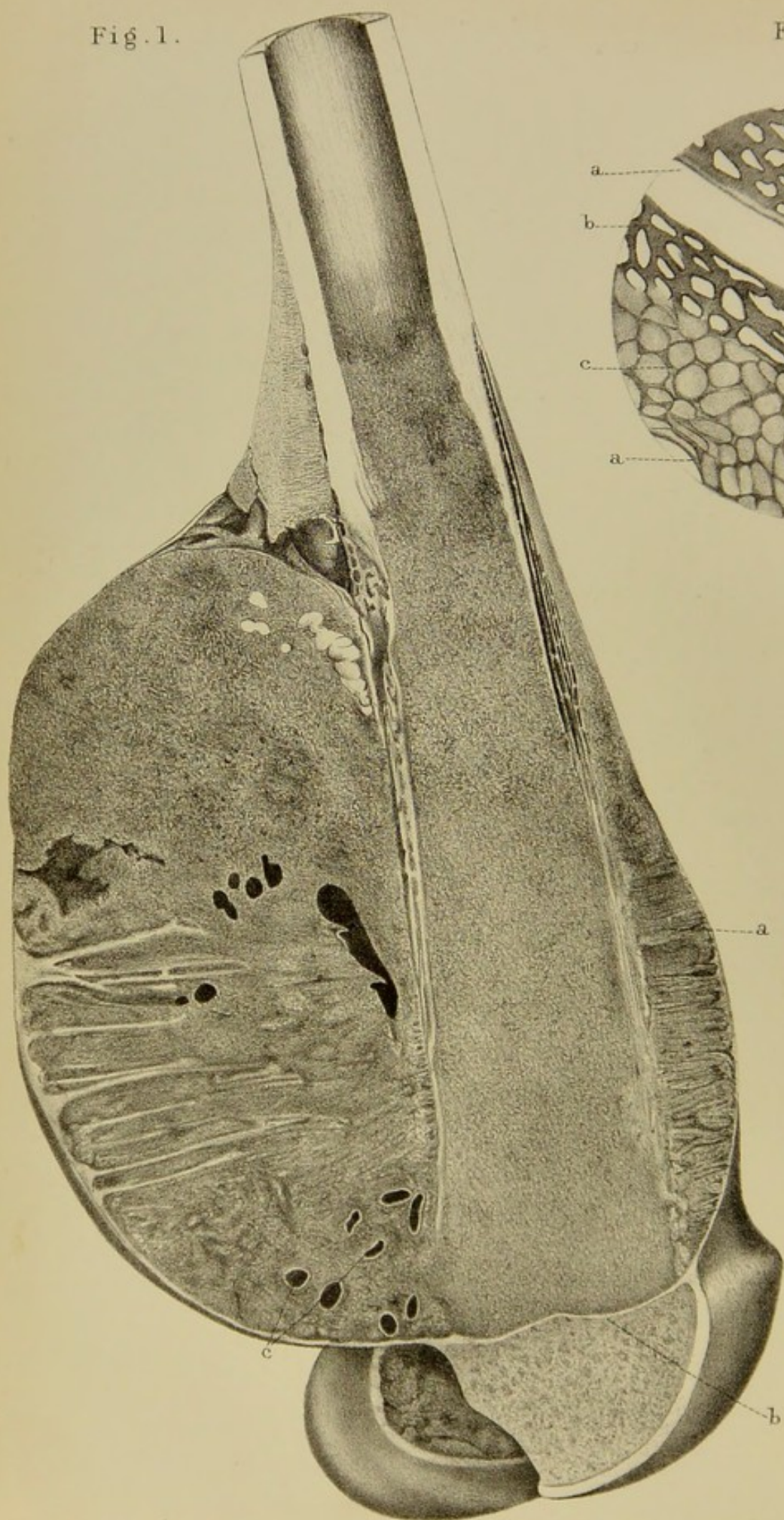


Fig. 3.

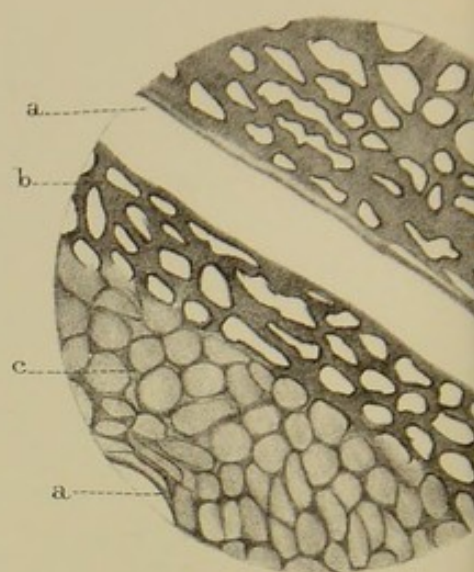


Fig. 2.

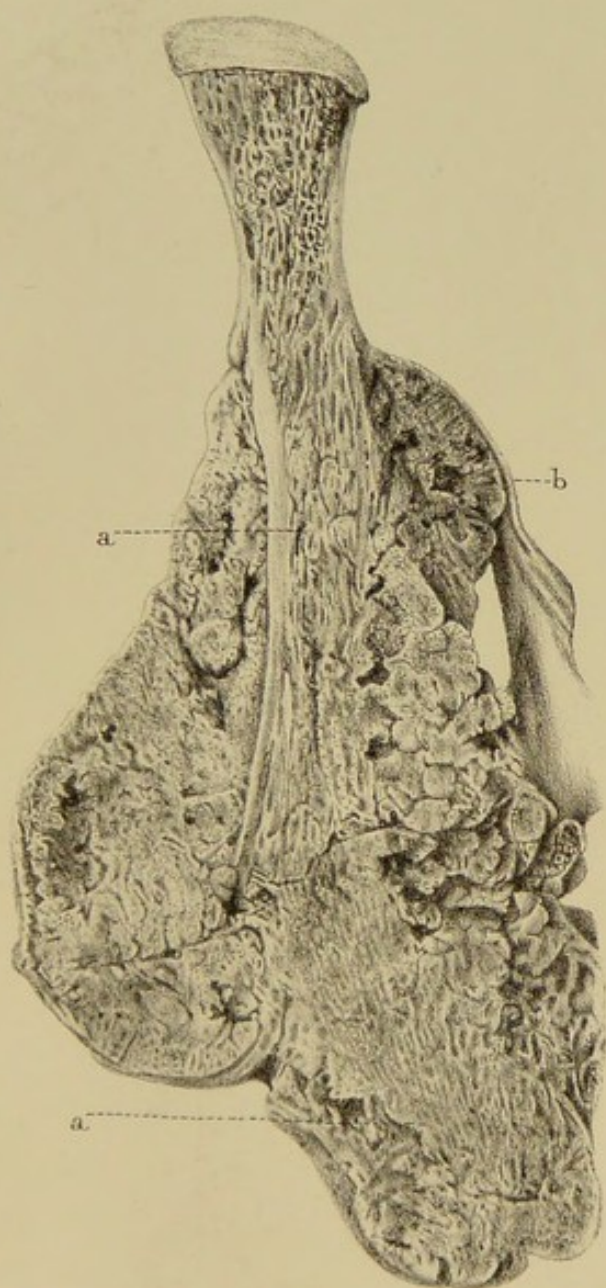
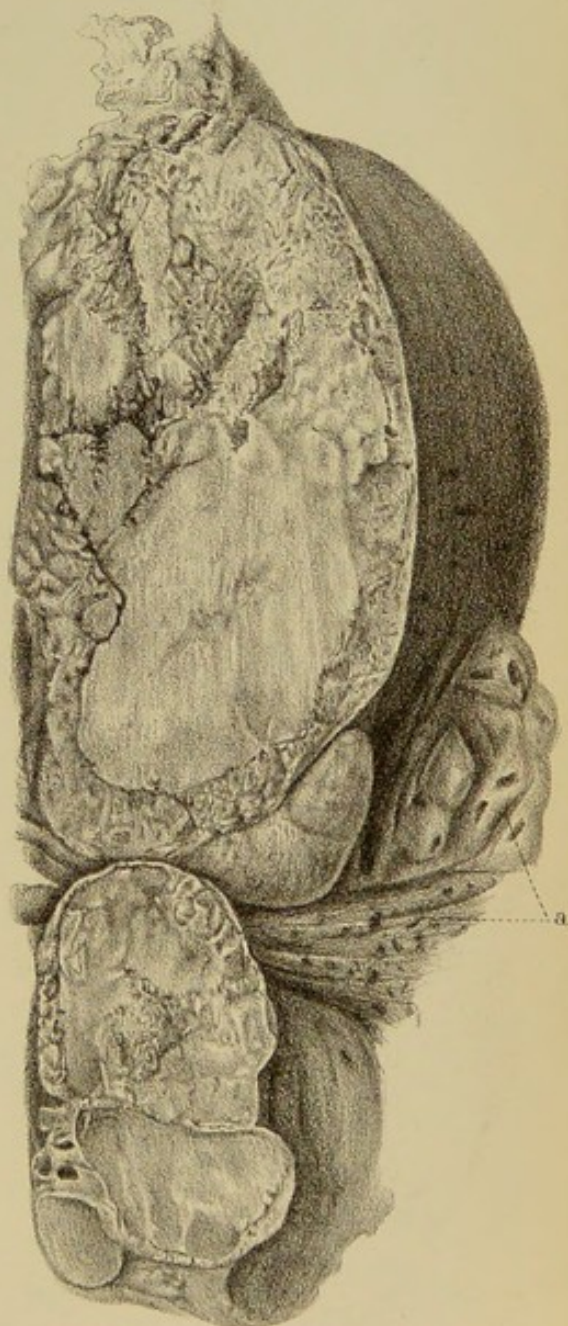


Fig. 4.



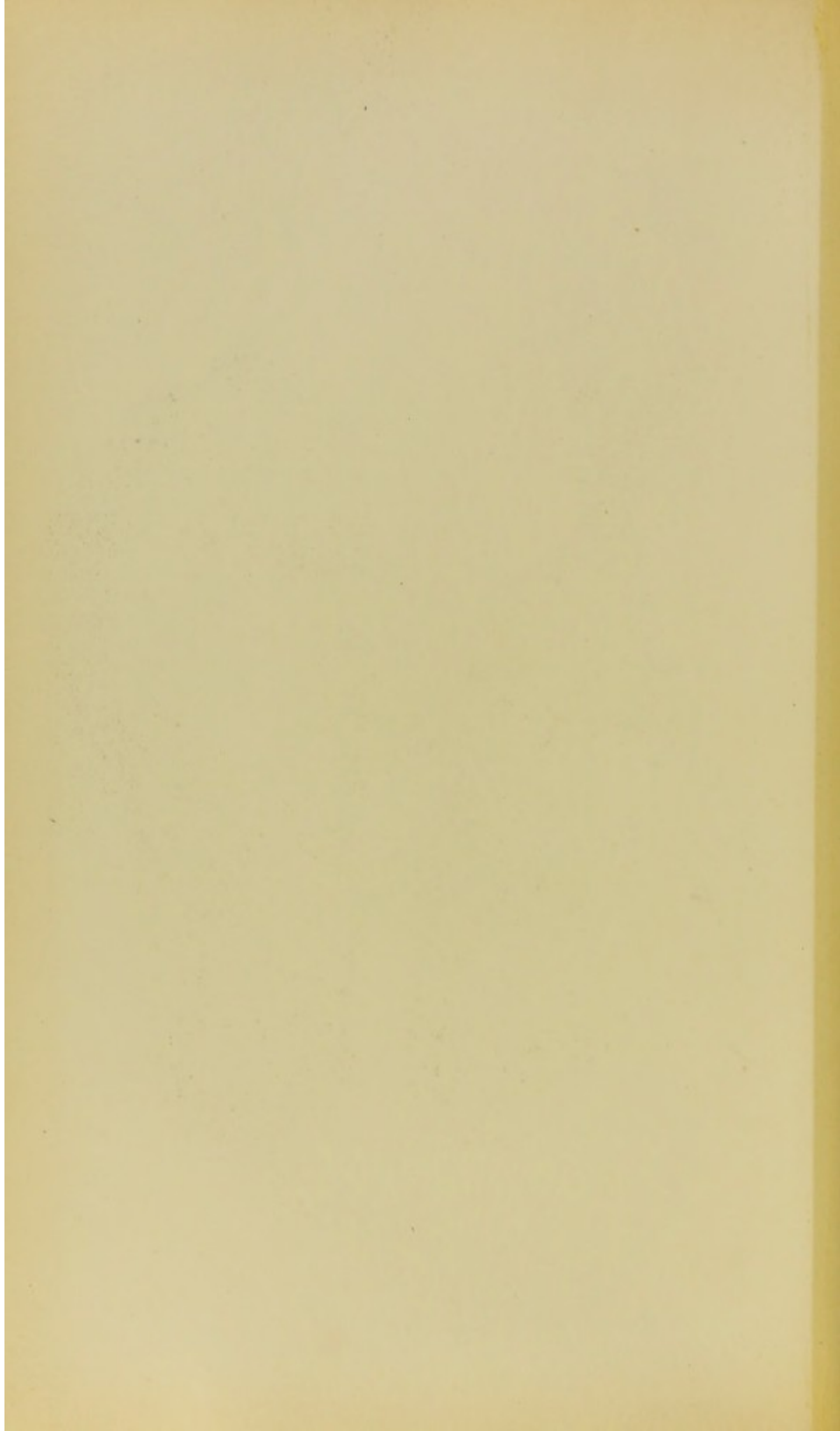


PLATE II.

OSTEOID CANCER.

CASE 2. Page 11.

FIG. 1.—A reduced drawing of the right femur, showing the tumour surrounding the lower part of its shaft; masses of new growth extend upwards on the inner side of the bone as far as the small trochanter.

- a.* A secondary growth within the femoral vein.
- b.* Diseased lymphatic gland lying upon the femoral artery.

FAIRLAND, *del.*

FIG. 2.—A view of the same from the outer side, the lower part of the femur being divided longitudinally to show the relations of the bone to the new growth.

- a b.* Ends of the fragments of the shaft of the femur which had been fractured by an accident during the course of the disease. The lower fragment is displaced behind the upper one, and both lie embedded, partly in the substance of the tumour, and partly in the callus formed as a result of the fracture.
- c.* Healthy bone.
- d.* Femoral artery, healthy.

FAIRLAND, *del.*

FIG. 3.—A microscopical section of the secondary osteoid tumour in the lung, reproduced from a figure in the 'Pathological Society's Transactions,' vol. vi.

The section shows trabeculae of osseous tissue of fairly normal type; the contents of the spaces are not shown.

DR. HILLIER, *del.*

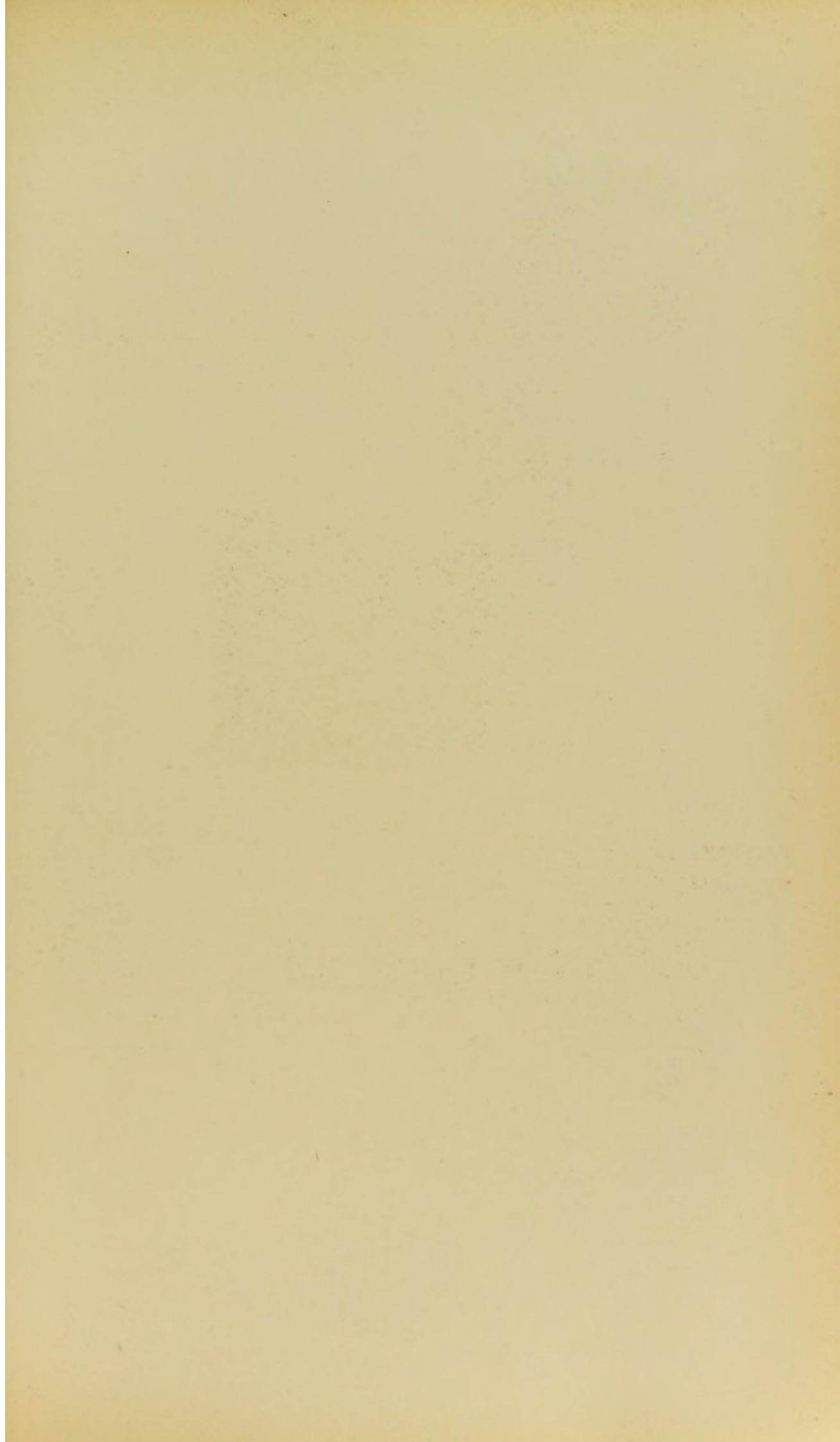


Fig. 2.

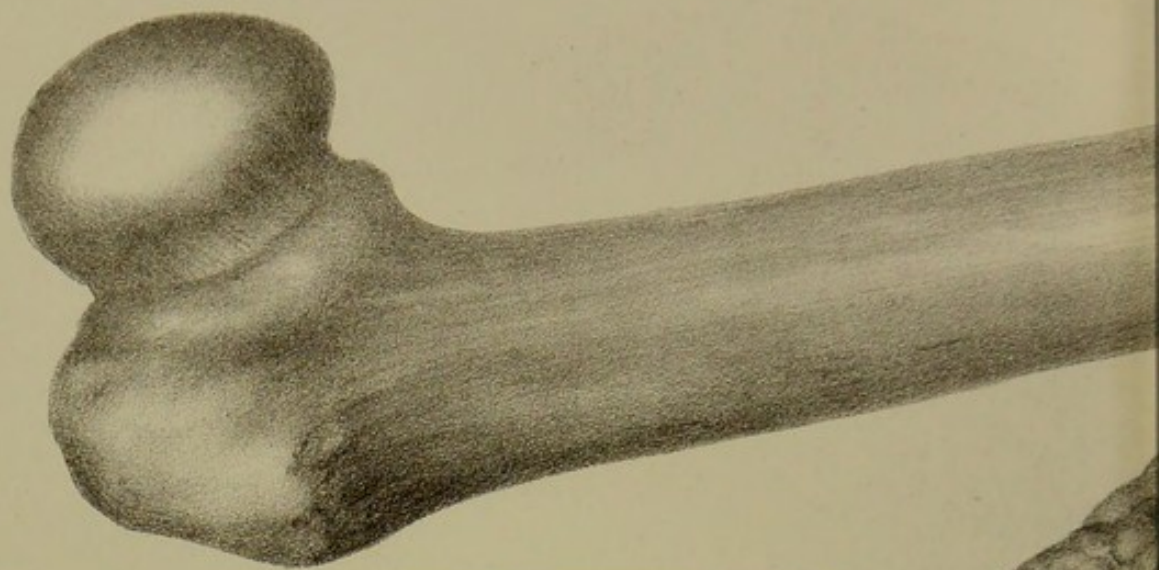


Fig. 3.

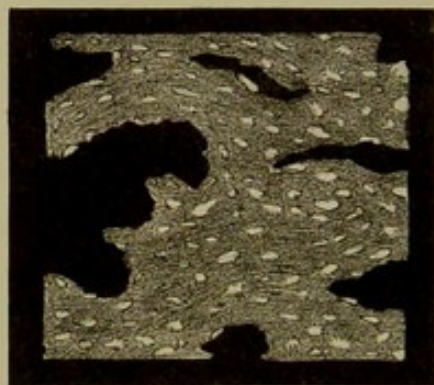
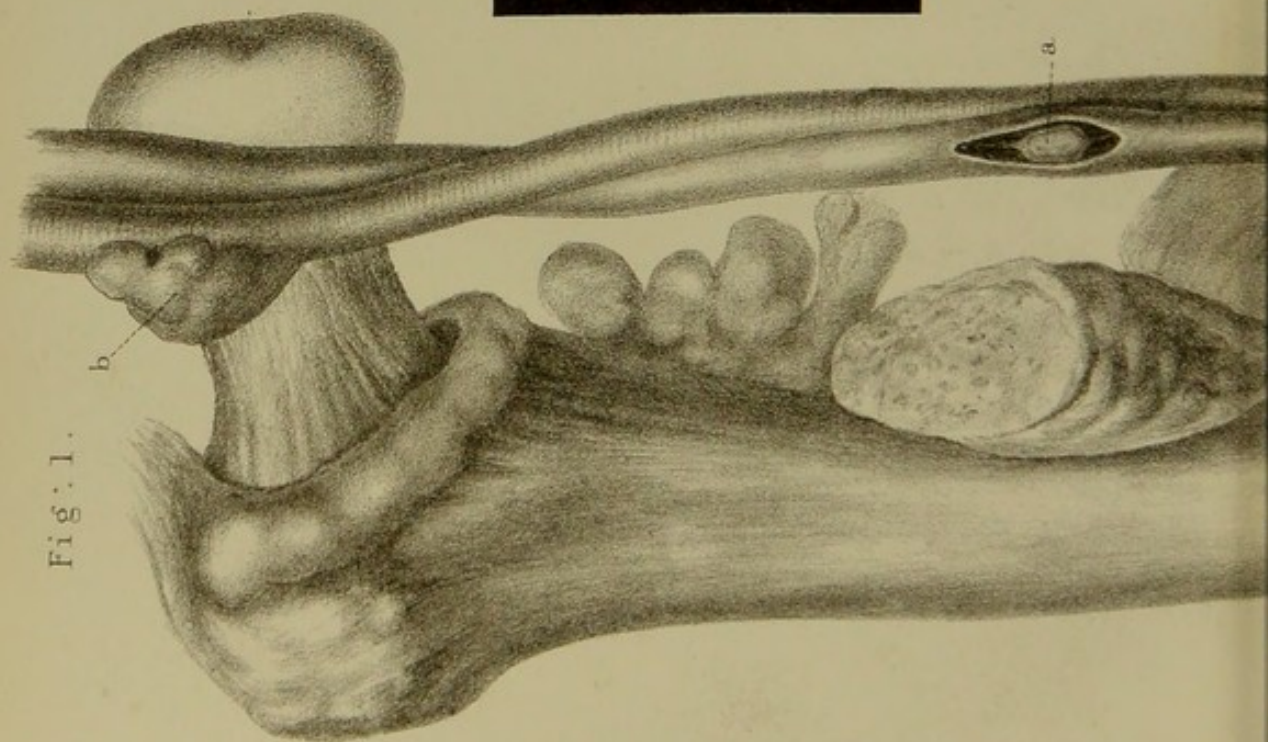


Fig. 1.



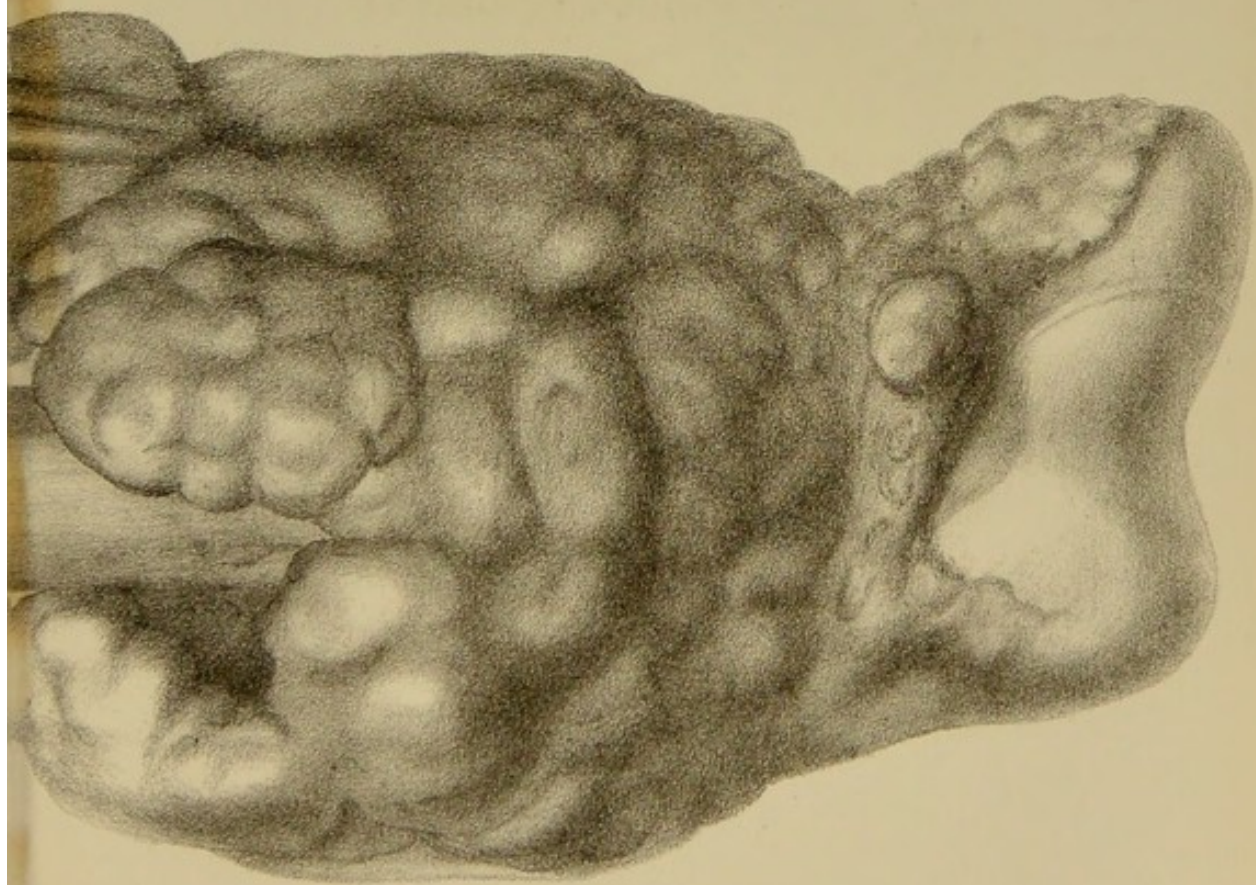
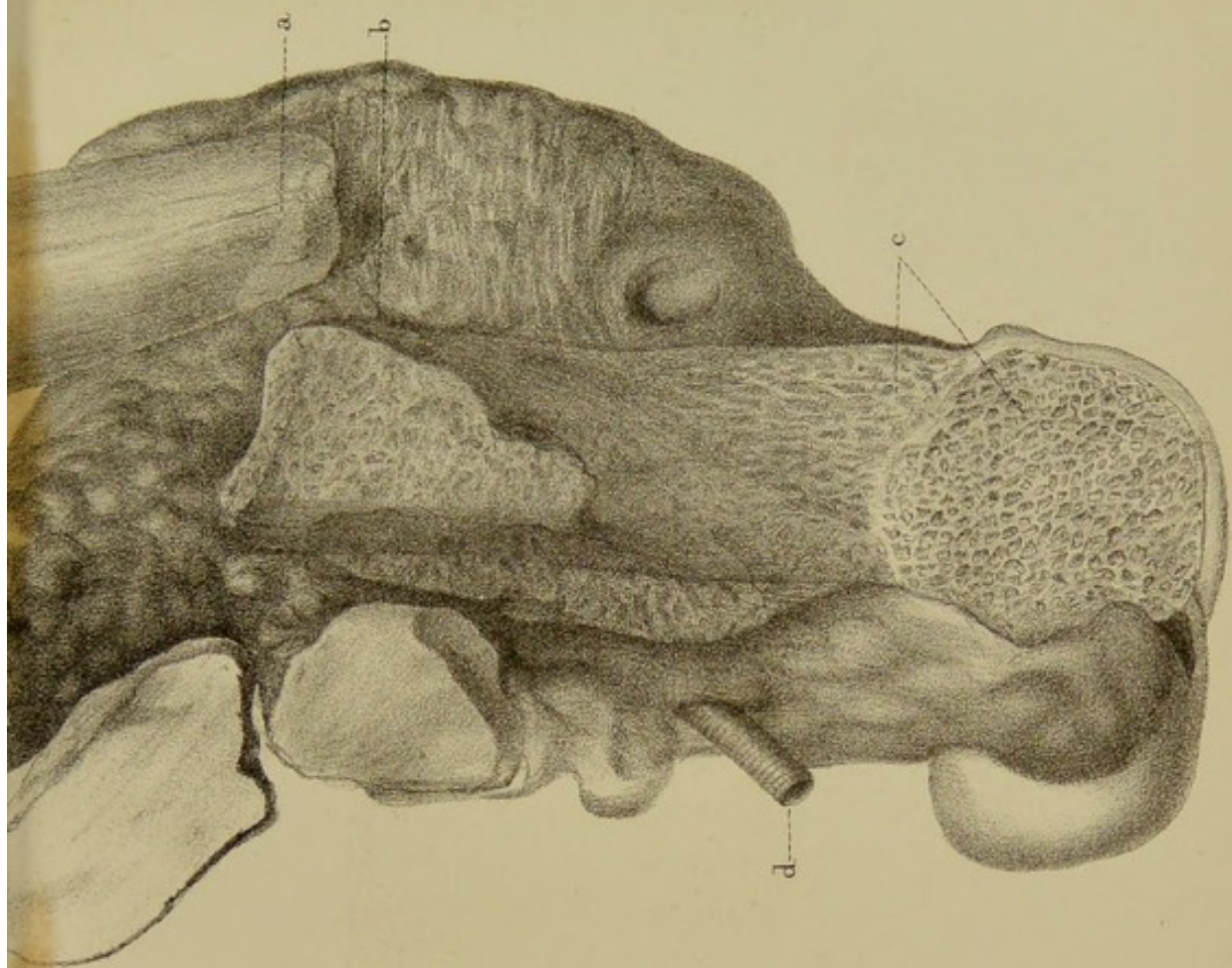
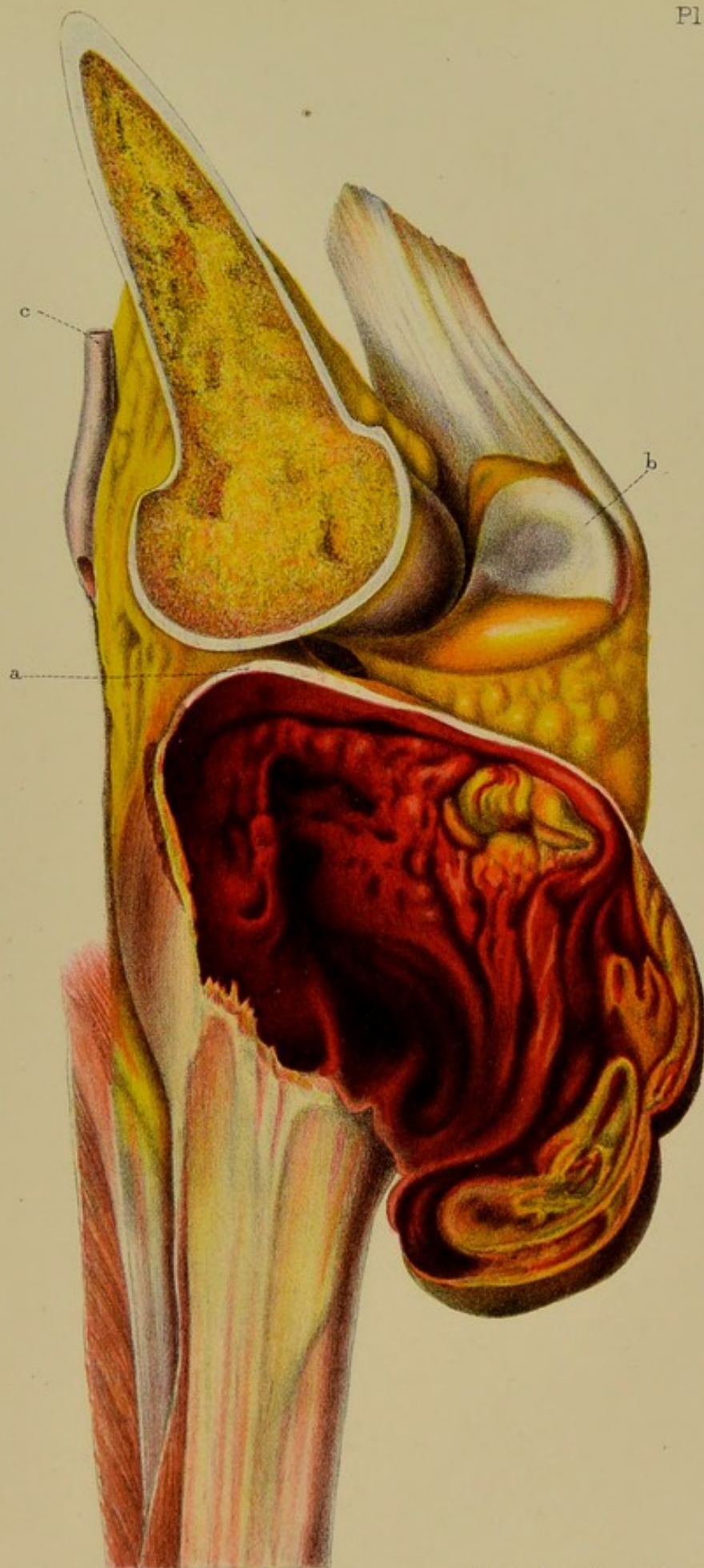




PLATE III.

MYELOID TUMOUR OF THE HEAD OF THE TIBIA.



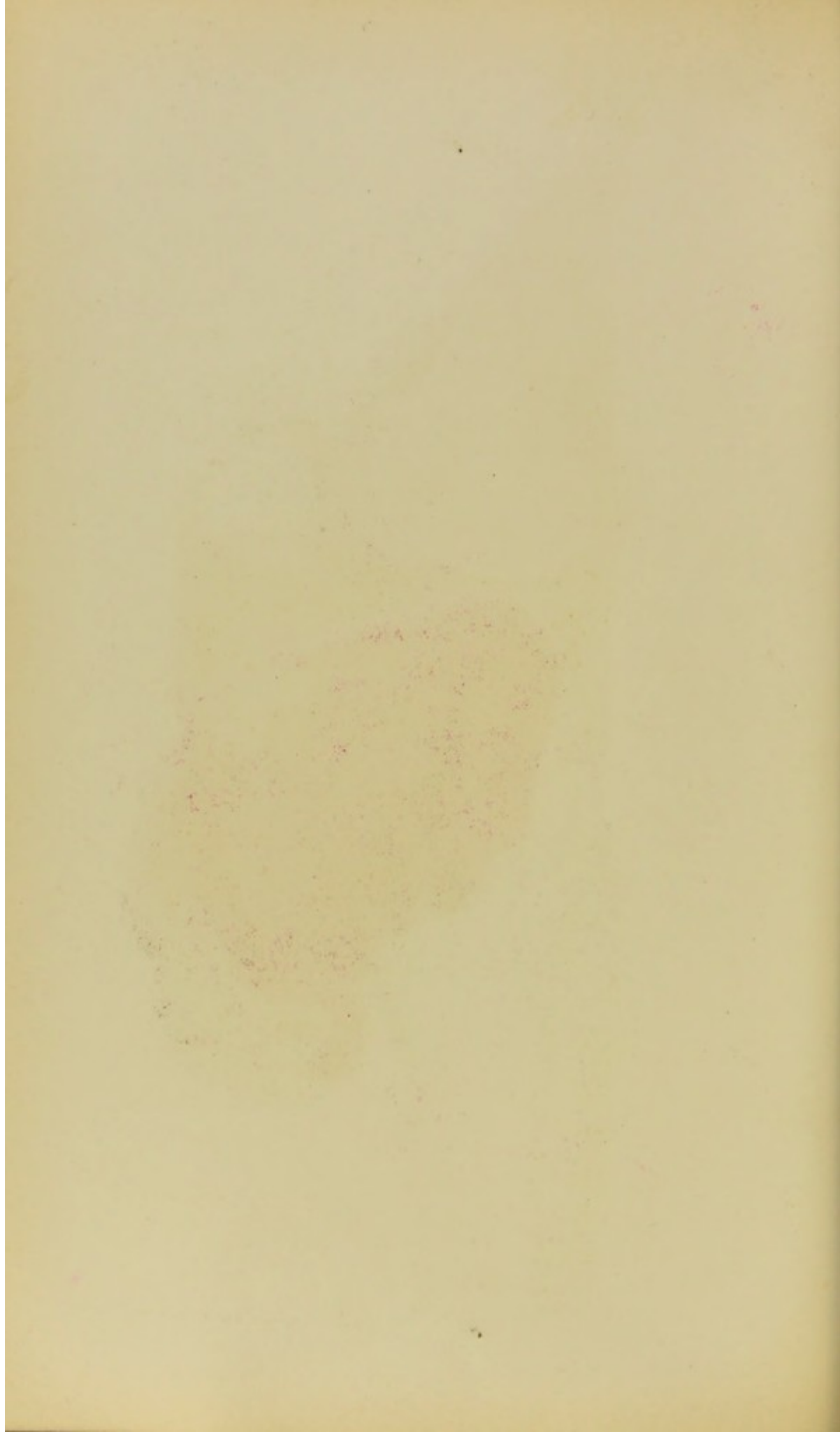


PLATE IV.

MICROSCOPIC ANATOMY OF MYELOID AND
RECURRENT FIBROID TUMOURS.

FIG. 1.—Cells from the myeloid tumour of the knee-joint.
The following drawings and descriptions are by Dr. Wilson Fox.

- a.* A mass of nuclei embedded in homogeneous granular substance, from the firmer portion of the tumour external to the bone.
- b.* Large fusiform cell with double nuclei.
- c.* Large fusiform cell with club-shaped enlargement at each end containing nuclei.
- d.* Mass of imbricated fusiform cells.
- e f.* Large round cells containing several clear round nuclei.

FIG. 2.—

- A. Cells from the firmer portion of the chief tumour of the lung.
- B. Cells from the softer portion of the same tumour of the lung, epithelioid, mingled with and passing into the fusiform cells which occur in the firmer parts.
 - a.* Length of cell, $\frac{1}{800}$ th inch.
 - b c.* Chief diameter of cells, $\frac{1}{1300}$ th inch.
- C. Cells from the small portion of the tumour found in the midst of the infarct which is represented in the following figure.

FIG. 3.—Superficial portion of the lung, showing an embolus of tumour substance lodged in one of the terminal branches of the pulmonary artery, with resulting infarction.

FORD, *del.*

FIG. 4.—Cells from the tumour (recurrent fibroid) of the knee. Case 8. Page 40.

- a.* Nuclei of which the cell-wall is not discernible, and without nucleoli, embedded in fibrous tissue.
- b.* Elongated cells (with nuclei and nucleoli) massed together, and thinning out into points.
- c.* A single oval cell, dimly granular.
- d.* Mass of such cells grouped together, with nuclei and nucleoli.
- e.* Small nuclei set in a fibrous basis; an indistinct wall of an elongated cell being visible in connection with some of them.

Fig. 1.

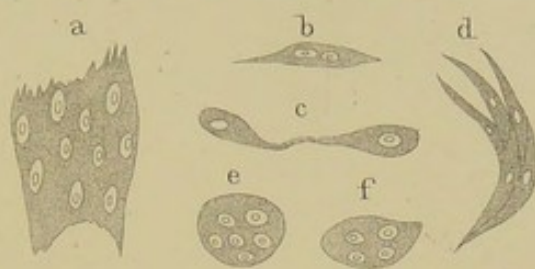


Fig 2

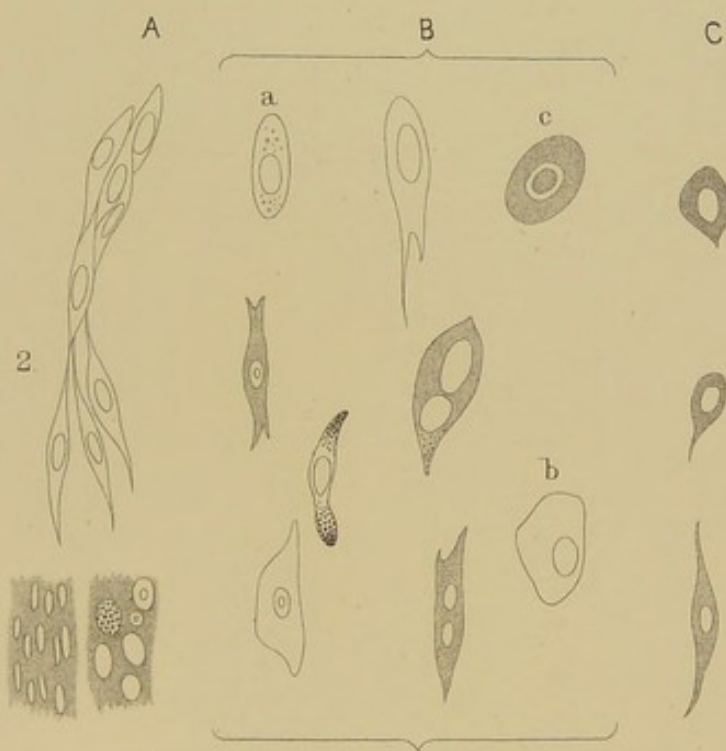
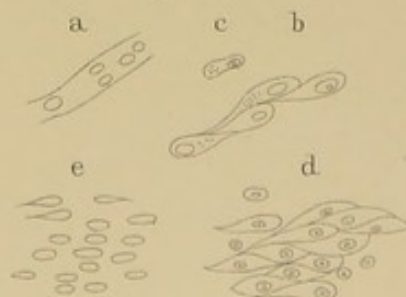


Fig 3



Fig 4



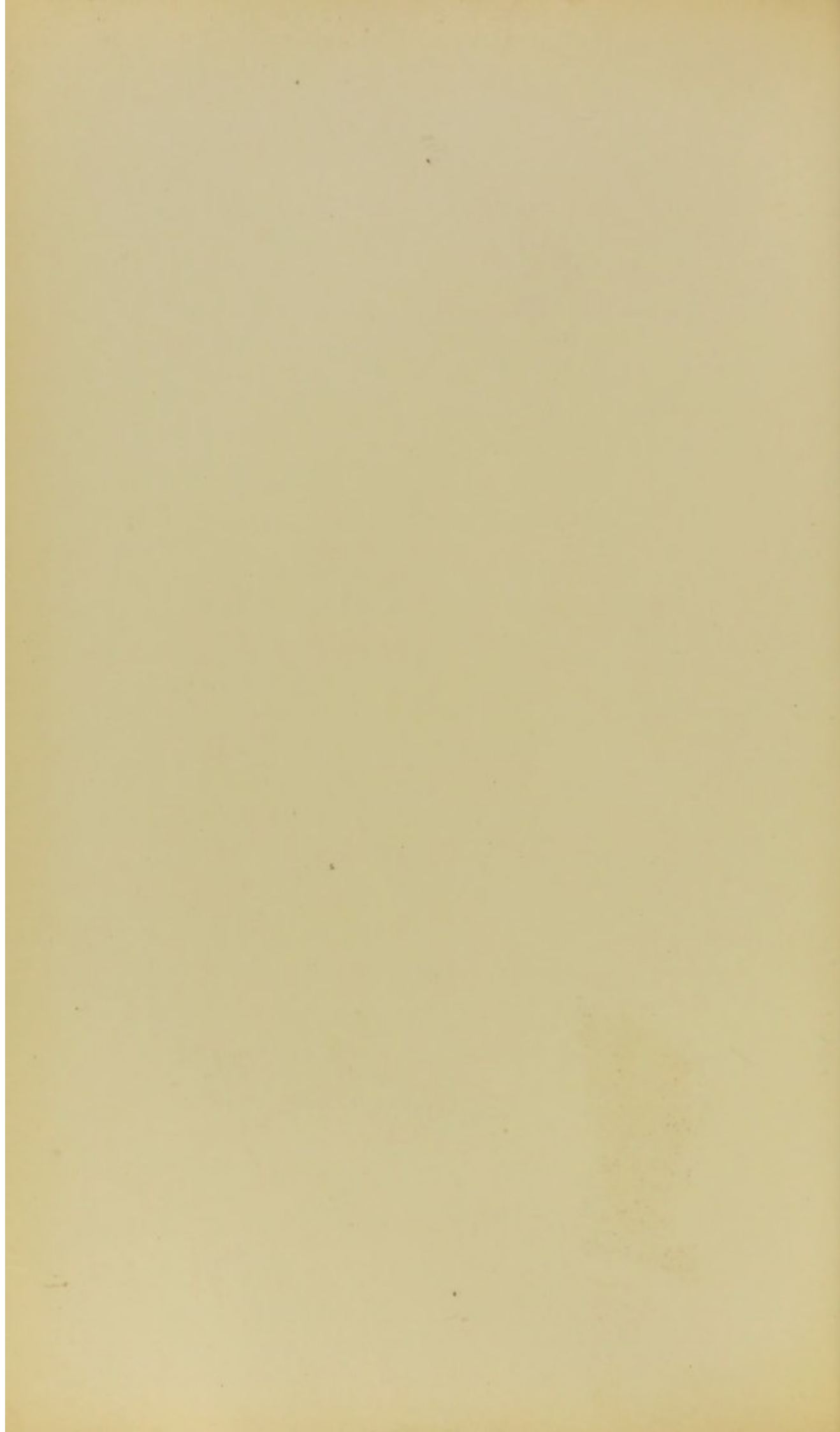


PLATE V.

EXOSTOSIS OF THE LOWER END OF THE FEMUR.

CASE 5. Pages 26 and 30.

FIG. 1.—Drawing (reduced) from a plaster cast of the knee.

R. MINTERN, *del.*

FIG. 2.—The tumour (natural size) viewed from its deep aspect.

a. Divided surface of the pedicle.

FAIRLAND, *del.*

FIG. 3.—Vertical section of the same tumour.

aa. Extensive calcification.

b. Cancellated osseous tissue.

FAIRLAND, *del.*

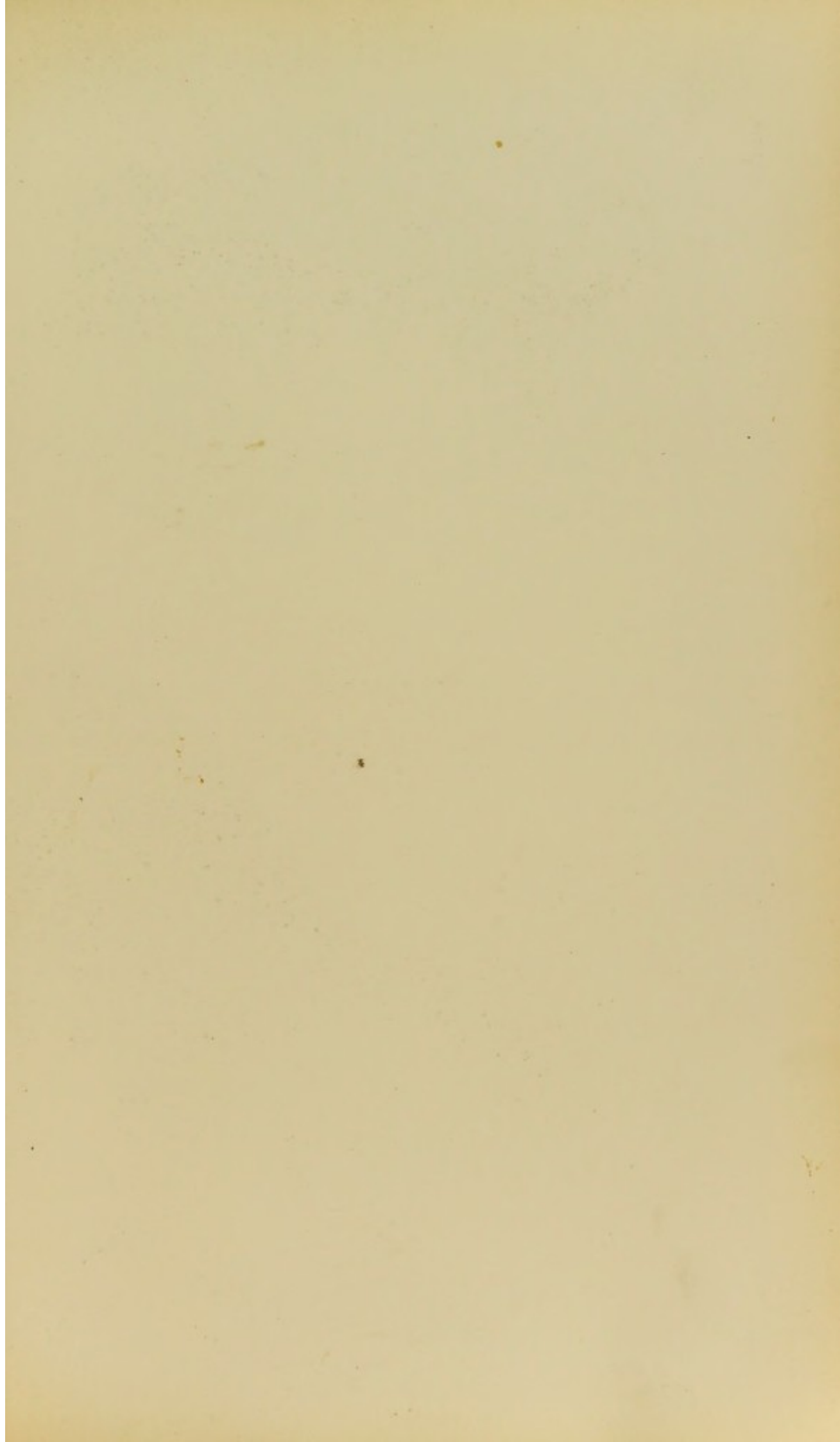


Fig. 1.

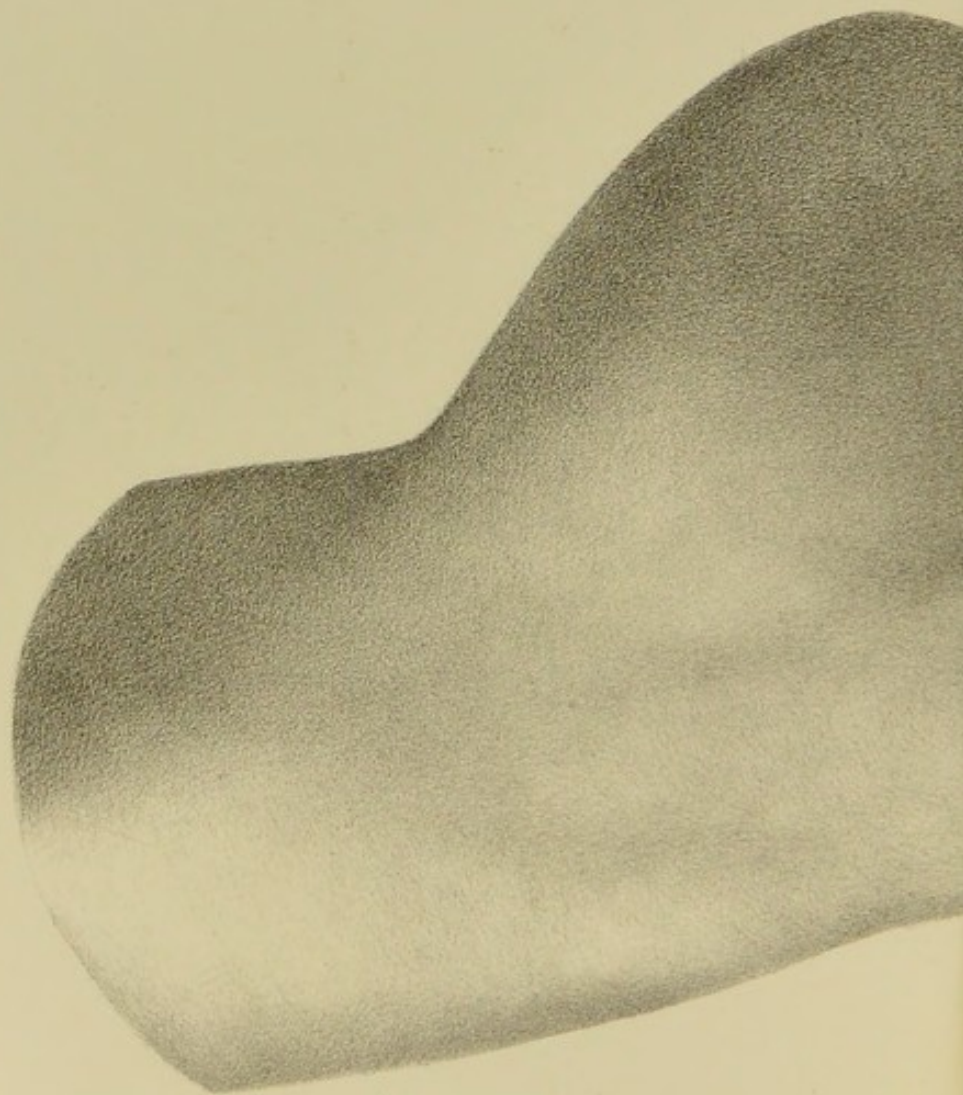
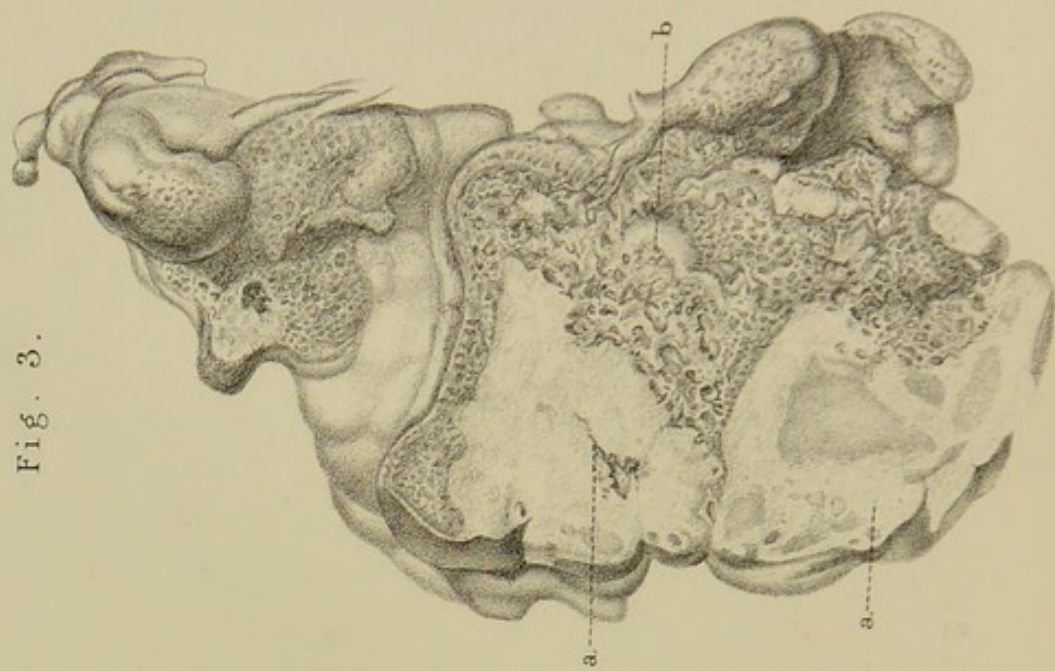


Fig. 3.



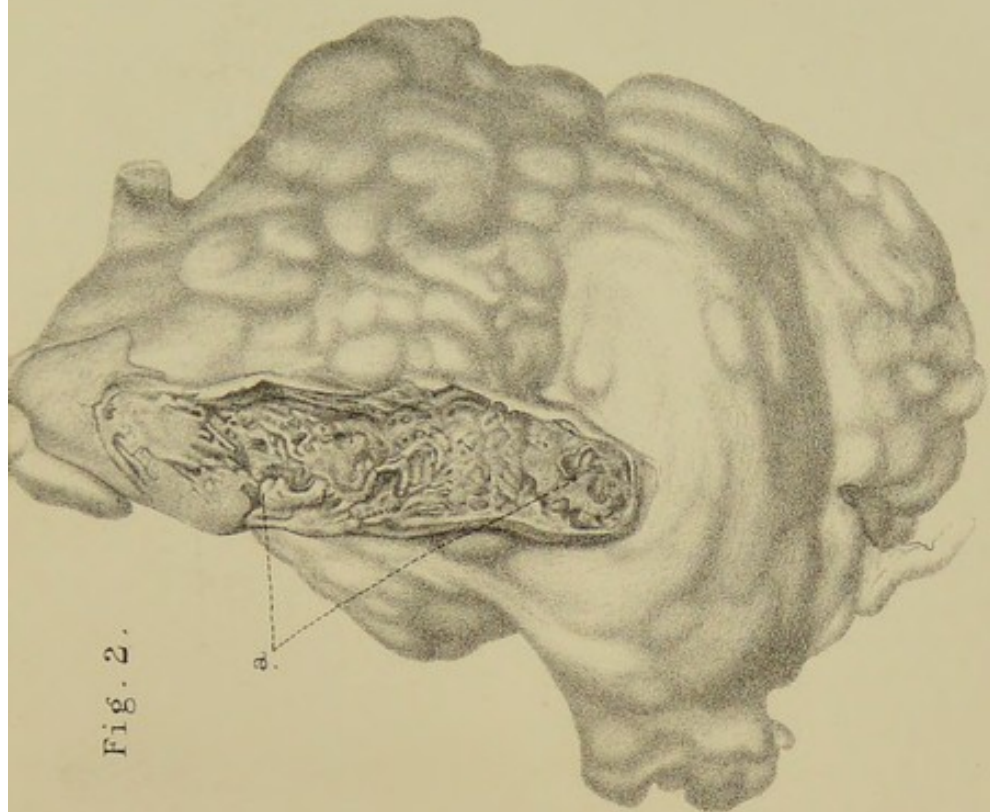


Fig. 2.

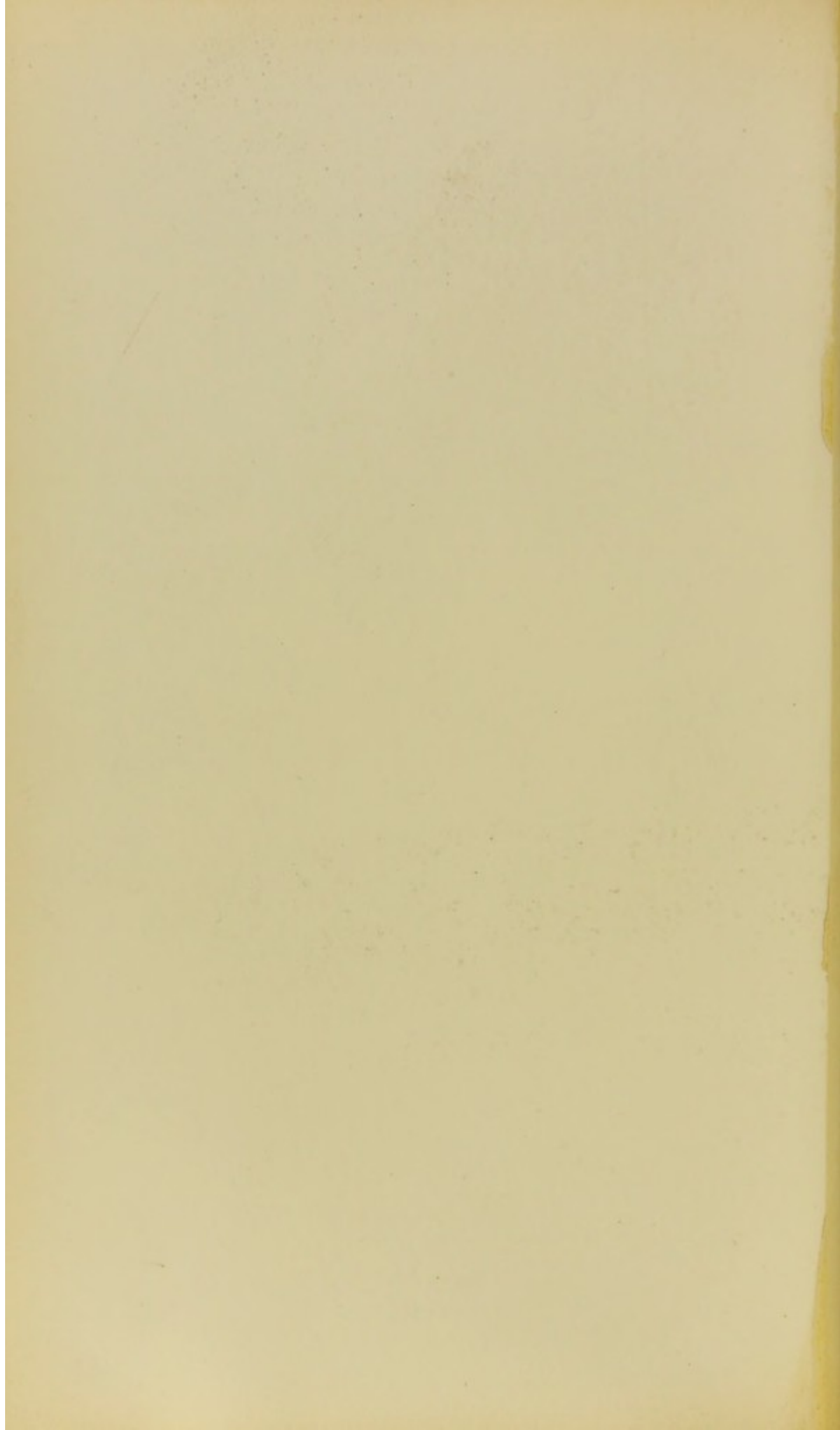


PLATE VI.

ACUTE INFLAMMATION OF THE HIP-JOINT AT
AN EARLY STAGE.

III CASE 13. Page 69.

FIG. 1.—*a*. Divided lower edge of the capsule of the hip-joint, which has been removed from the front of the articulation.

A highly vascular membrane is shown covering the whole of the head and neck of the femur, continued from the inner surface of the capsule. An incision has been made along the middle of the newly-formed membrane. In the incision the cartilage-covered surface of the head is visible. It is smooth, and, to all appearance, natural.

FORD, *del.*

FIG. 2.—CASE 14. Page 71.

The capsule has been divided across the front of the joint, and the head of the femur displaced from the acetabulum.

- a*. The synovial membrane over the neck of the bone, tumid and highly congested from inflammation. The ligamentum teres is much inflamed.
- b*. Capsule of the joint turned down; it is much thickened and its synovial lining acutely inflamed.

FORD, *del.*

Fig. 1.

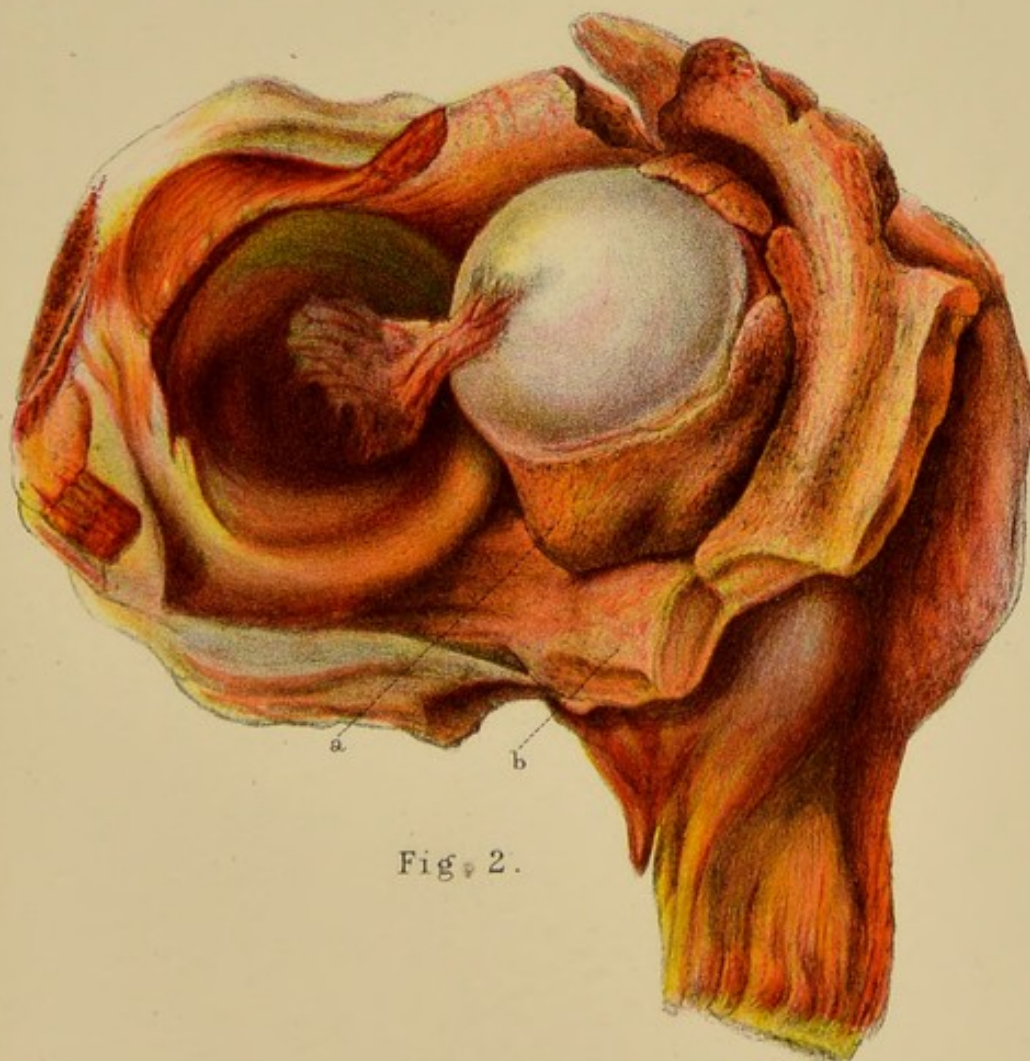
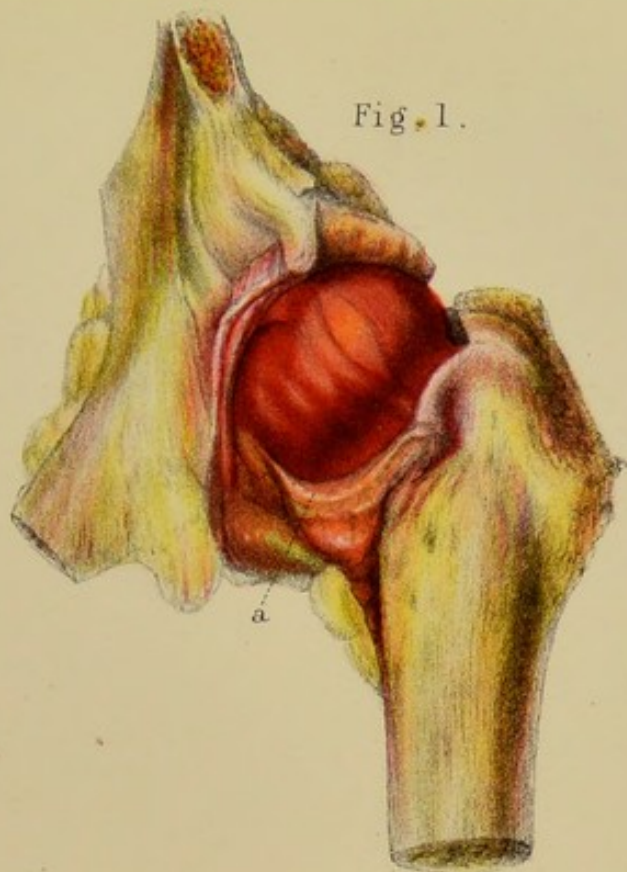


Fig. 2.

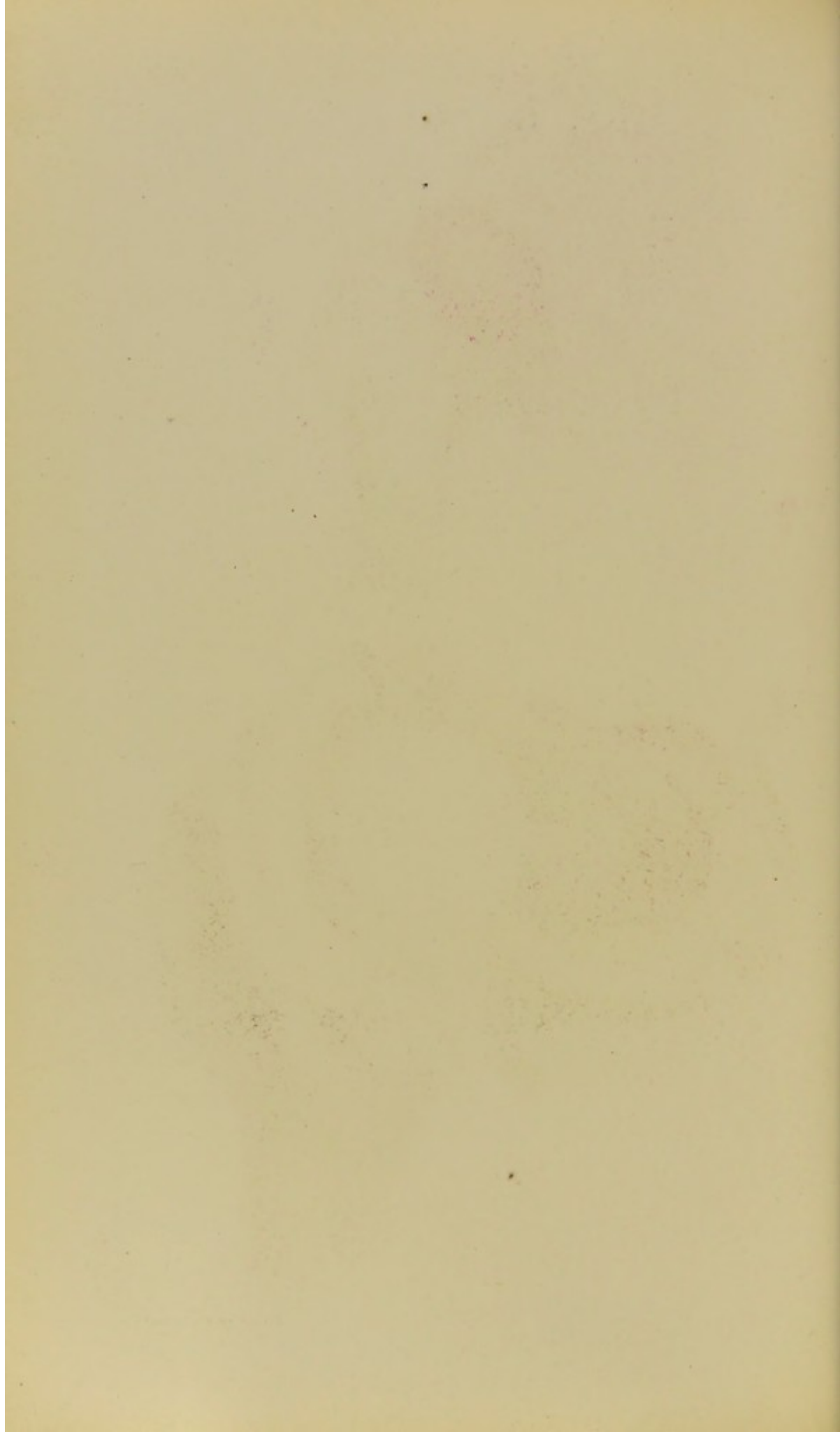


PLATE VII.

ACUTE INFLAMMATION OF THE HIP-JOINT.

CASE 14. Pages 71 and 72.

FIG. 1.—A vertical section of the diseased hip-joint represented in Plate VI.
Fig. 2.

- a.* Portion of the hip-bone forming the acetabulum.
- b.* Normal cartilage with angular projection, intervening between the epiphysis of the head and the diaphysis. A similar piece of the natural cartilage exists on the other side of the section.
- c.* Normal ossific centre in the epiphysis of the great trochanter.
- d.* Dense necrosed bone of yellow colour, contrasting with the congested bone around, and involving partly the cancellated tissue of the neck, partly that of the head of the femur; in the latter situation the disease is less advanced.
- e.* Small hard nodules (miliary tubercles) situated in the cancellated tissue and medulla of the bone.

FORD, *del.*

FIG. 2.—A section made at right angles to the preceding in the axis of the neck of the femur; the anterior half of the section is alone shown.

- a.* Yellow, dense, necrosed portion of bone: on the left-hand side (*b*) it involves the whole thickness of the neck; the synovial membrane, unossified cartilage and periosteum being here destroyed.

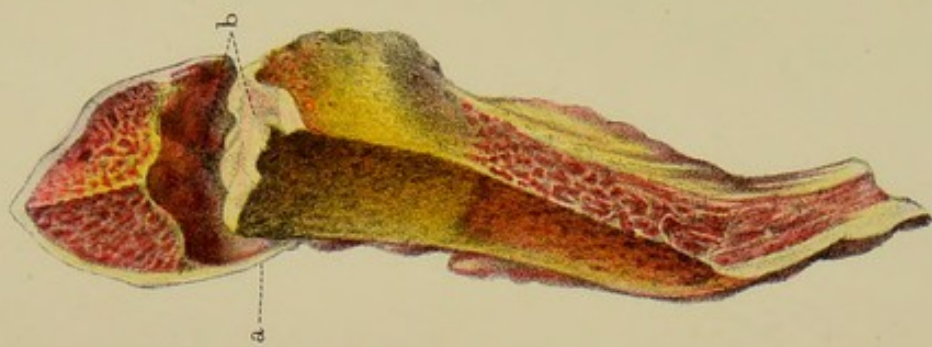
FORD, *del.*

FIG. 3.—The divided, right-hand surface of the preceding is here in part shown, the bone being half twisted on its long axis.

- a.* Point where the cartilage was still continuous.
- b.* Surfaces where the two portions of the necrosed bone have been separated. Each surface is worm-eaten and was coated with a small amount of curdy, cheesy matter.

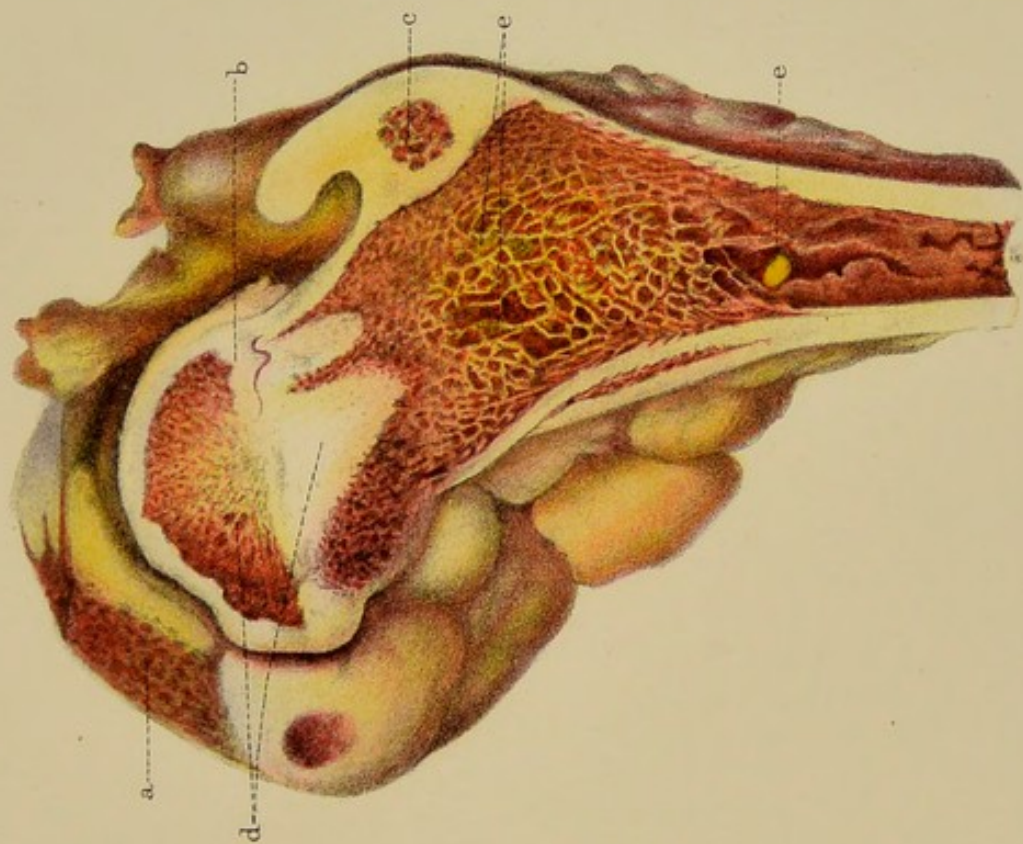
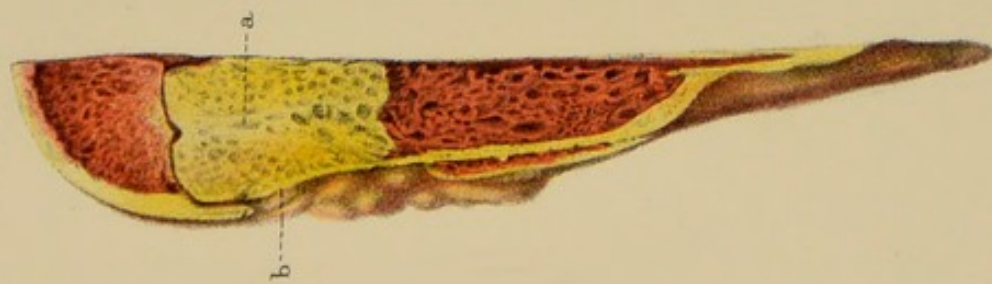
FORD, *del.*

Fig. 3.



Mintern Bros. Chromo lith.

Fig. 2.



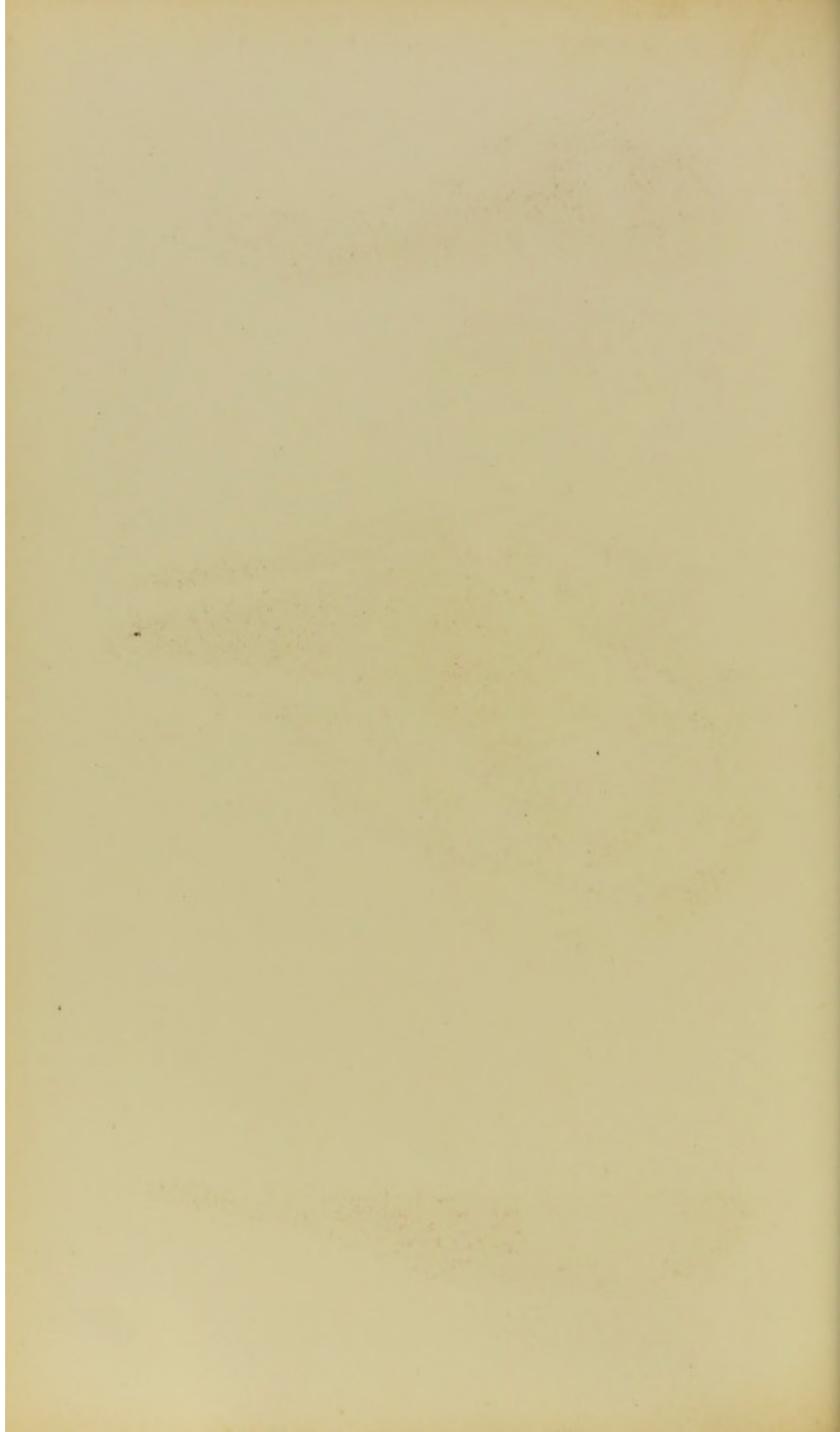


PLATE VIII.

ADVANCED DISEASE OF THE HIP-JOINT.

CASE 15. Page 75.

a. Small trochanter.

b. Symphysis pubis.

Part of the head of the femur has been destroyed by ulceration.

c. Loose sequestra, including portions of the head of the bone.

The ligamentum teres has been destroyed.

A probe has been passed through an opening in the capsule, by which the abscess in the hip-joint passed externally. This opening is situated close to the anterior margin of the great trochanter.



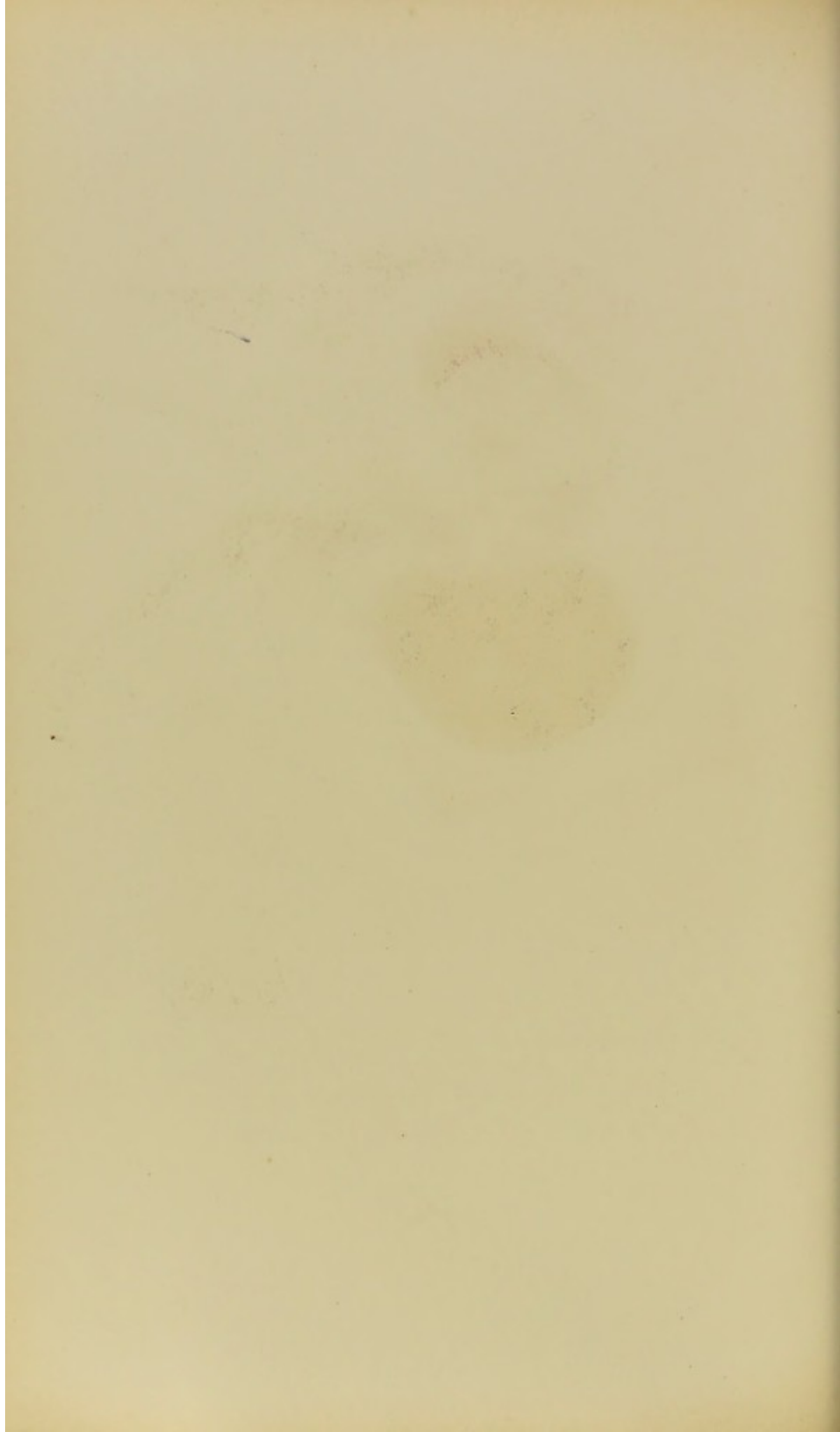


PLATE IX.

A NORMAL HIP-JOINT.

CASE 22. Page 96, *et seq.*

The right hip-joint from the body of a healthy adult. The capsule has been completely removed, and the head of the femur has been displaced from the acetabulum.

The interarticular ligament (ligamentum feres) and the transverse ligament, with their attachments, are shown.

The periosteum remains on the bones.

AUTOTYPE.



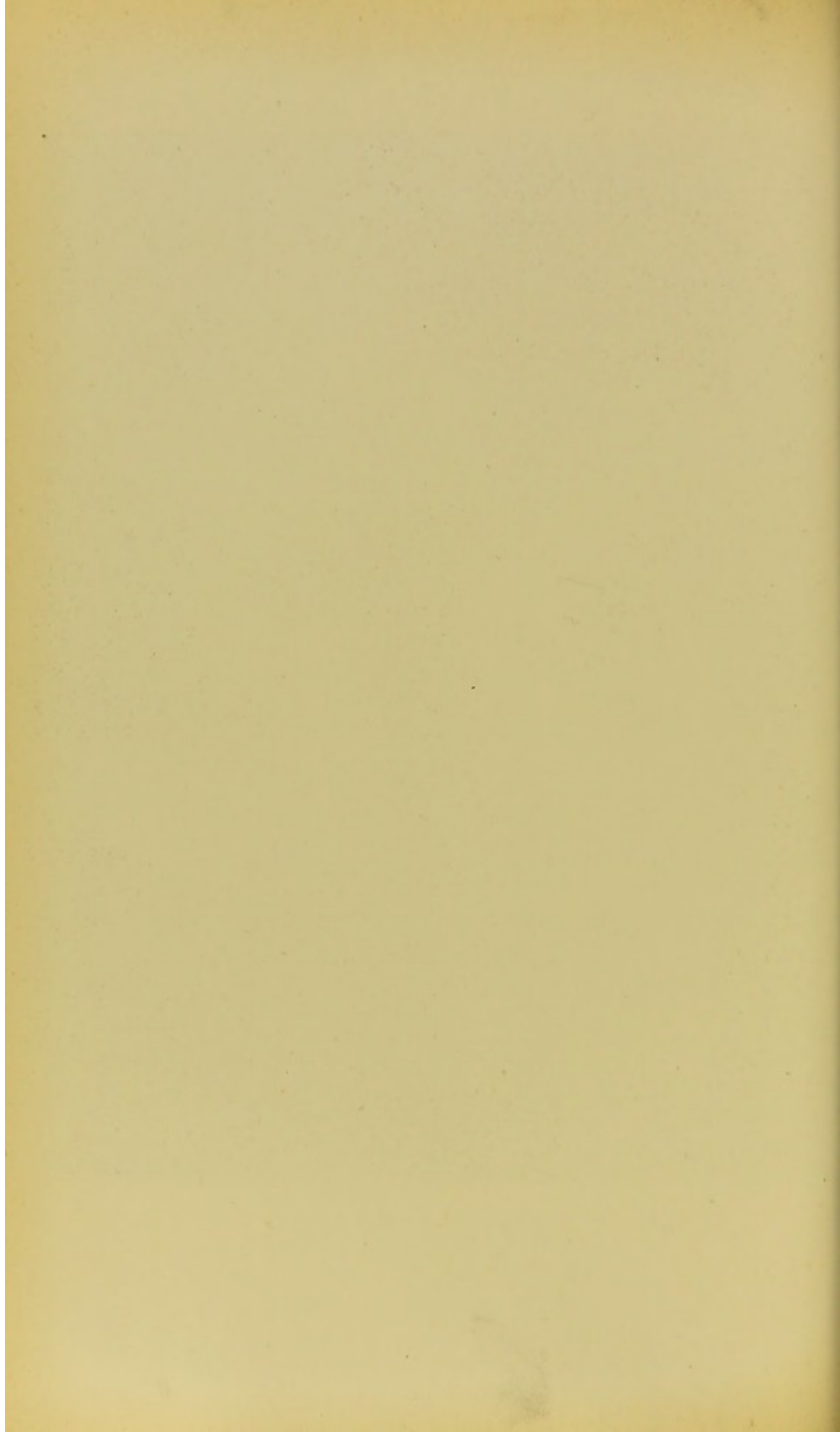


PLATE X.

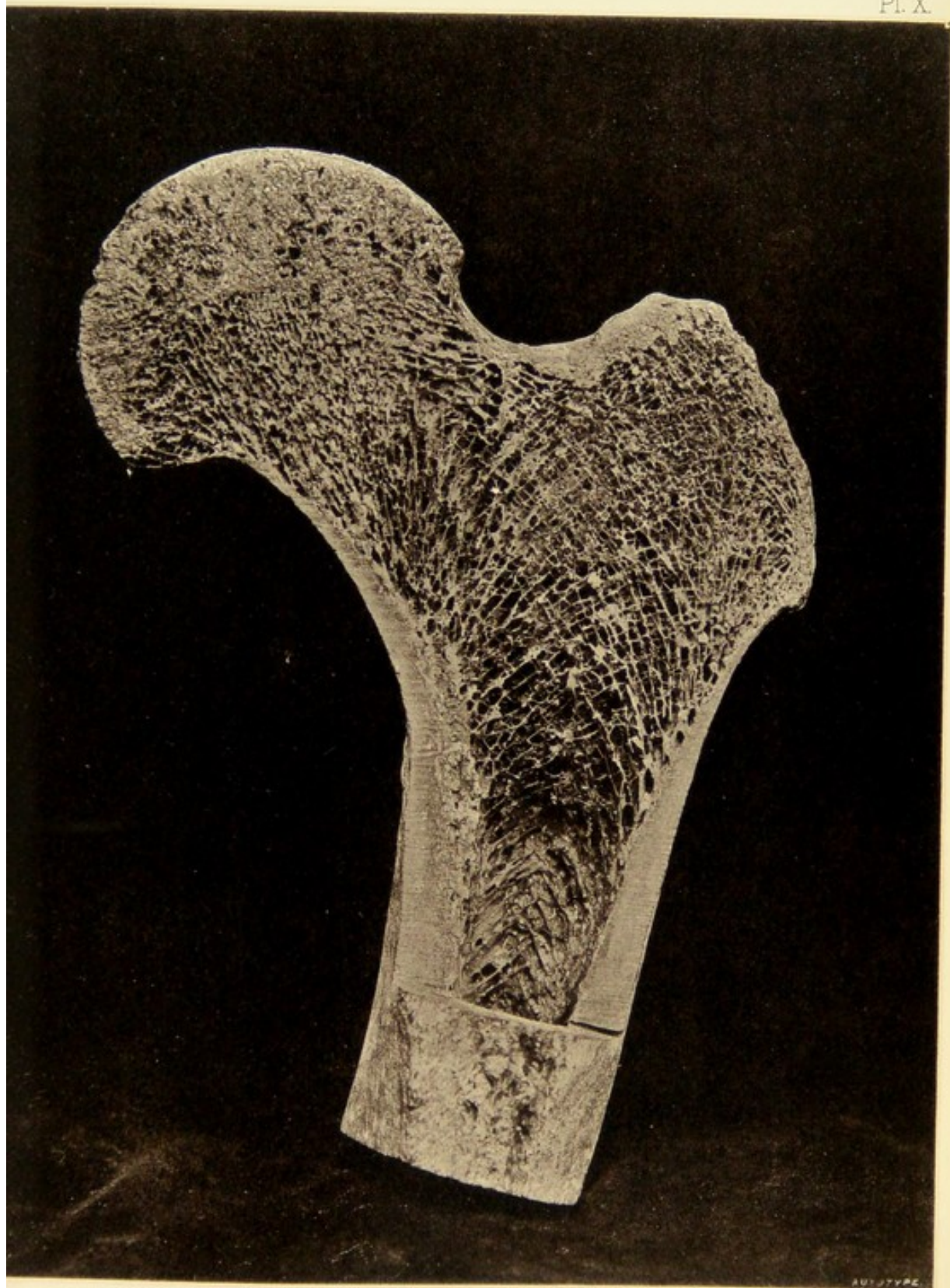
A VERTICAL SECTION OF THE UPPER END OF A
HEALTHY FEMUR.

CASE 24. Page 102.

A vertical section of the upper end of the femur, from a healthy adult, viewed from behind.

The section shows the arrangement of the beams (trabeculæ) which form the cancellated structure of the head and neck of the bone.

AUTOTYPE.



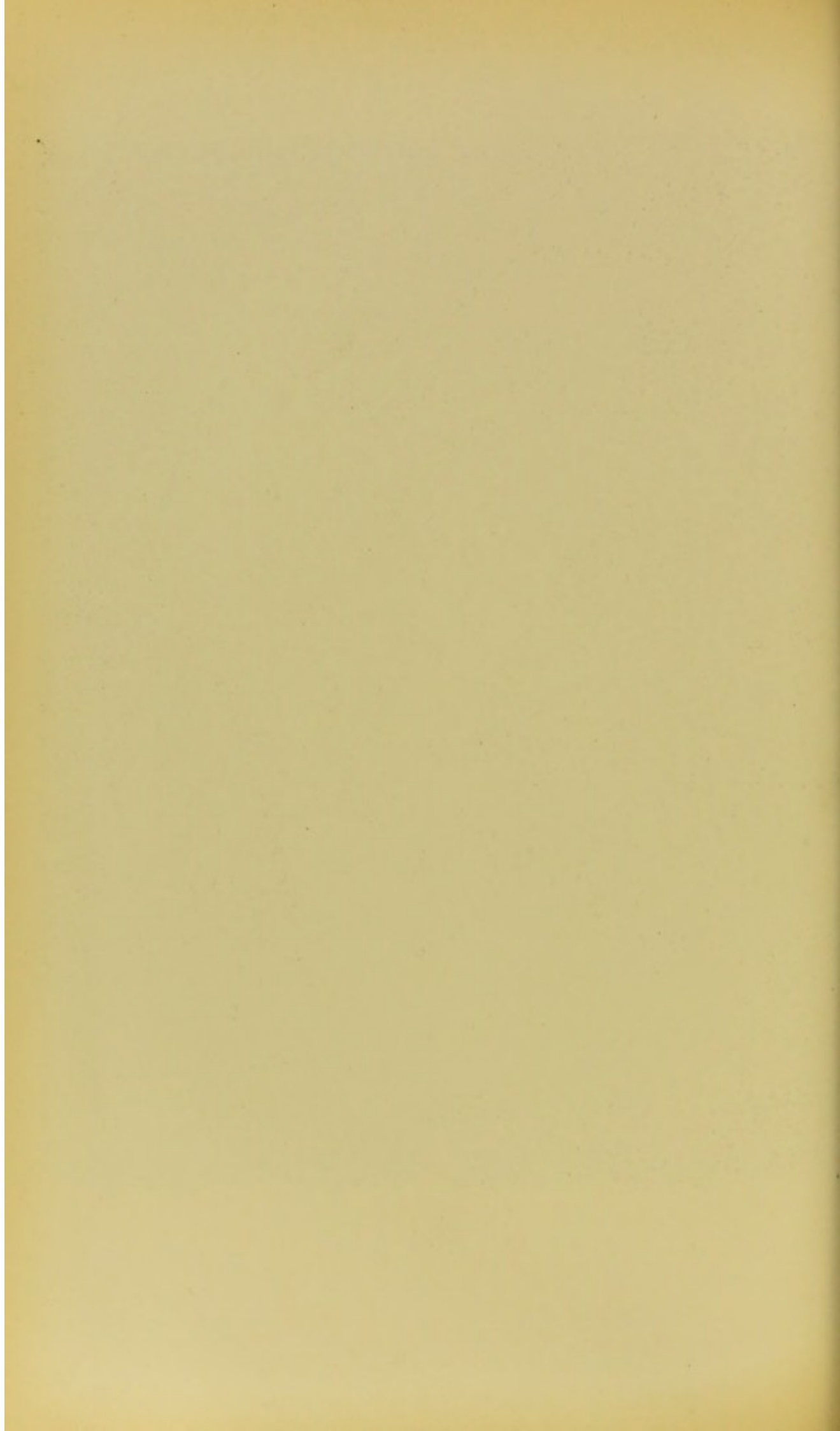


PLATE XI.

CHRONIC INFLAMMATION OF THE HIP-JOINT.

CASE 23. Page 98.

The upper end of the right femur (after maceration) viewed from the front. The head of the bone is much flattened, and increased at the circumference by an outgrowth of new bone from the margin of the original articular surface.

AUTOTYPE.



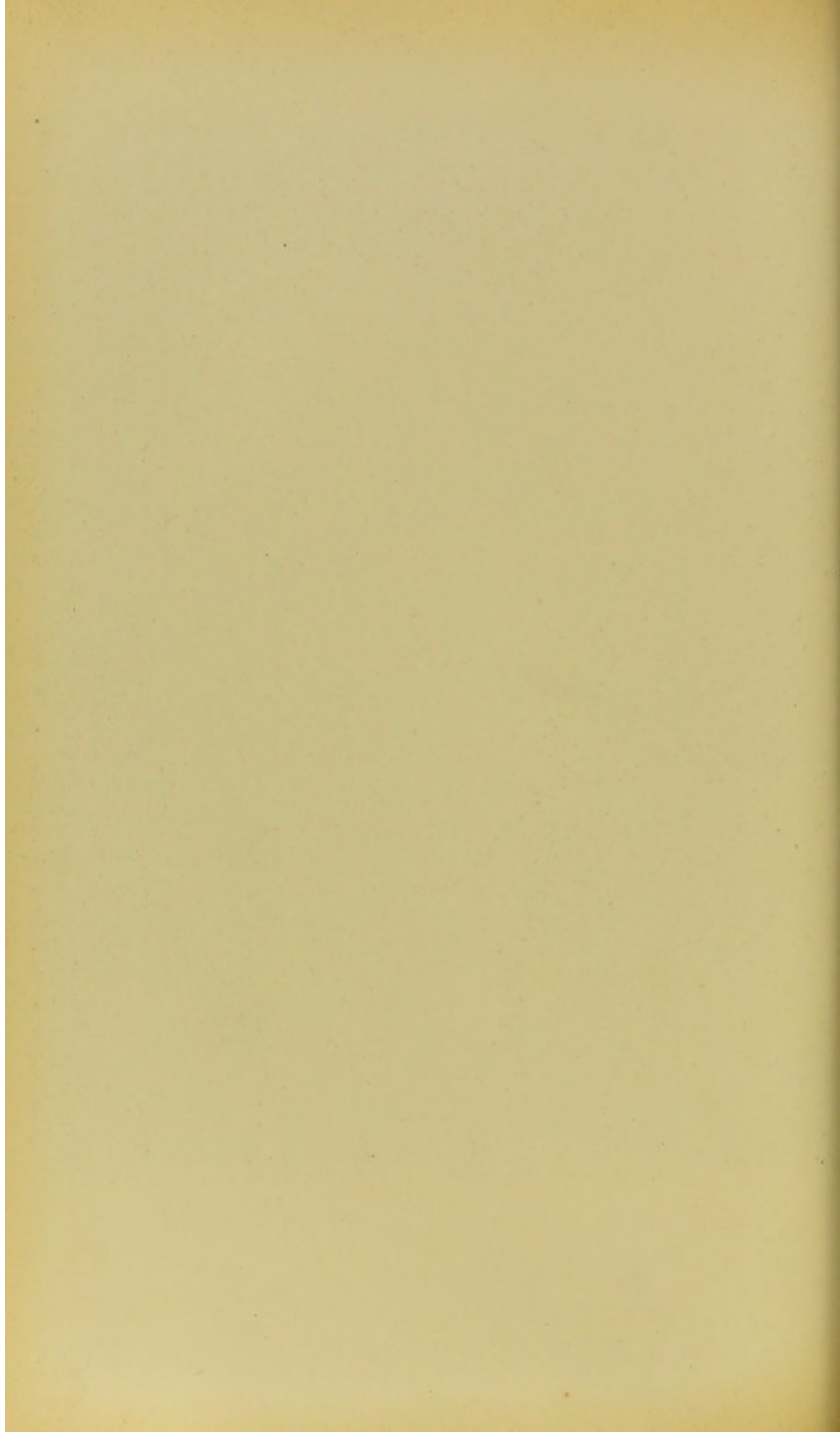


PLATE XII.

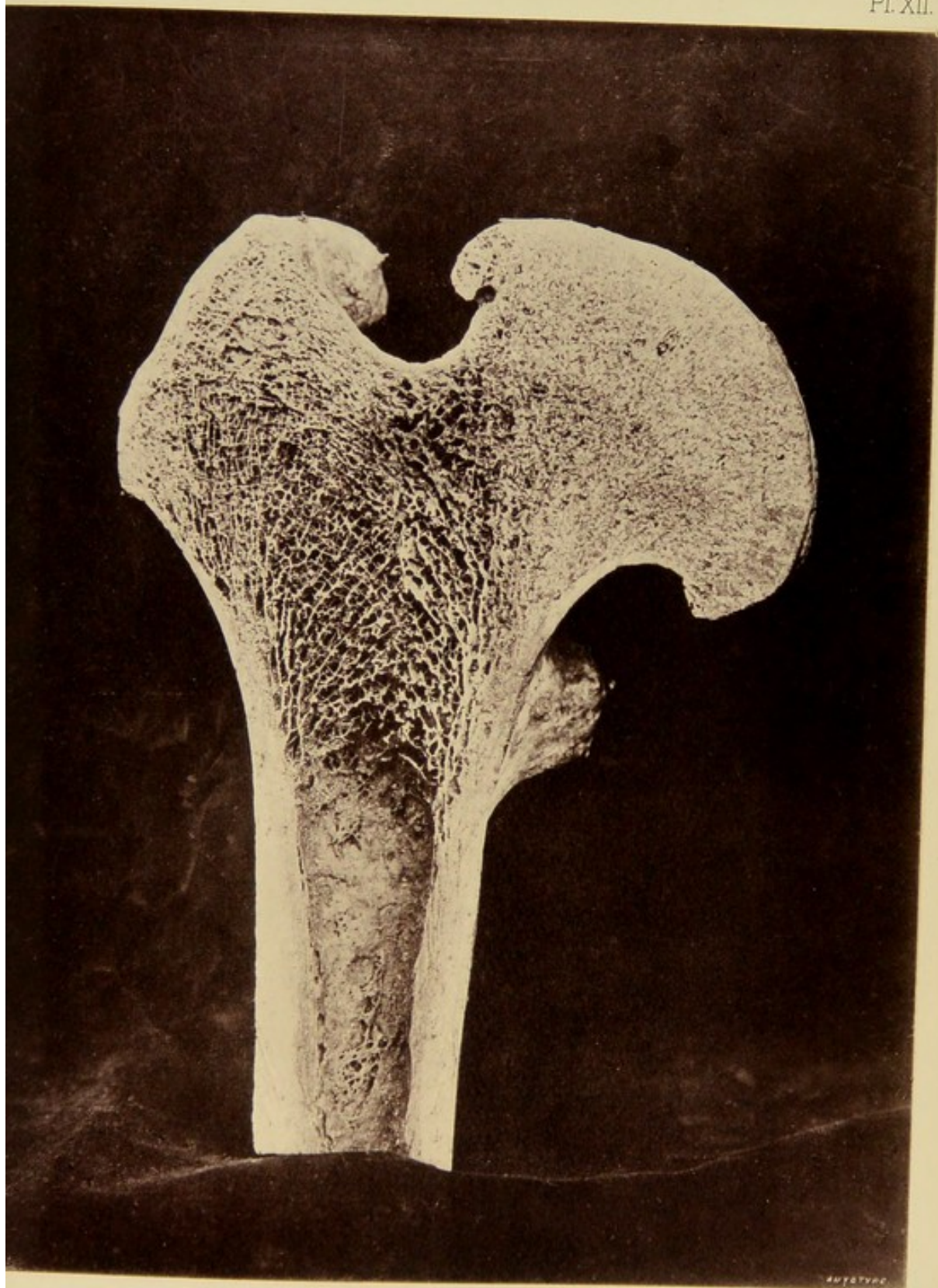
A VERTICAL SECTION OF THE UPPER END OF
THE FEMUR REPRESENTED IN PLATE XI.

CASE 24. Page 102.

A vertical section of the femur represented in the preceding plate. The manner in which the articulating surface is diminished in prominence and increased in circumference is shown.

The cancellated tissue of the neck lying in the line of pressure is more dense than natural, as is also that of the whole of the head of the bone.

AUTOTYPE.



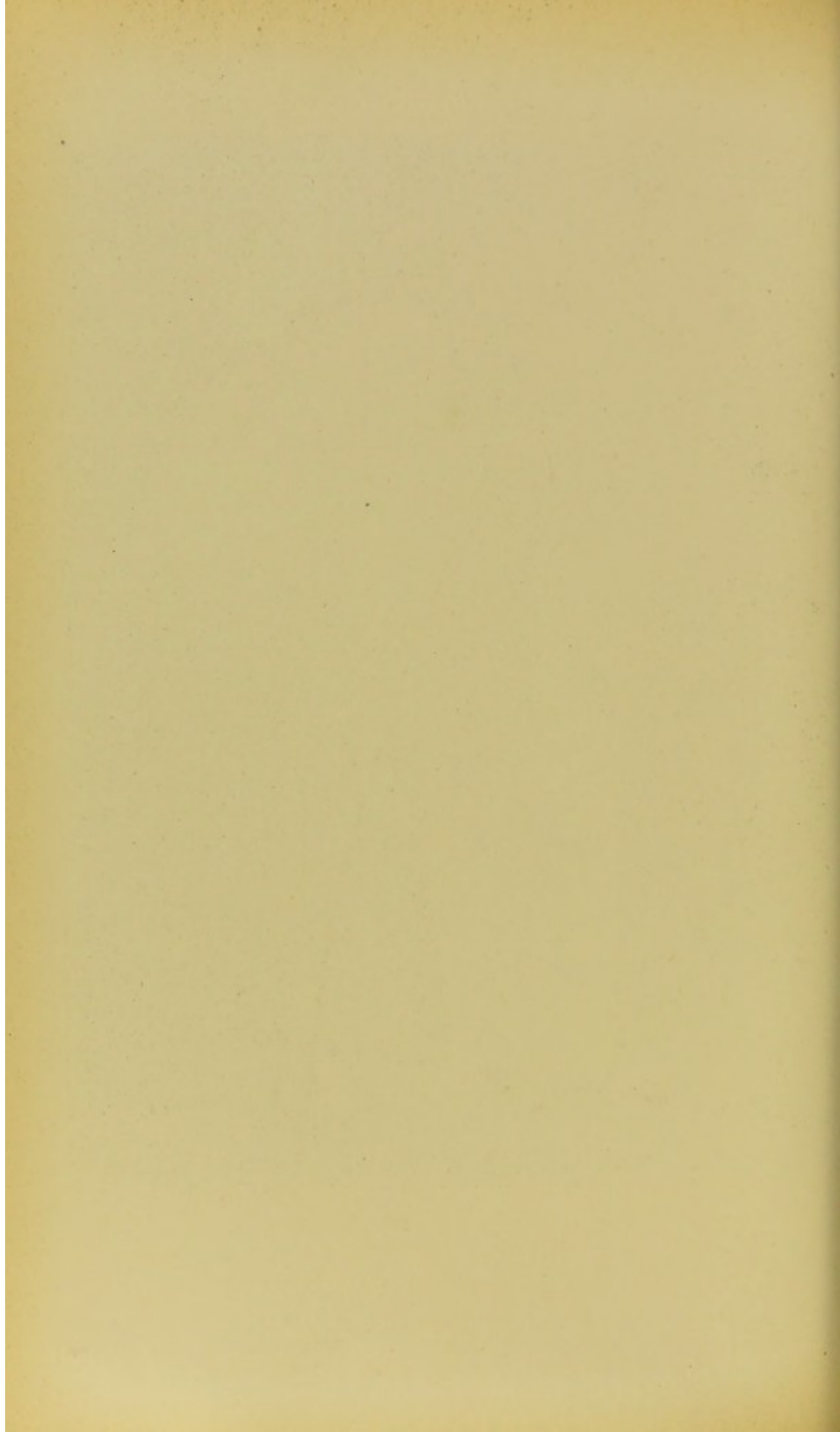


PLATE XIII.

CHRONIC DISEASE OF THE HIP-JOINT.

CASE 24. Page 102.

The upper end of the femur has been divided longitudinally and displaced from the acetabulum, the capsule of the joint being wholly removed.

The ligamentum teres and articular cartilage are entire. The cancellous tissue of the head and neck of the femur has been in great part removed by absorption.

The articular surface of the head is increased by an extensive outgrowth of new bone, which, on the lower aspect, gives rise to an appearance of the neck having sunk to a right angle with the shaft of the bone.

Indications of the original internal construction of the head remain in the vertical trabeculae which abut upon the lower compact wall of the neck. The osseous tissue of the head and neck is more dense than natural. The acetabulum is increased in extent.

AUTOTYPE.



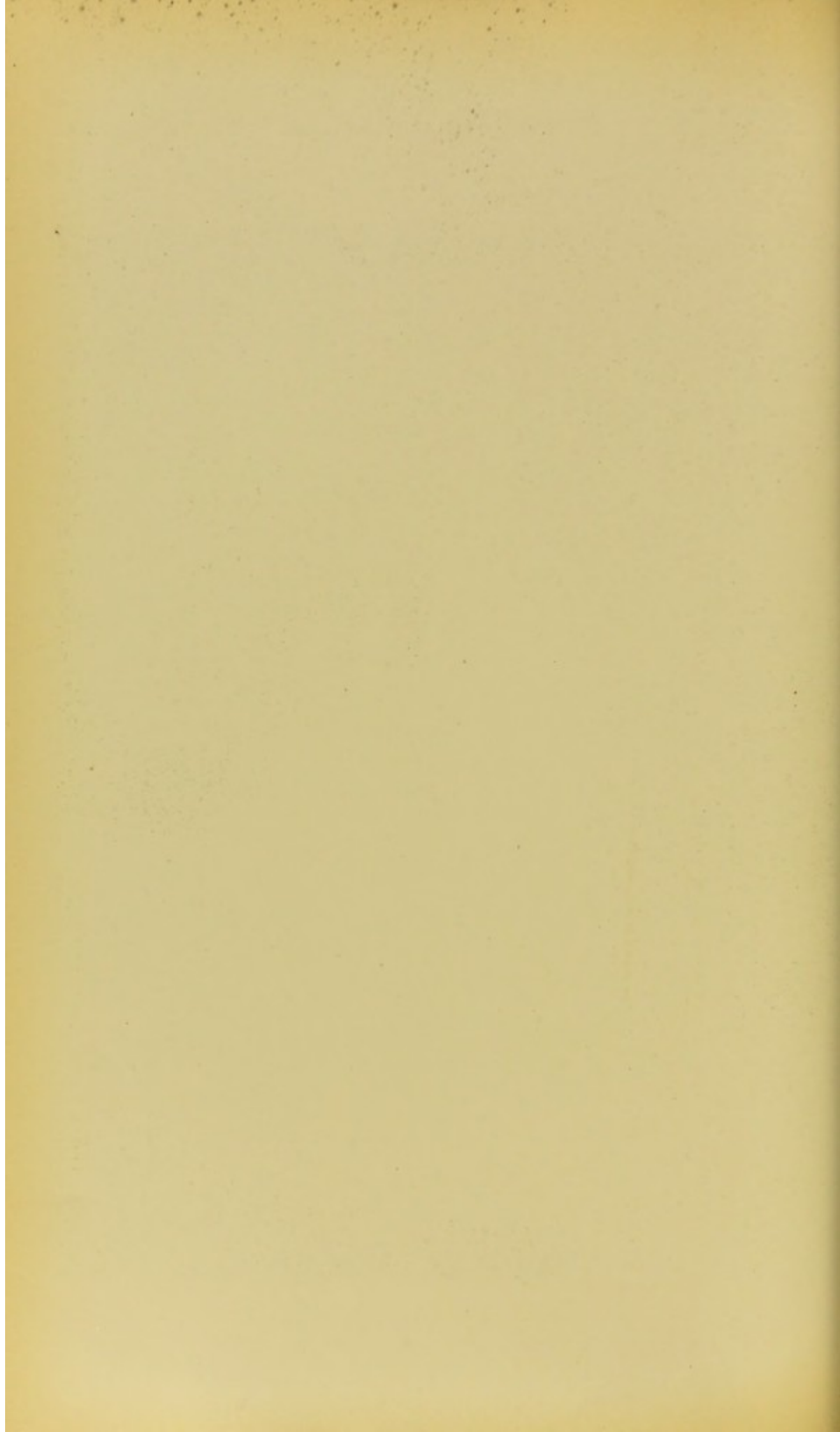


PLATE XIV.

ADVANCED RHEUMATOID ARTHRITIS OF BOTH
HIP-JOINTS.

CASE 25. Page 108.

The figure is reduced in size, and the healthy part of the pelvis sketched in outline. The front of the capsule of each joint has been removed.

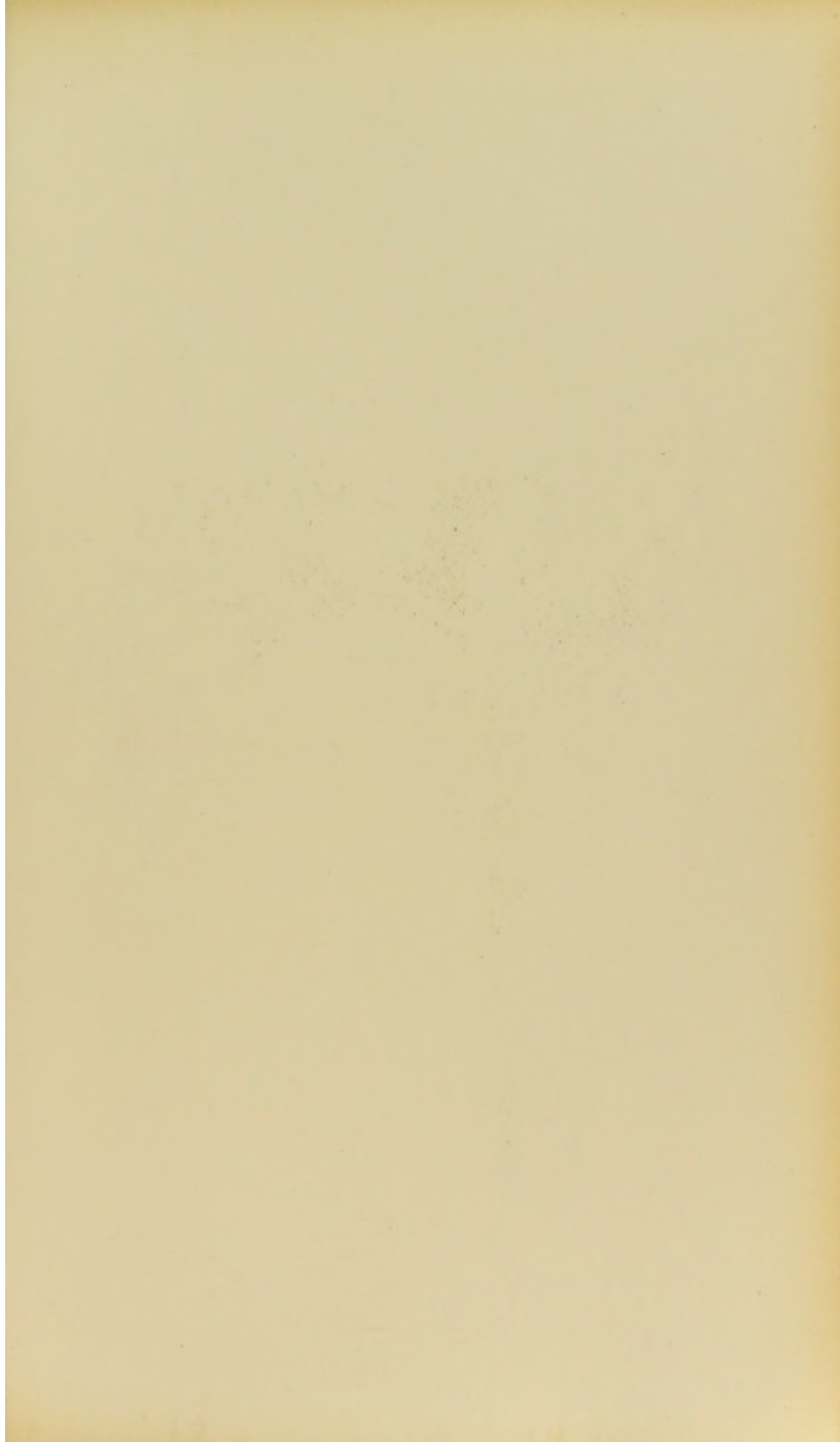
The following references apply to the hip-joint of the left side:—

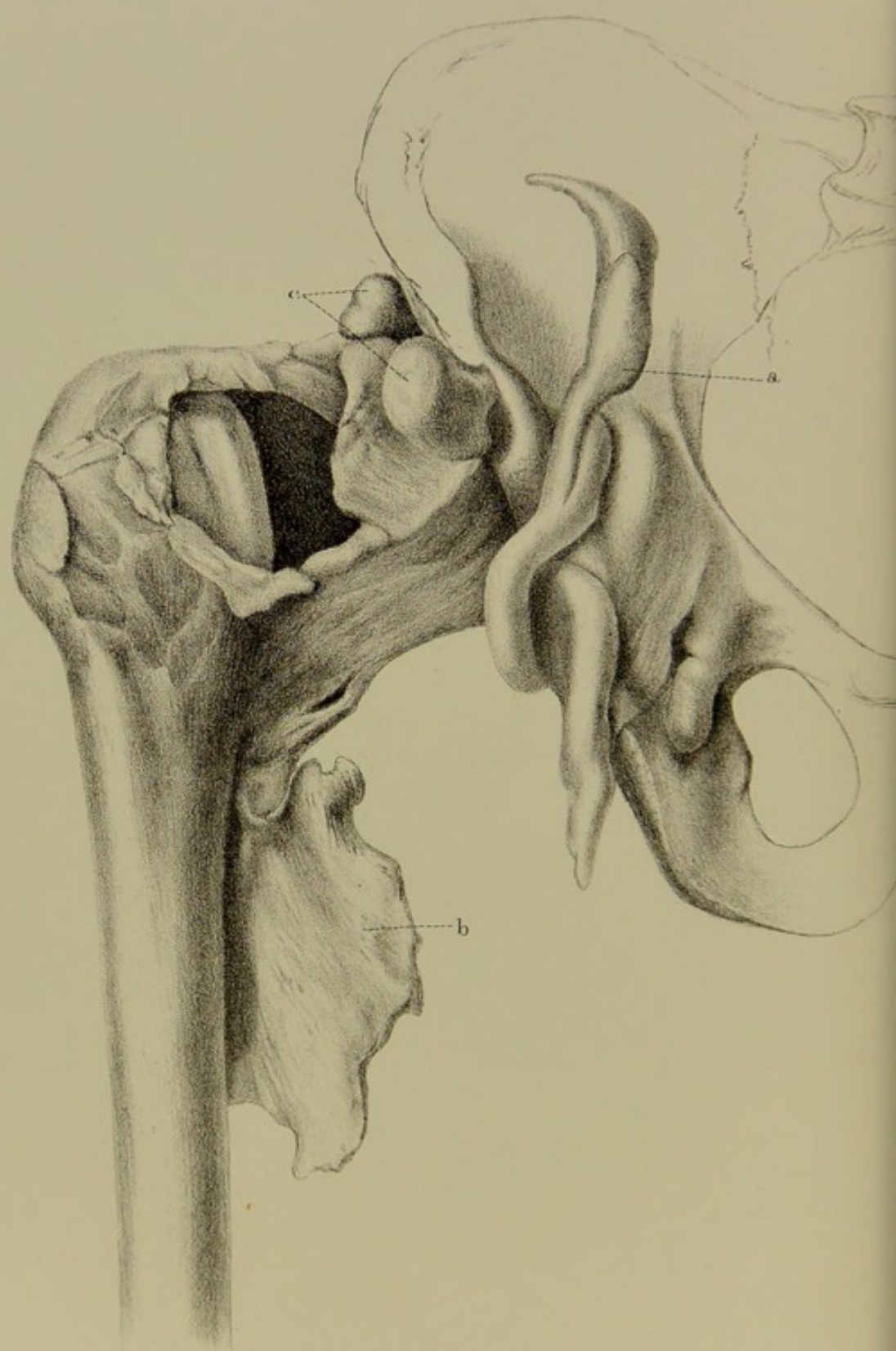
- a.* Divided edge of capsule, much thickened.
- b.* Root of neck of the femur, the head and neck having been entirely removed during the course of the disease. The surface is worn smooth, and articulates with the altered acetabulum.
- c.* Pedunculated growths from the synovial membrane.
- d.* A thick spur of new bone formed in the ilio-psoas muscle.
- e.* A long thick process of bone formed in the vastus externus and crureus muscles.
- f.* A thick transverse bar of new bone between *d.* and *e.*

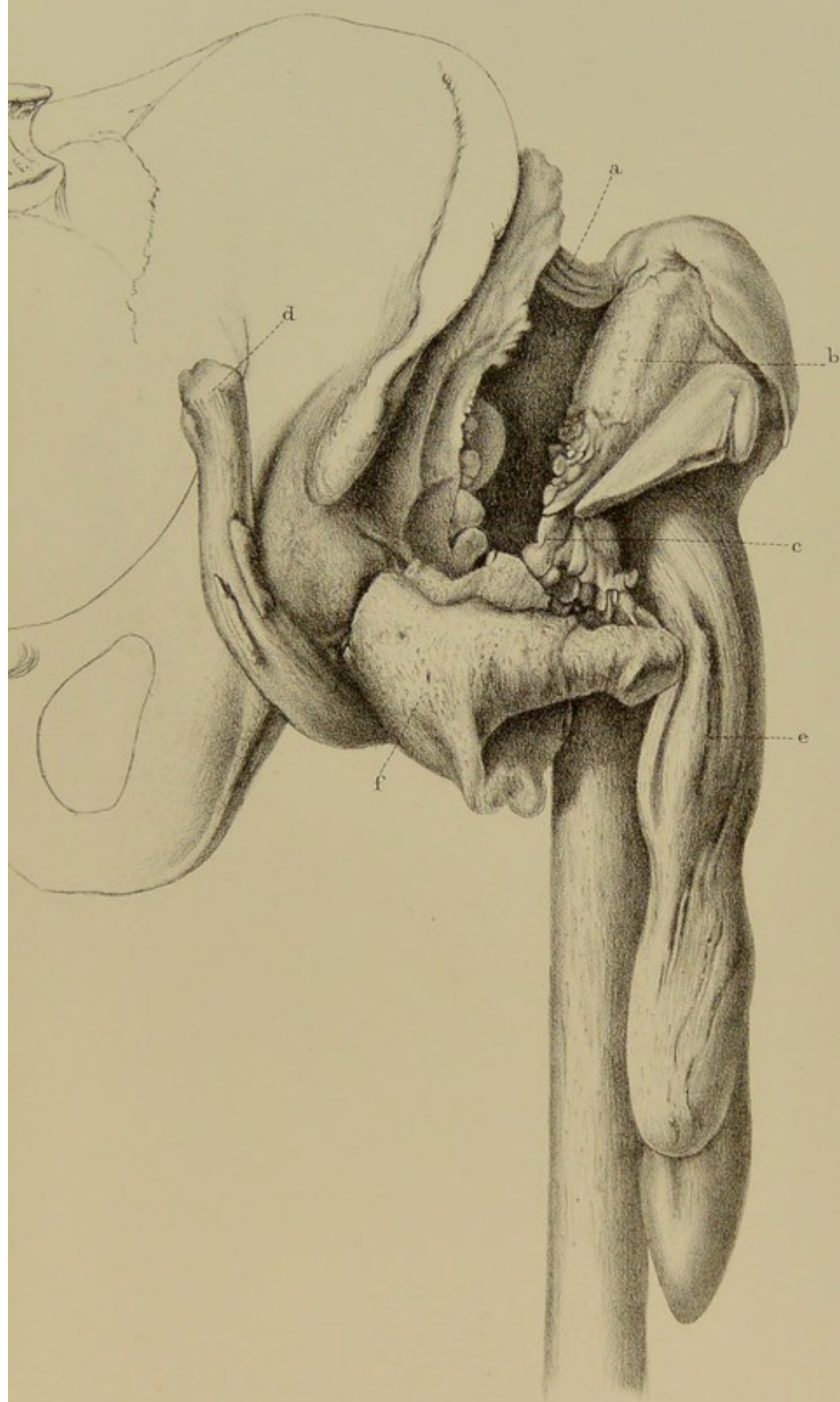
In the joint of the right side similar changes have occurred, but the masses of newly-formed bone differ.

- a.* New bone produced in the ilio-psoas muscle.
- b.* Plate of bone formed in the pectineus.
- c.* Nodules of new bone lying outside the capsule.

FORD, *del.*







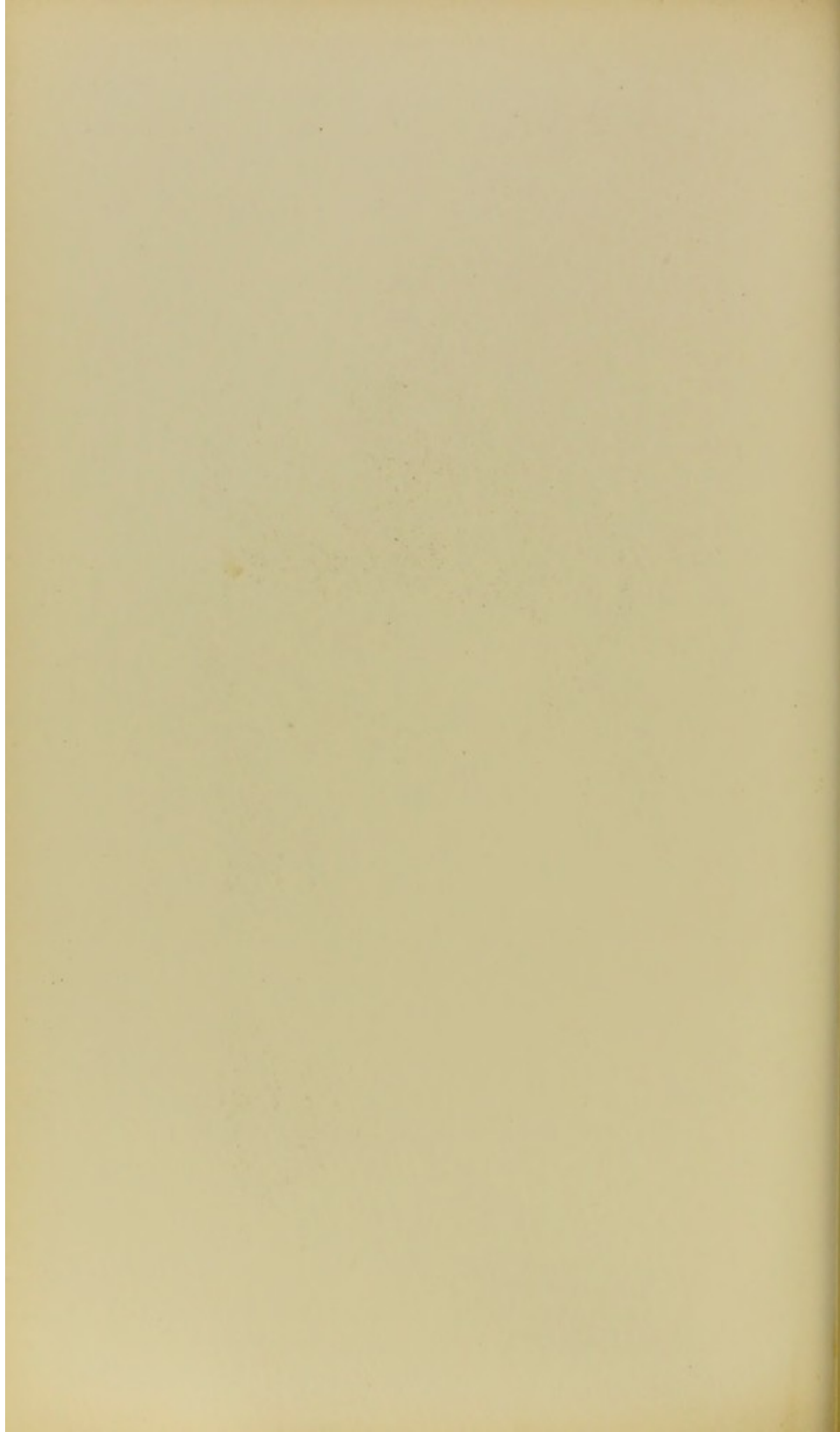


PLATE XV.

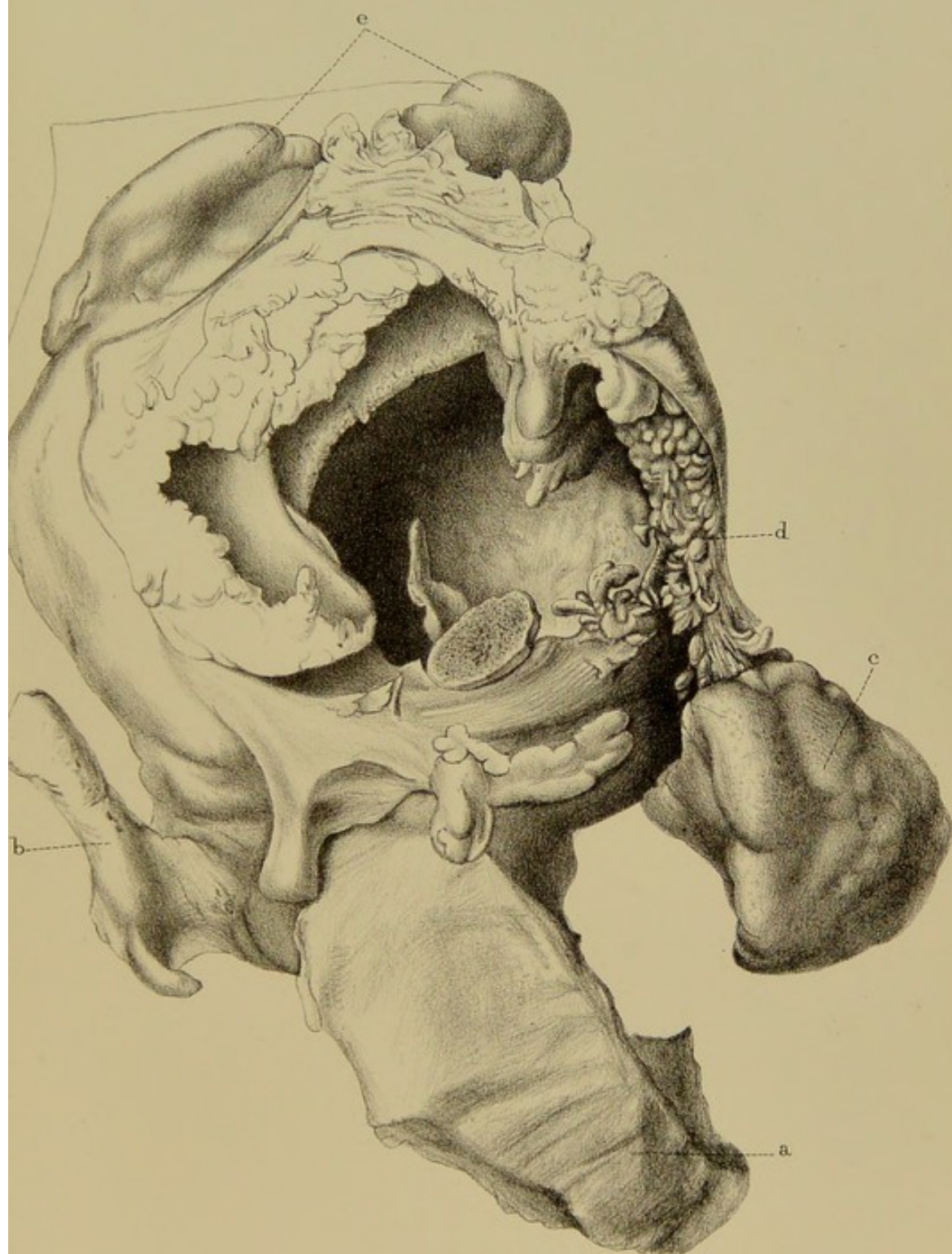
ADVANCED RHEUMATOID ARTHRITIS.

CASE 25. Page 108.

The acetabulum of the right side shown in the preceding plate, and here represented of natural size. The parts are viewed from behind.

- a.* Tuberosity of ischium (enlarged).
- b.* Spine of ischium (enlarged).
- c.* Large nodulated mass of new bone attached by a membranous pedicle within the articular cavity.
- d.* Pedunculated growths from the synovial membrane.
- e.* Several nodules of new bone formed on the margin of the acetabulum.

FORD, *del.*



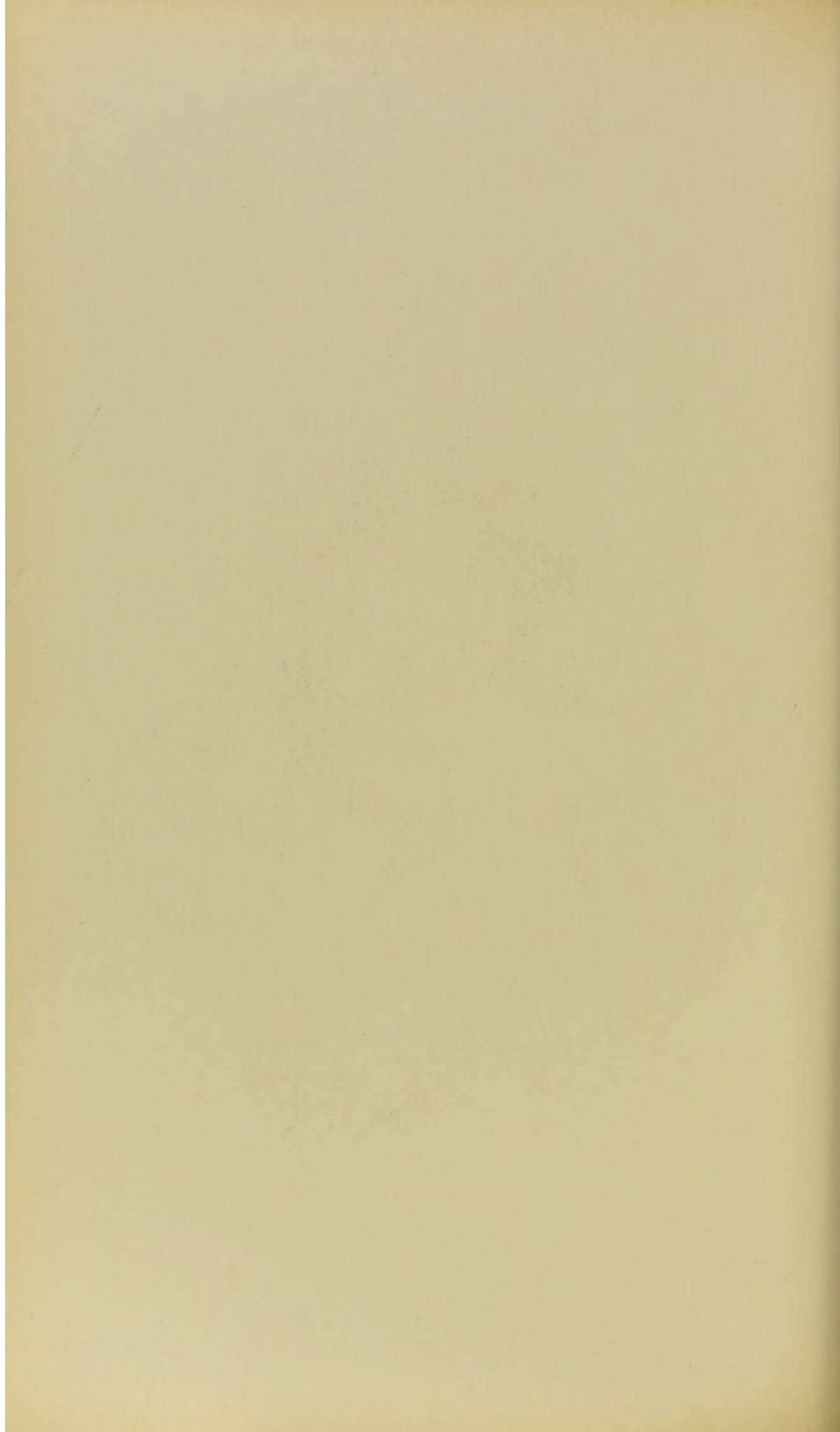


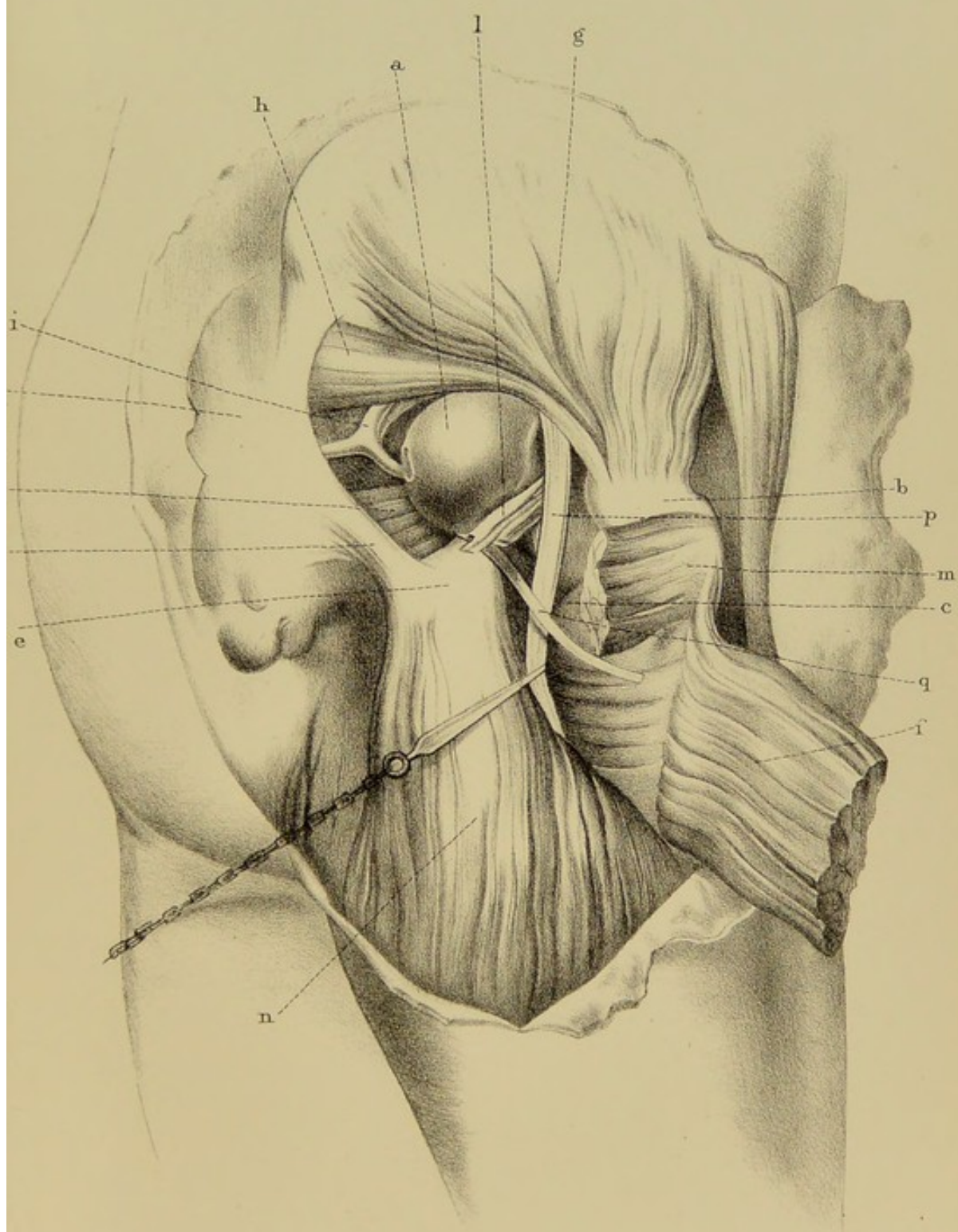
PLATE XVI.

DISLOCATION OF THE HEAD OF THE RIGHT
FEMUR, BACKWARDS.

CASE 26. Page 112.

- a.* Head of the bone.
- b.* Great trochanter.
- c.* Small trochanter.
- d.* Sacrum.
- e.* Tuberosity of ischium.
- f.* Lower end of gluteus maximus.
- g.* Gluteus medius.
- h.* Piriformis.
- i.* Sciatic artery.
- k.* Obturator internus and gemelli.
- l.* A fragment of obturator externus.
- m.* Quadratus femoris.
- n.* Hamstring muscles.
- o.* Great sacro-sciatic ligament.
- p.* Great sciatic nerve.
- q.* Small sciatic nerve.

MR. NOAH BRANGWIN, *del.*



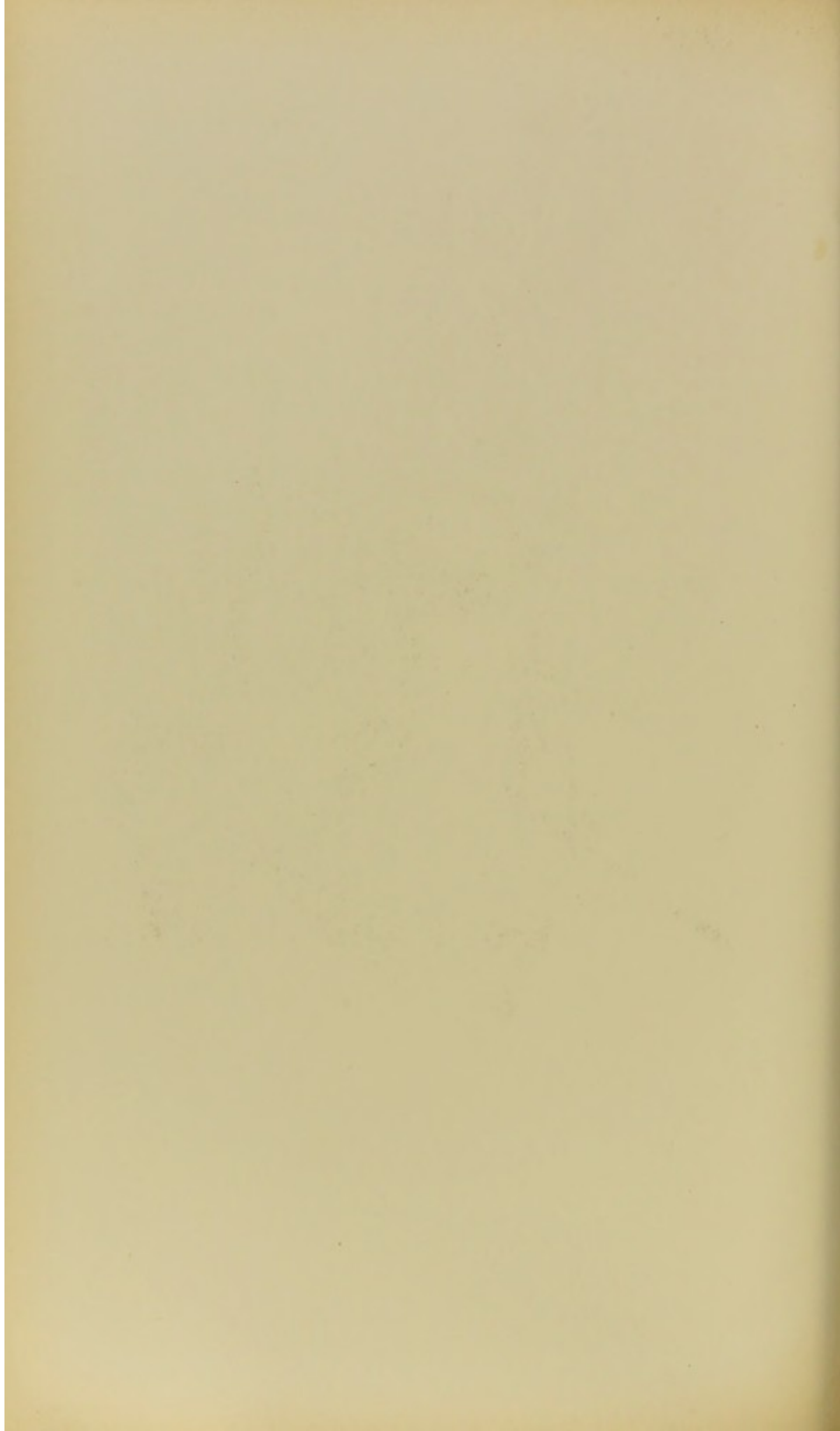


PLATE XVII.

IMPACTED EXTRACAPSULAR FRACTURE OF THE
NECK OF THE FEMUR.

CASE 30. Page 132.

The upper part of the left femur, viewed from behind. The fracture passes from below through the small trochanter (which has been fractured), upwards and outwards across the root of the neck. The posterior part of the great trochanter has been also detached. All the parts are firmly united by bone.

The lower fragment is in no degree everted; the shortening is extremely slight.

AUTOTYPE.



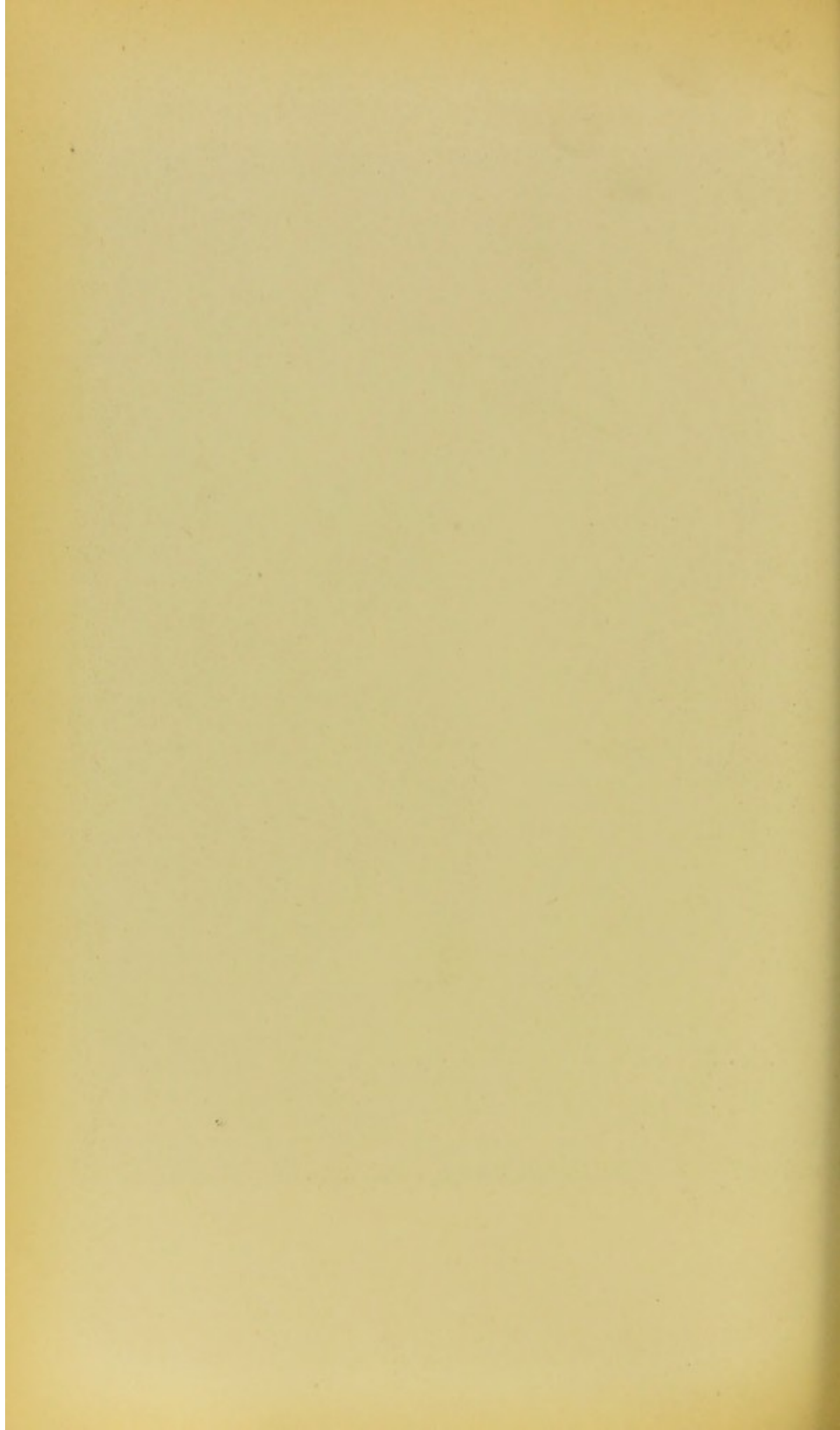


PLATE XVIII.

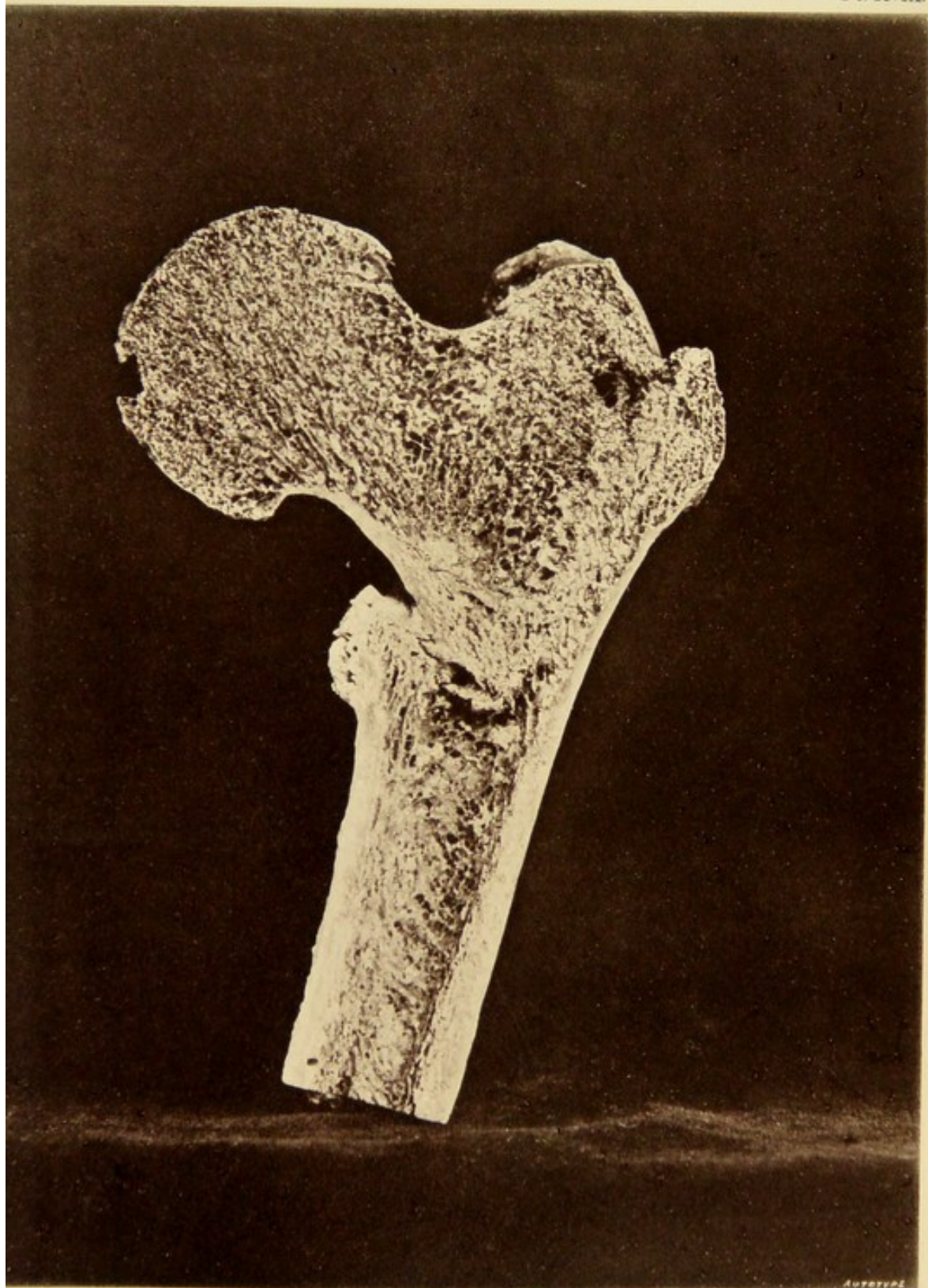
A VERTICAL SECTION OF THE FRACTURED
FEMUR REPRESENTED IN PLATE XVII.

CASE 30. Page 132.

Vertical section of the fractured femur shown in the preceding plate; solid union.

The section shows the impaction of the pointed lower end of the neck into the cancellous tissue of the upper part of the shaft and great trochanter.

AUTOTYPE.



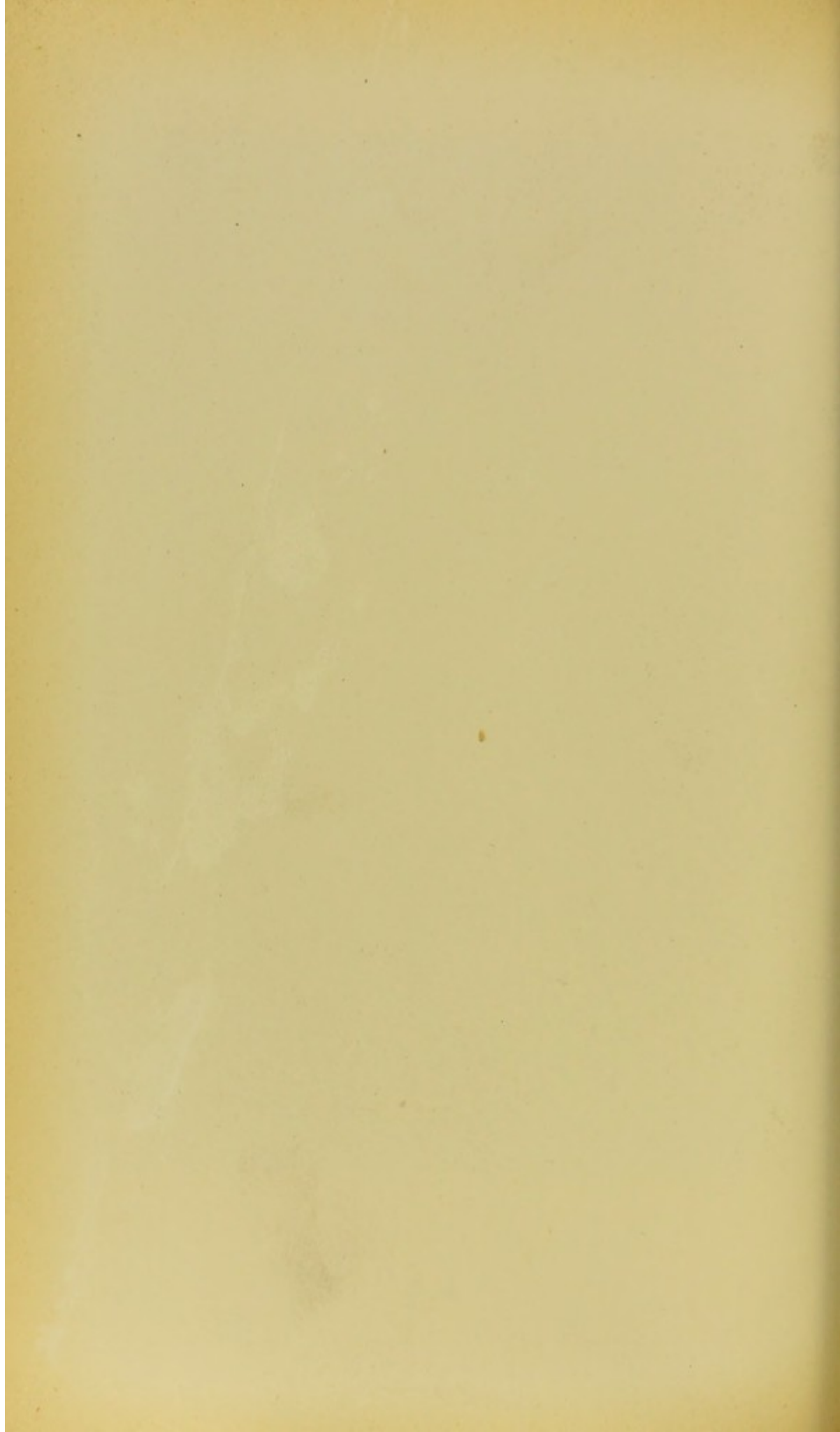


PLATE XIX.

FRACTURE OF THE NECK OF THE FEMUR.

CASE 34. Page 140.

FIG. 1.—Front view of the upper part of the bone.

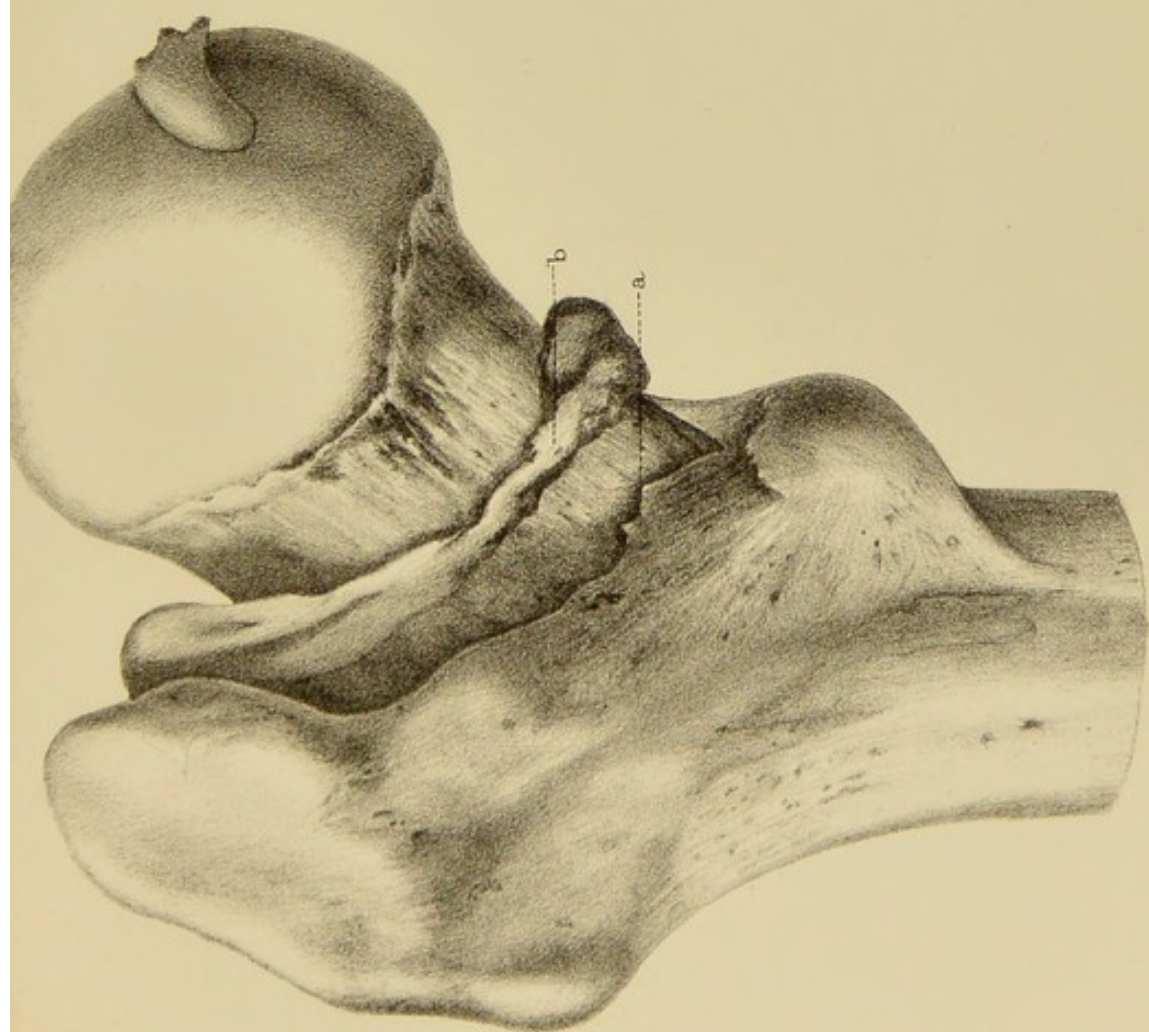
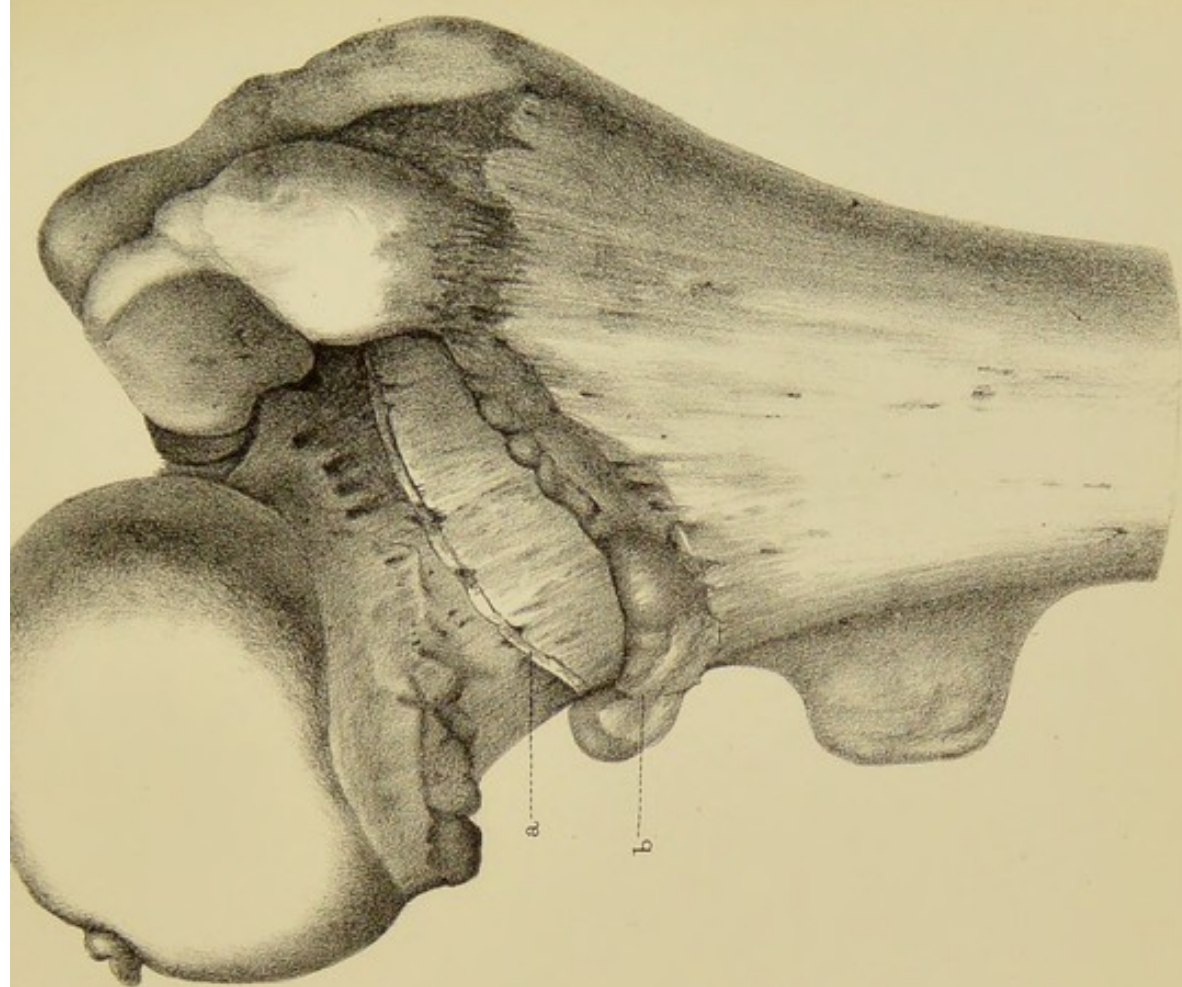
- a.* Line of recent fracture.
- b.* Portion of the capsule of the hip-joint, attached along the anterior intertrochanteric line.

FIG. 2.—Back view of the same.

- a.* Line of fracture crossing the root of the neck.
- b.* Limit of the capsule on the posterior surface of the neck of the bone.

The fracture is seen to lie within the capsule in front, and outside the capsule behind.

TUSON, *del.*



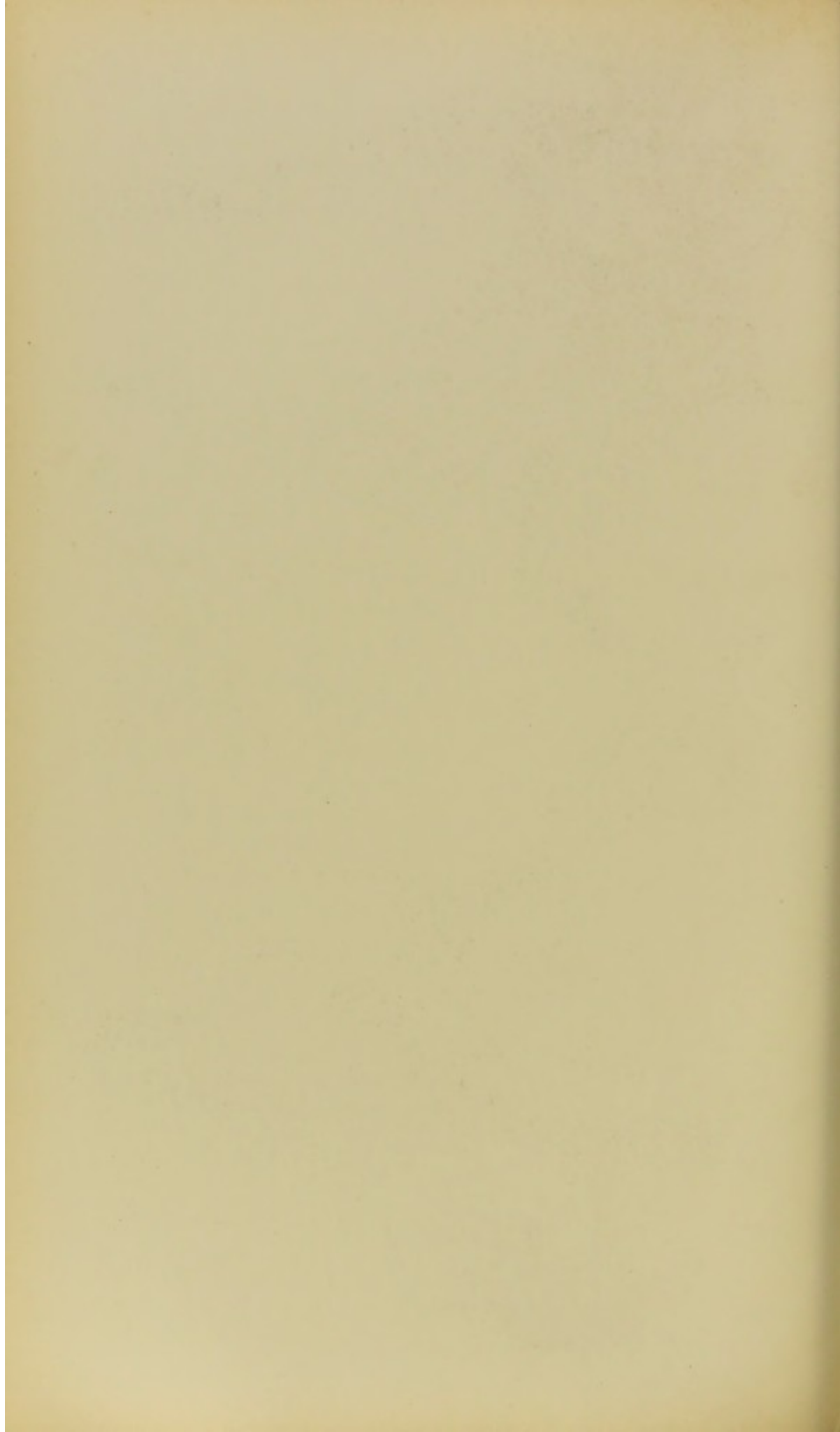


PLATE XX.

DISLOCATION OF THE KNEE-JOINT.

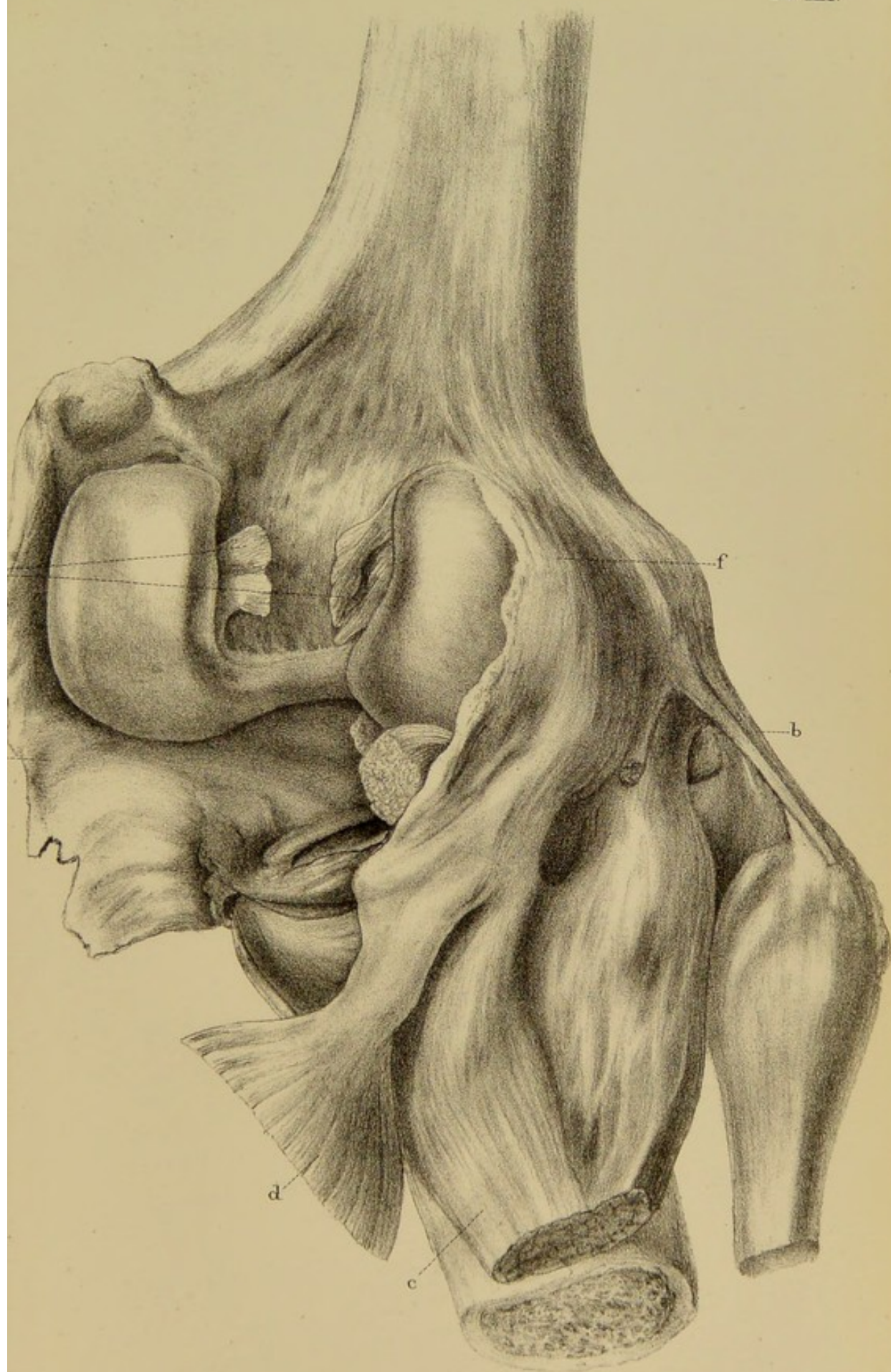
CASE 35. Page 143.

The tibia and fibula, which maintain their natural relative position, are displaced outwards, so that the inner tuberosity of the tibia lies beneath the intercondyloid fossa of the femur.

- a. The femoral ends of the crucial ligaments, which are both completely ruptured; the other ends are seen projecting below the outer condyle of the femur: as the lower ends of the ligaments were ragged they were cut level.
- b. The external lateral ligament.
- c. Popliteus muscle.
- d. Portion of the semi-membranosus turned down.
- e. Inner part of the capsule of the joint.
- f. Back part of the same.

The capsule was torn in the accident.

MR. NOAH BRANGWIN, *del.*



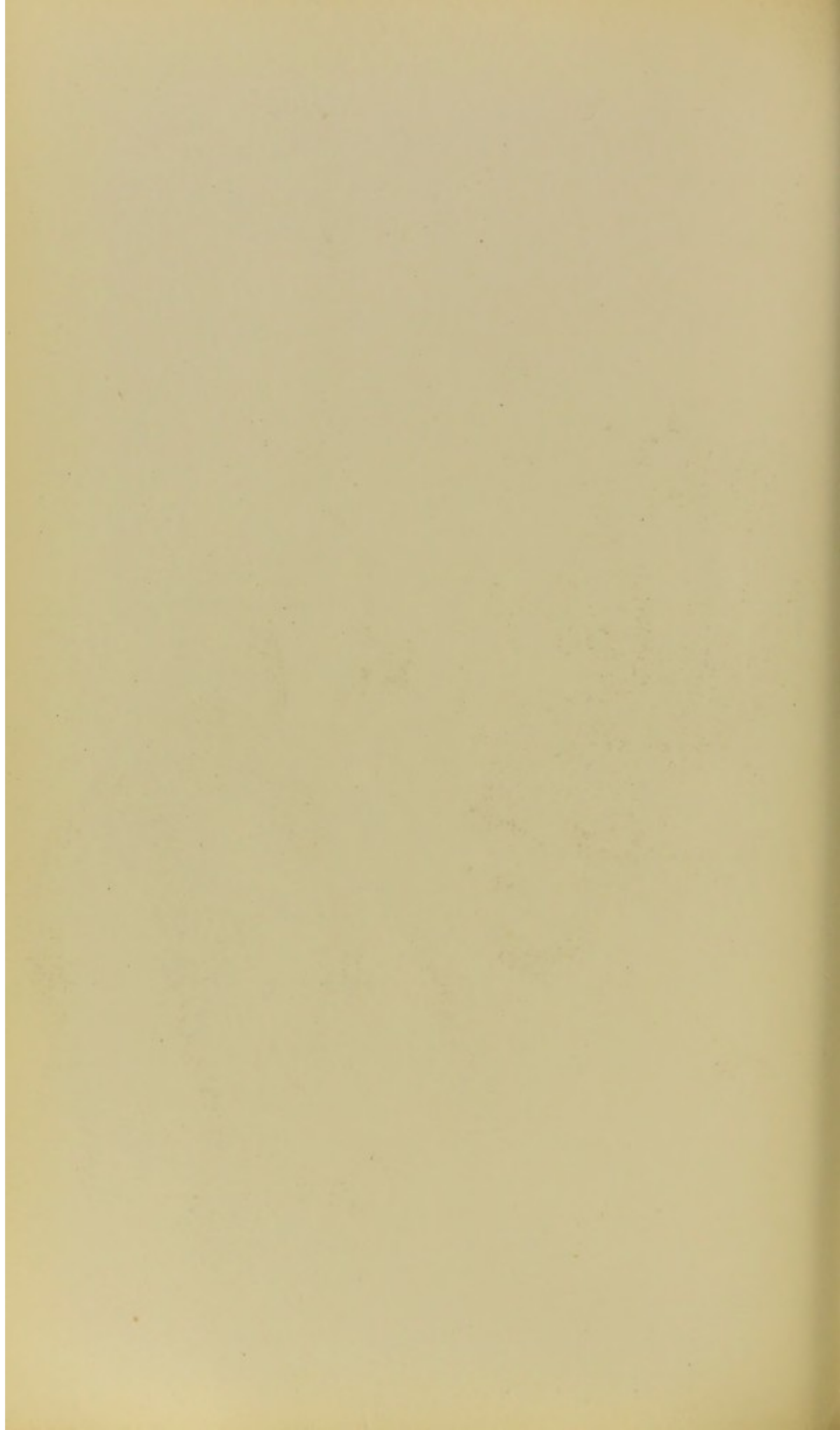


PLATE XXI.

ENLARGEMENT OF THE PROSTATE GLAND
ABOVE THE URETHRA.

CASE 38. Page 151, *et. seq.*

FIG. 1.—The urinary bladder, with part of the penis and pubic bones, showing the external appearance produced by the enlargement of the prostate. The dotted line crossing the bladder marks the limit to which the hypertrophied prostate projects within the cavity of the bladder.

a. The left ureter.

FAIRLAND, *del.*

FIG. 2.—A microscopic section of the tumour, showing a fibrous stroma (*a*) forming acinous spaces (*b*), which were filled with cells as at *c*; from most of the spaces the cells have fallen out in preparing the specimen.

FIG. 3.—A microscopical drawing of one of the spaces represented in Fig. 2 (*d*) more highly magnified. The cells are 'arranged somewhat regularly alongside each other, and often in beaded strings radiating from the centre to the circumference. A very delicate hyaline substance cements them together.'

From drawings and description by DR. GOODHART.

Fig. 3.

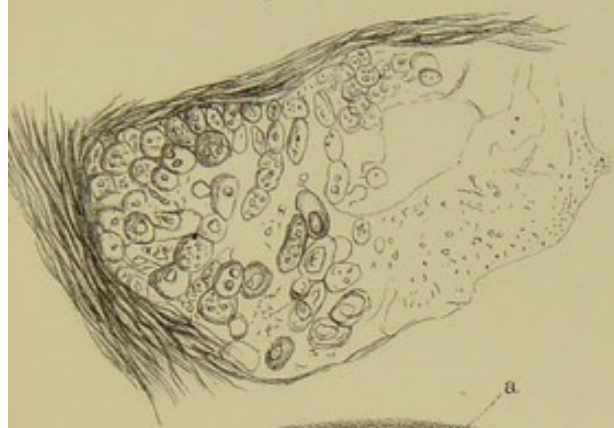


Fig. 2.

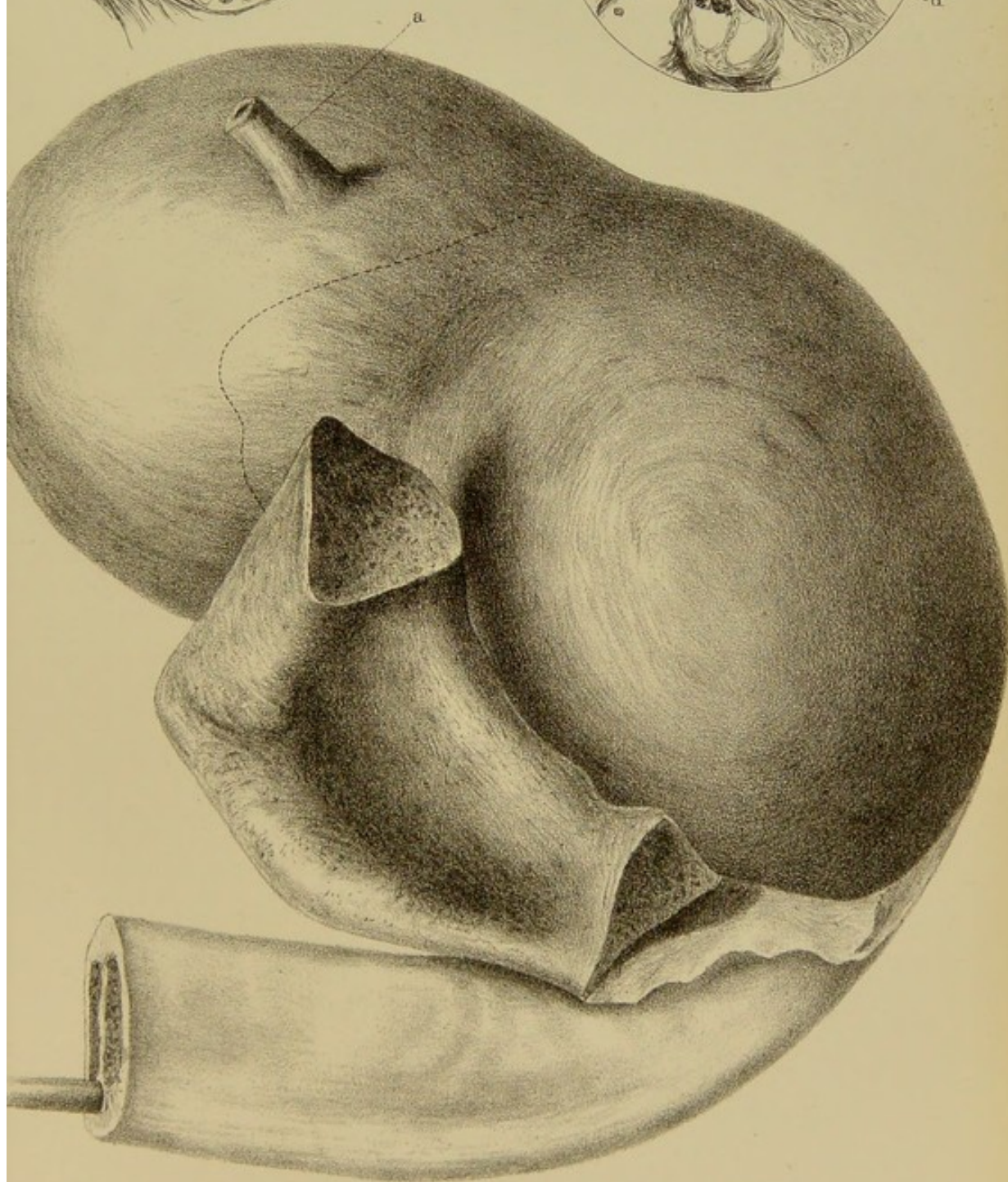
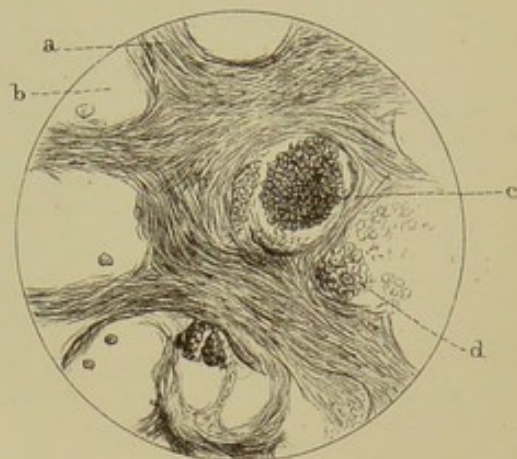


Fig. 1.

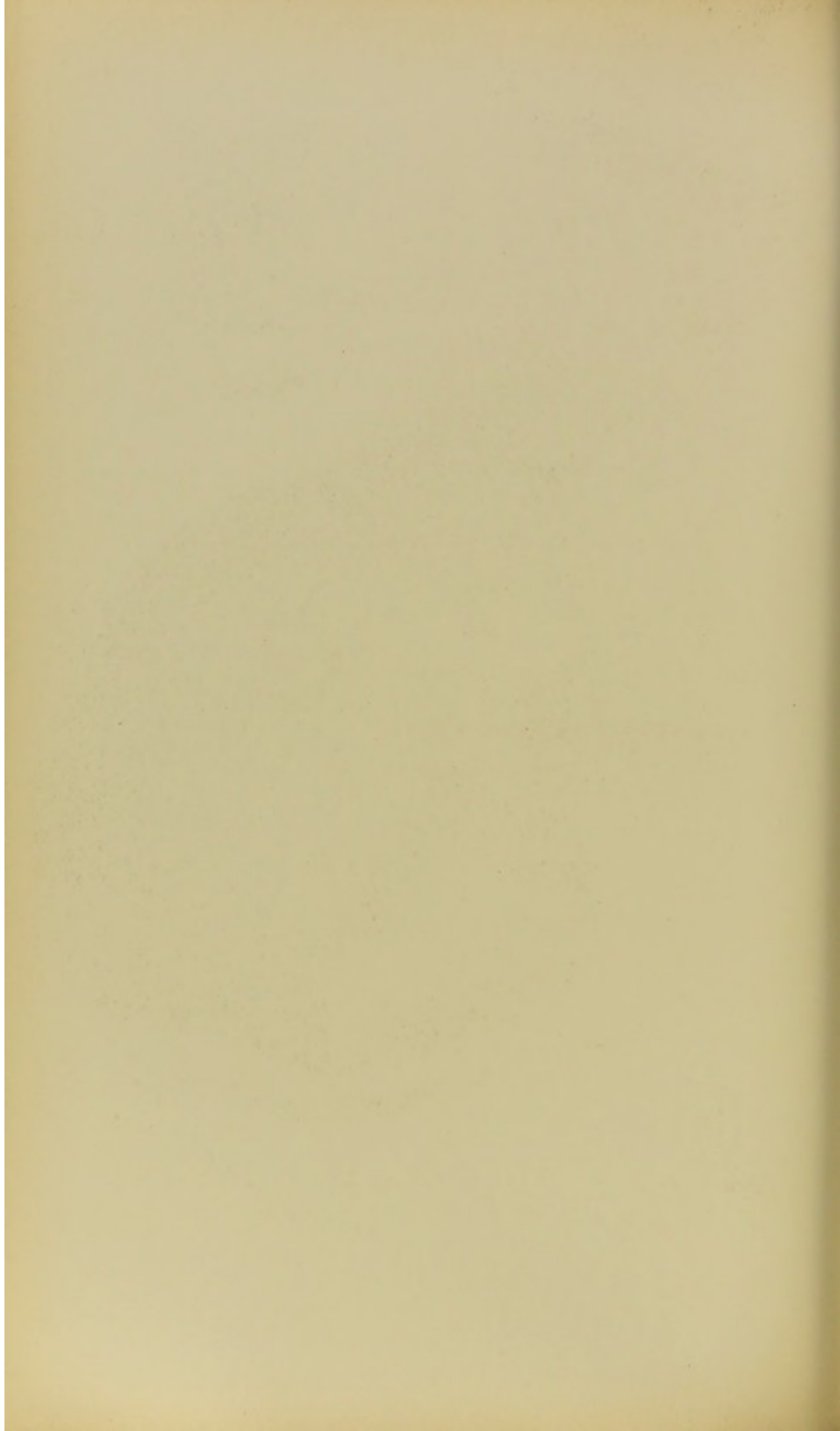


PLATE XXII.

A LONGITUDINAL SECTION OF THE PRECEDING
SPECIMEN.

CASE 38. Page 153.

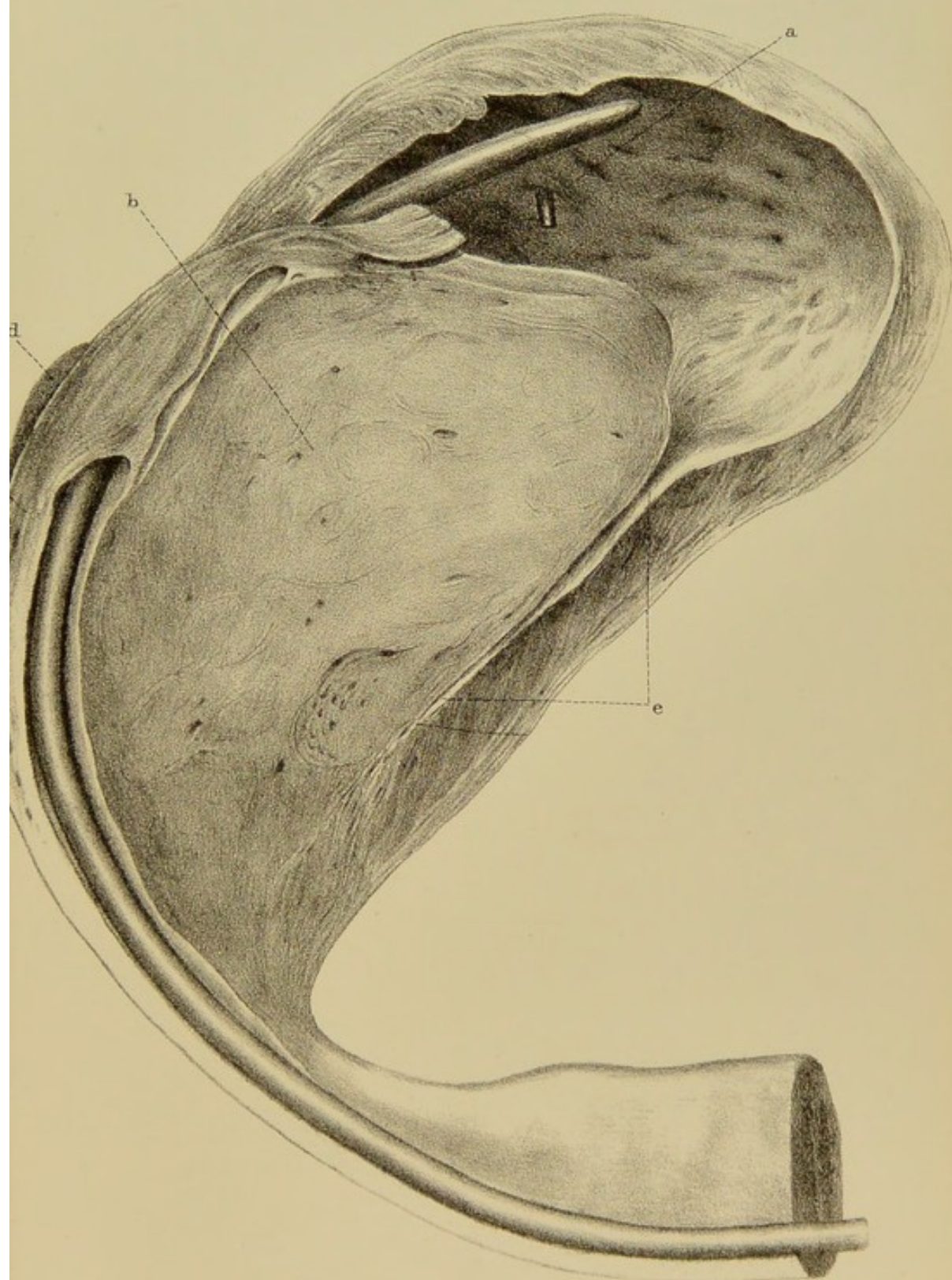
A longitudinal section of the preceding specimen. A catheter has been passed to mark the course of the urethra, and a probe passed through the opening of the left ureter (*a*).

The portion of the urethra included within the enlarged prostate is increased to the length of five inches.

- b.* The growth projecting within the bladder, wholly in front of the urethral opening.
- c.* Portion of the prostate thinly stretched below the urethra.
- d.* Portion of vesicula seminalis.
- e.* The cavity of the bladder in front of the growth.

The muscular wall of the bladder is considerably hypertrophied.

FAIRLAND, *del.*



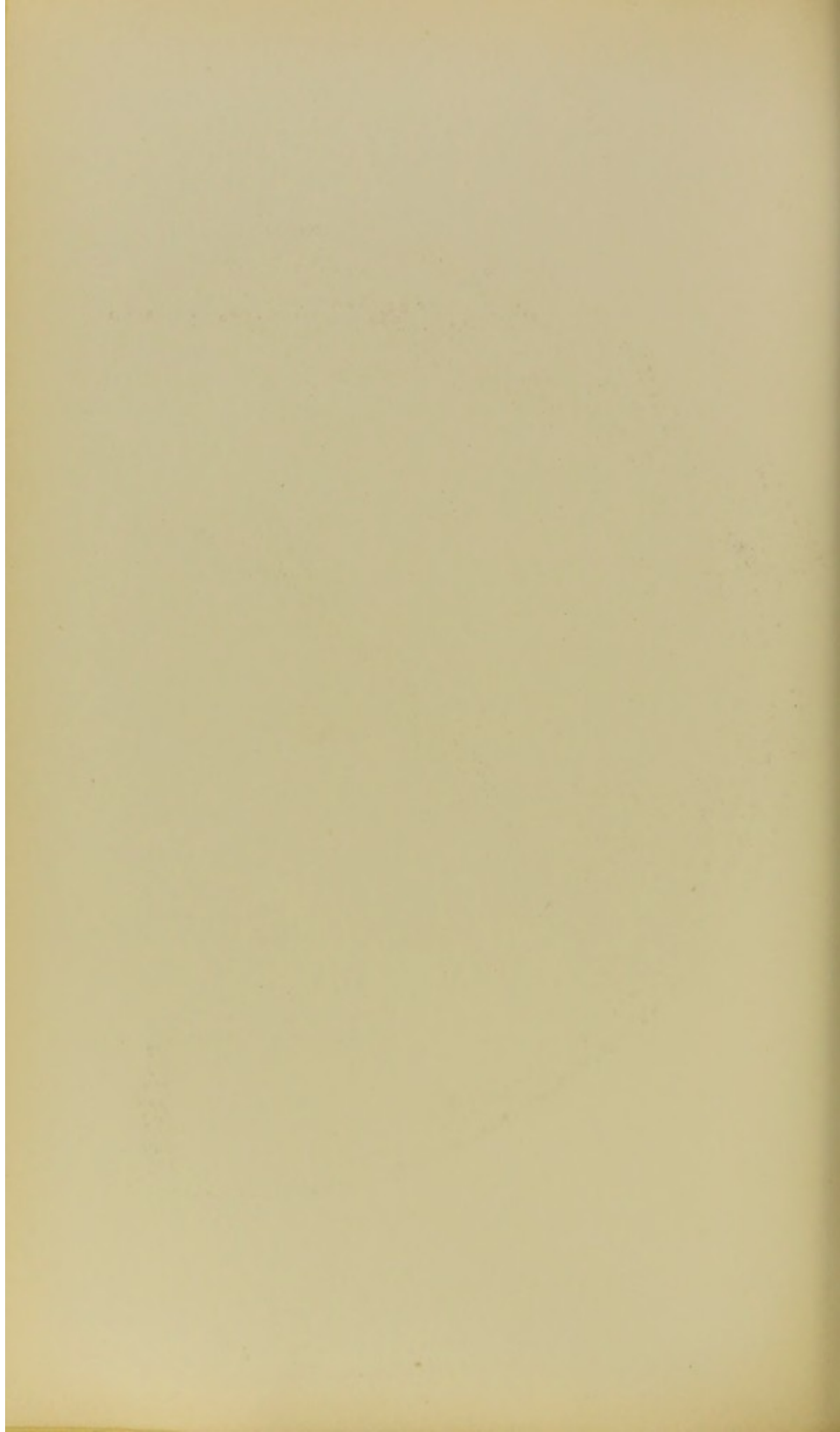


PLATE XXIII.

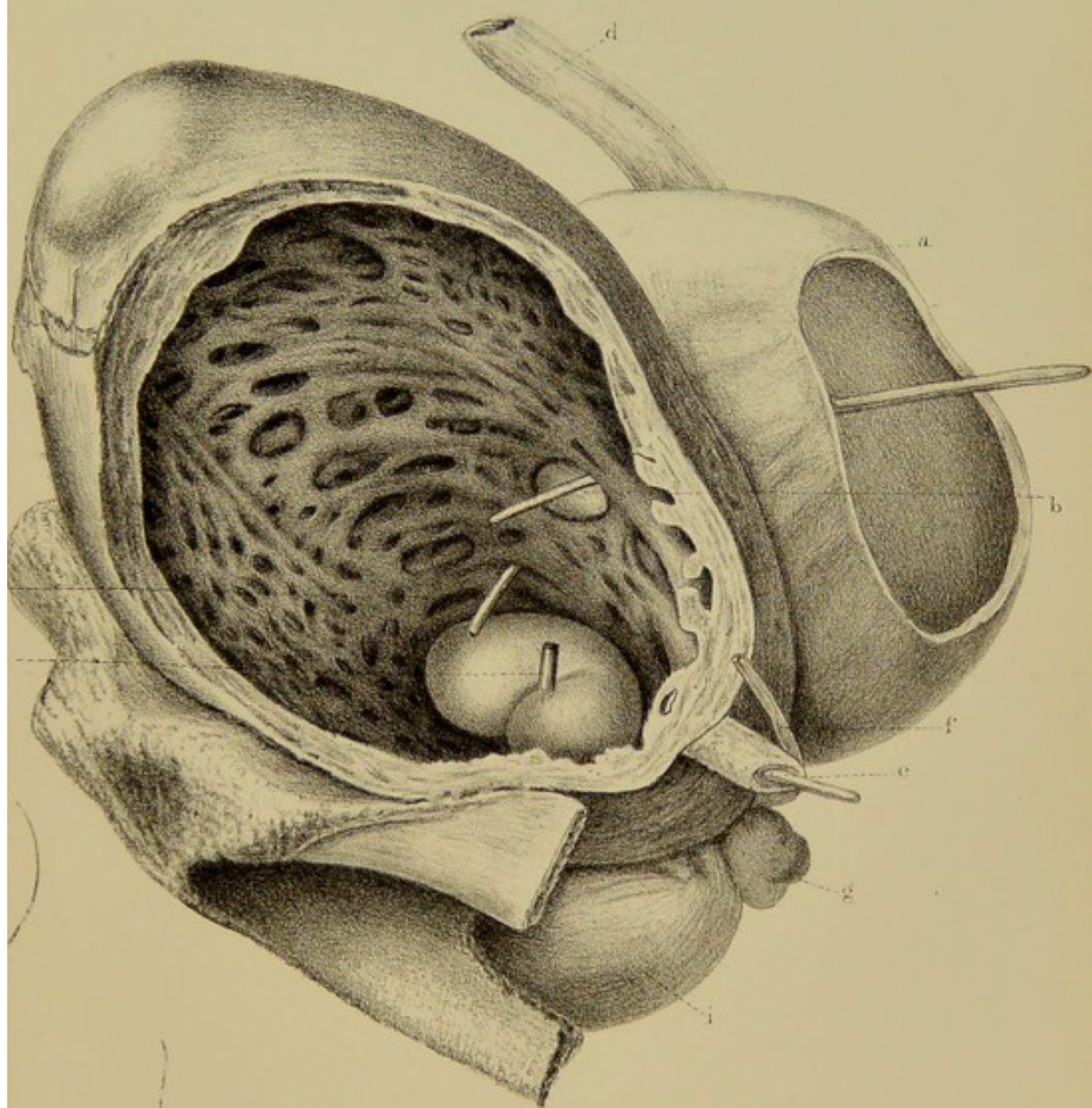
ENLARGEMENT OF THE MIDDLE LOBE OF THE
PROSTATE AND SACCULUS OF THE BLADDER.

CASE 43. Page 163.

The bladder and prostate gland, with the pubic bones in natural position. The bladder is hypertrophied and fasciculated.

- a.* The sacculus projecting from the posterior wall of the bladder. It is thinly walled, and apparently possesses no muscular tissue continuous with the muscular wall of the bladder.
- b.* The aperture by which it communicates with the vesical cavity: through this a probe has been passed from the sacculus into the bladder.
- c.* A probe marking the orifice of the right ureter.
- d.* The right ureter.
- e.* The left ureter.
- f.* Vas deferens.
- g.* Left vesicula seminalis.
- h.* The enlarged middle part of the prostate, lying behind, and nearly surrounding the urethral orifice, which is indicated by a probe.
- i.* Left lateral lobe of prostate, of normal size.

FAIRLAND, *del.*



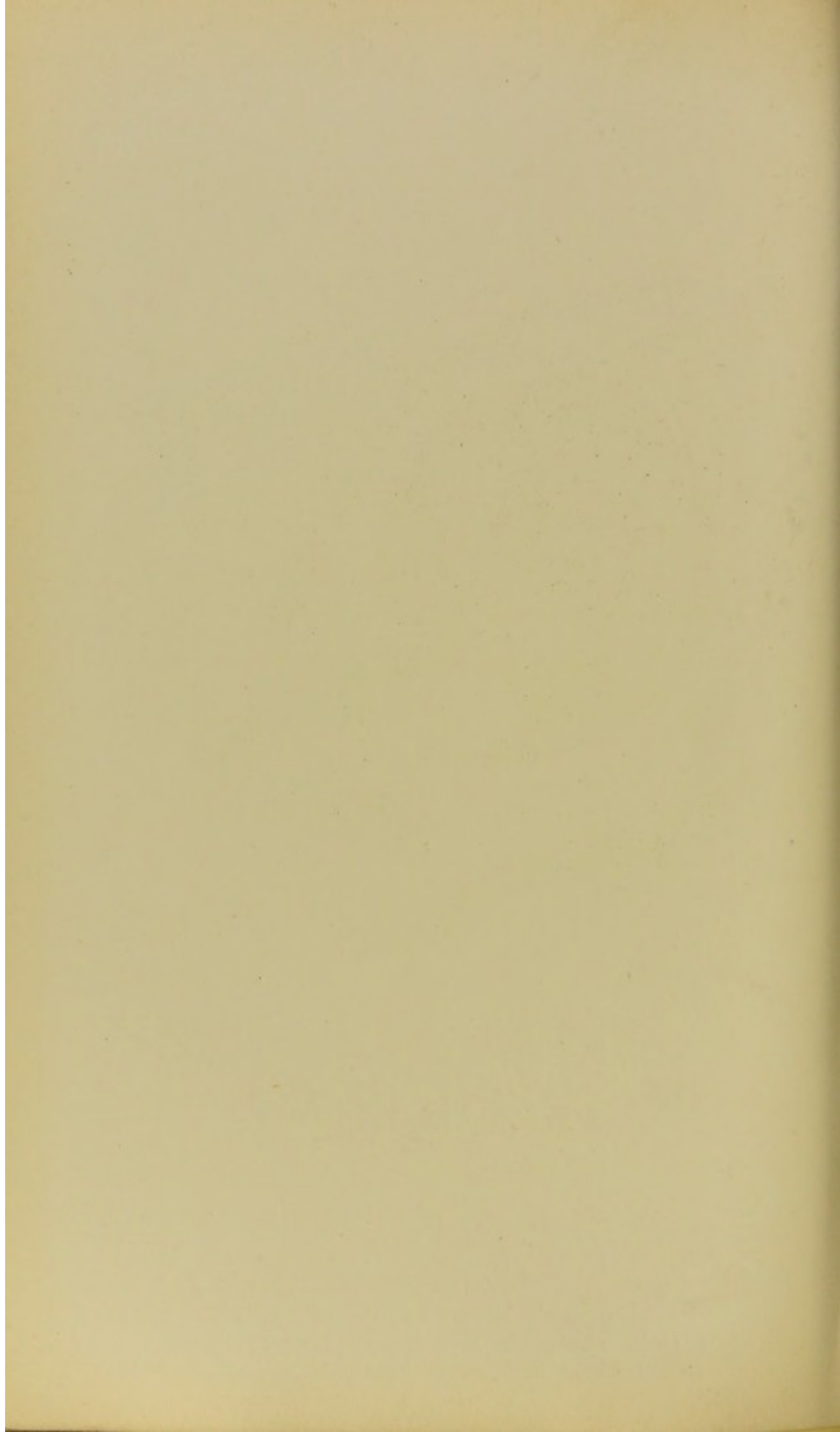


PLATE XXIII.

DISEASE OF THE URETHRA.

CASE 47. Page 173.

The parts have been laid open from the front, and the glans penis removed.

The urethra is throughout rough, tuberculated, and narrowed in calibre.

The left lobe of the prostate is riddled with abscesses.

The penis is considerably swollen.

a a. The swollen bulb.

The bladder hypertrophied.

FAIRLAND, *del.*





PLATE XXIV.

VILLOUS TUMOUR OF THE BLADDER.

CASE 52. Page 184, *et seq.*

The bladder laid open from the front.

- a.* The tumour, highly vascular, and as seen in the recent state—smooth on the surface, coated with blood and mucus.
- b.* A long process of the growth projecting into the prostatic portion of the urethra.
- c.* The narrow pedicle of the growth attached close to the orifice of the left ureter; a probe has been passed between the pedicle and the bladder: the pedicle found on microscopical examination to be composed of loose connective tissue and to be highly vascular.
- d. e.* The ureters equally and largely dilated.

The wall of the bladder hypertrophied.

FAIRLAND, *del.*

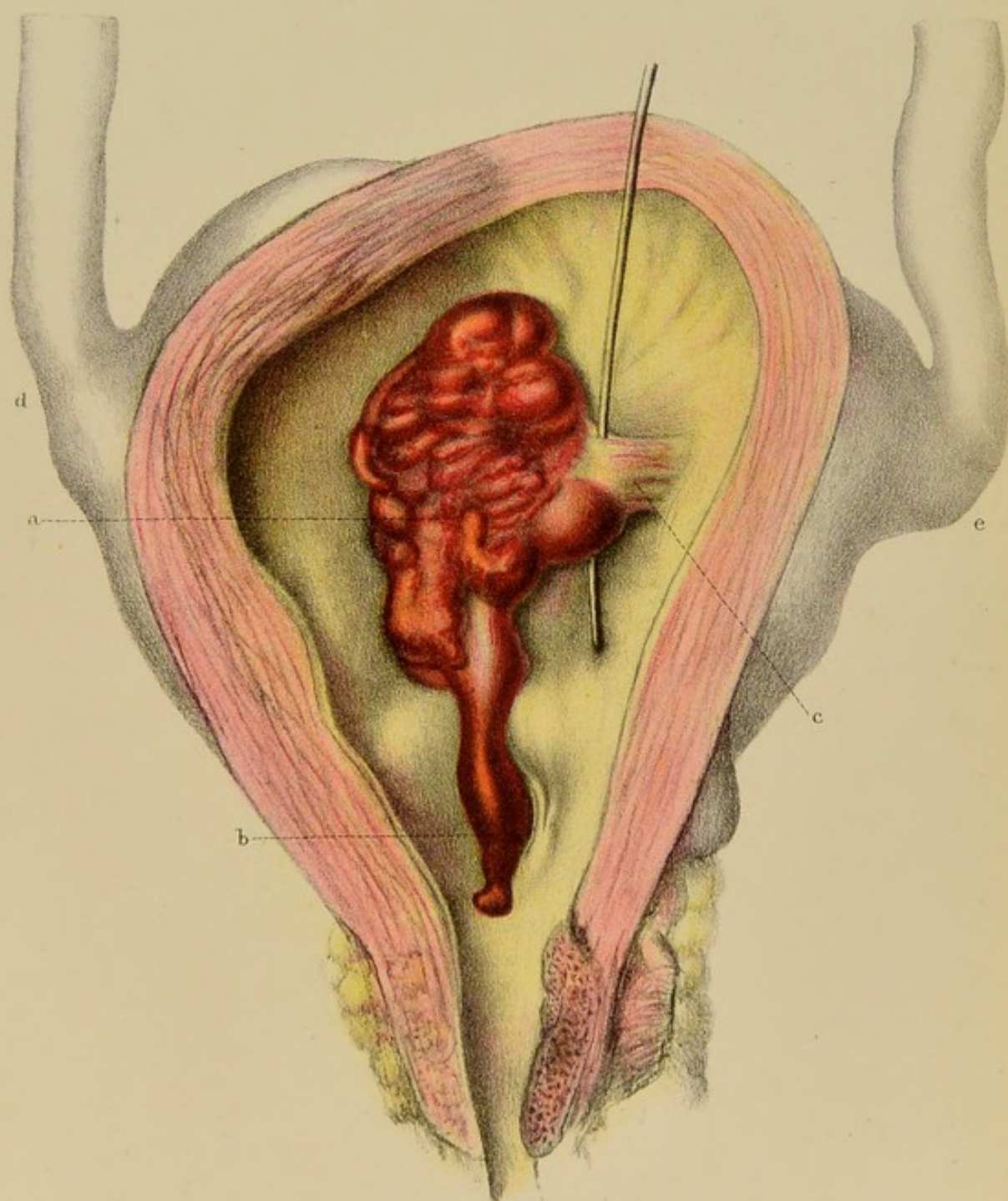




PLATE XXV.

VILLOUS TUMOUR OF THE BLADDER (MACERATED).

CASE 52. Page 186.

FIG. 1.—The specimen represented in the preceding figure, as it appears after partial maceration. The complex papillary construction of the growth is rendered evident by the removal of the blood and epithelium from its surface.

FORD, *del.*

FIG. 2.—A vertical section made through the left ureter of the same specimen, to show its course through the hypertrophied wall of the bladder (*a*).

- b.* Dilated ureter outside the bladder.
- c.* Ureter passing through the wall of the bladder, of about the normal size.
- d.* Pedicle of the tumour, by the side of which the ureter opens.

MR. S. G. SHATTOCK, *del.*

FIG. 3.—A vertical section made through the lower part of the right ureter and adjoining part of the bladder. The ureter is dilated up to its orifice, and opens within a sacculus which projects immediately above it from the posterior wall of the bladder. Its course is marked by a bristle.

- a.* Opened part of ureter.
- b.* Unopened part of same.
- c.* Sacculus of mucous membrane in the floor of which the ureter opens.
- d.* Hypertrophied wall of the bladder.

MR. S. G. SHATTOCK, *del.*

Fig. 2.



Fig. 3.

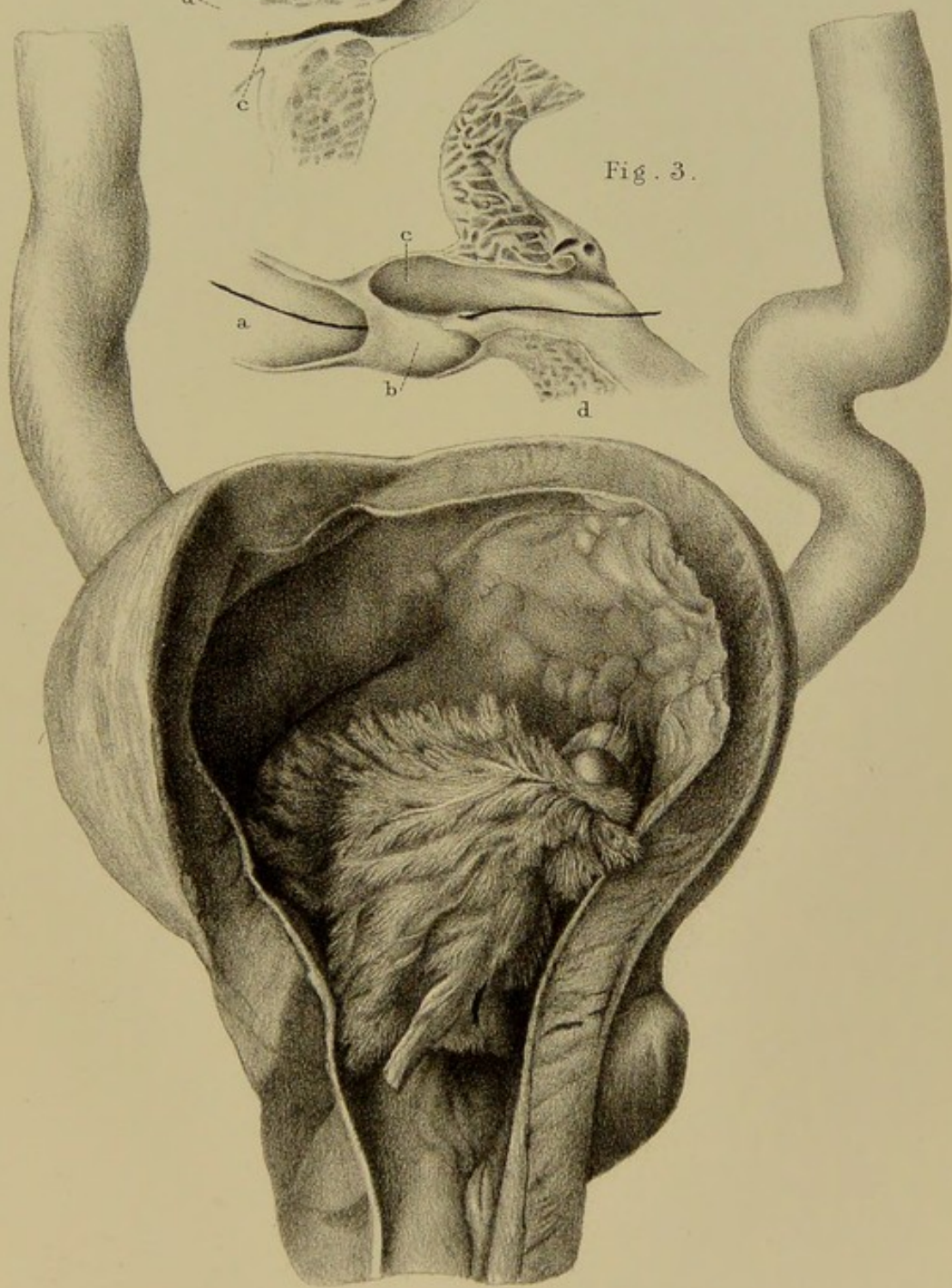
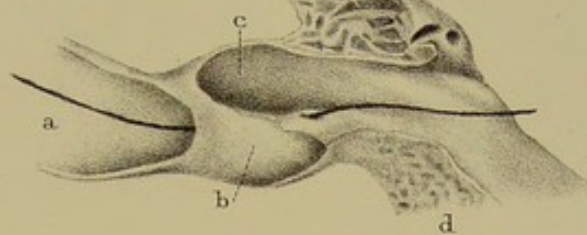


Fig. 1.

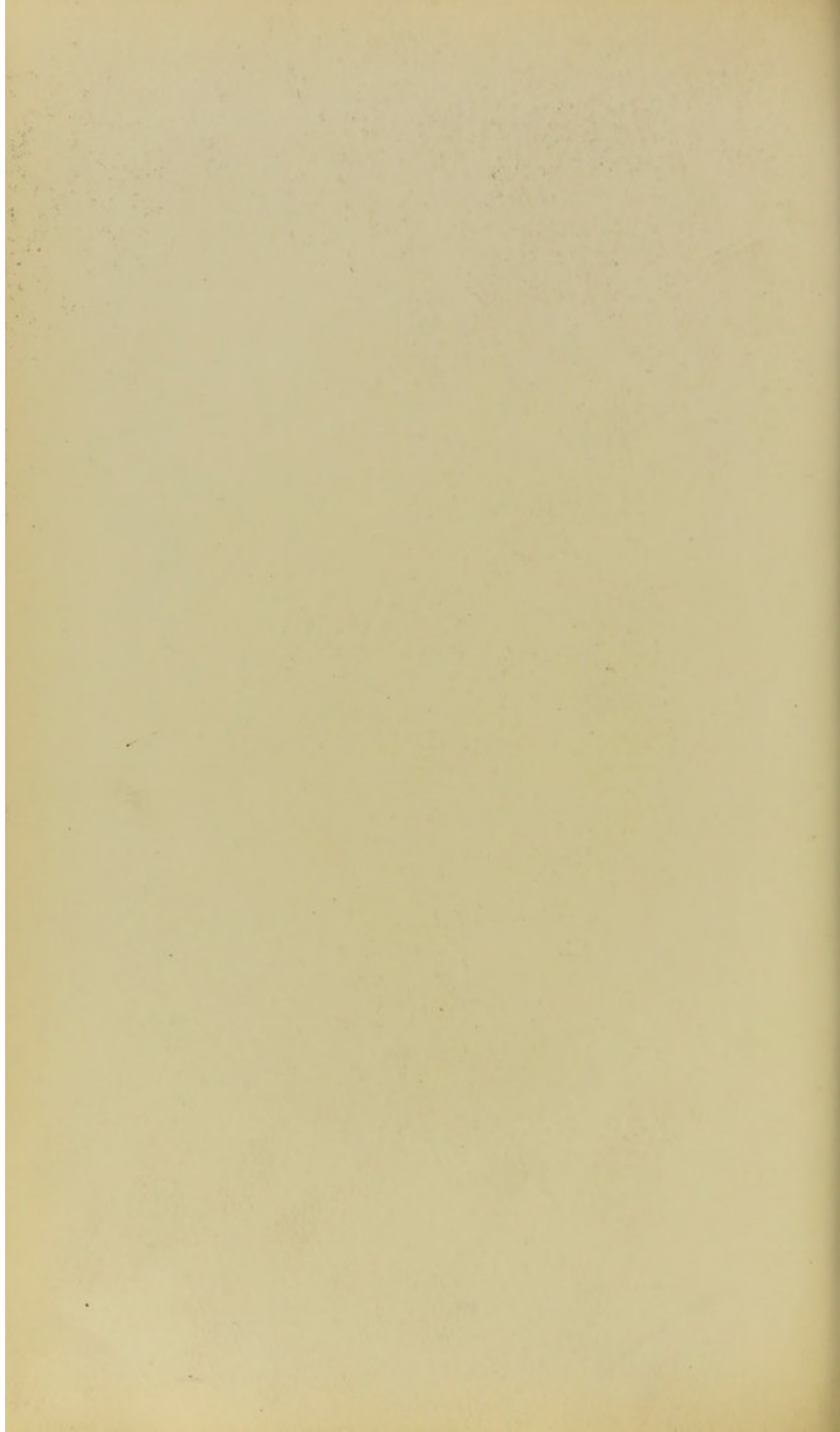


PLATE XXVI.

VILLOUS TUMOUR OF THE BLADDER.

CASE 53. Page 190.

The bladder and prostatic portion of the urethra have been laid open from the front to show the tumour.

A probe has been passed into the right ureter, the opening of which is surrounded and concealed by the new growth.

a b. The main portion of the growth which surrounds the neck of the bladder anteriorly and laterally ; this has been divided in the incision made to lay open the bladder.

c. Numerous other smaller growths of similar nature.

The several growths are highly vascular ; the smoothness of their surface is due to the close apposition of their villi, and to the presence of blood and mucus upon them.

d. The right ureter dilated from the obstruction occasioned by the main portion of the tumour.

e. The left ureter of normal size.

The bladder is hypertrophied and slightly fasciculated.

FORD, *del.*

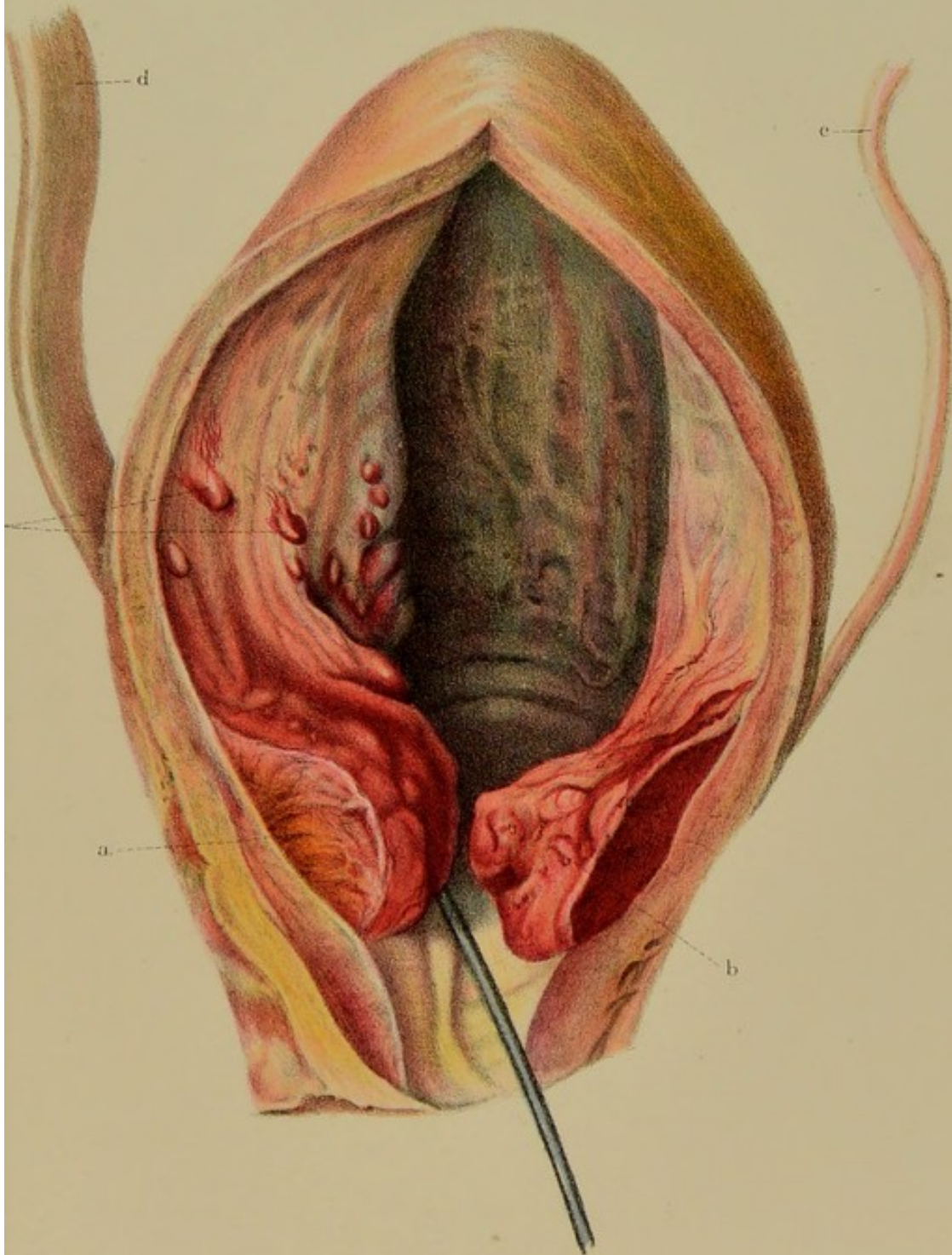




PLATE XXVII.

VILLOUS TUMOUR OF THE BLADDER.

CASE 53. Page 190.

FIG. 1.—The specimen shown in the preceding plate after partial maceration.

The villous construction of the different growths is rendered evident by the removal of blood, mucus, and epithelium from them.

R. MINTERN, *del.*

FIG. 2.—The right ureter of the same preparation, with the adjoining part of the bladder.

The ureter, being laid open, shows an extension of the villous growth for about three-quarters of an inch within it.

MR. S. G. SHATTOCK, *del.*

Fig. 2.

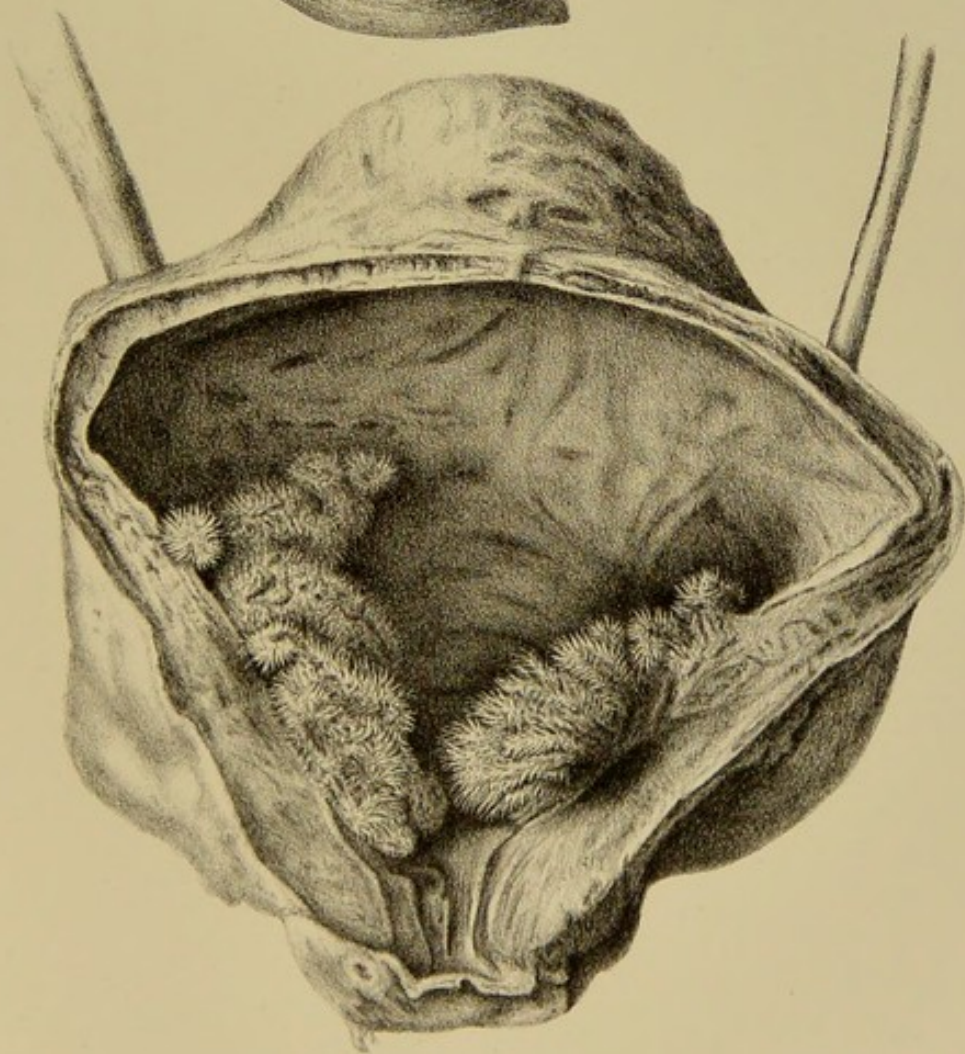
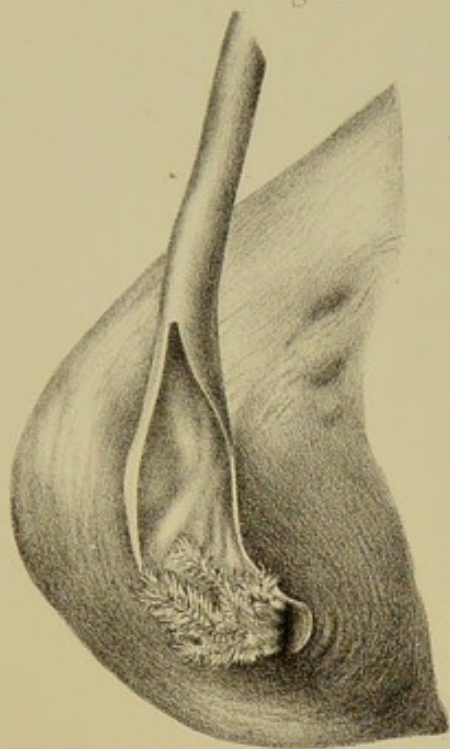


Fig. 1.

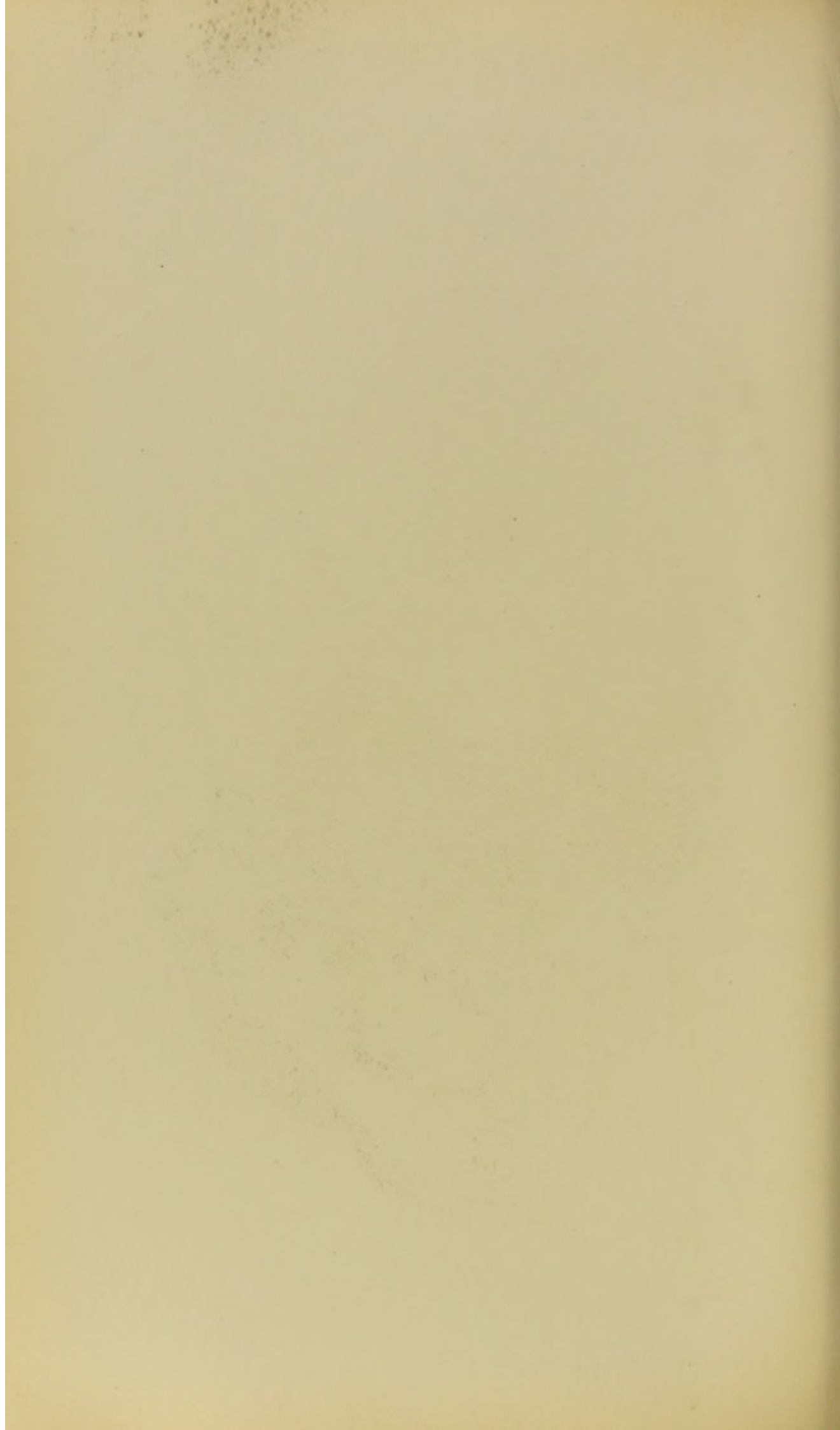


PLATE XXVIII.

VILLOUS TUMOUR OF THE BLADDER.

CASE 53. Page 190.

A bladder laid open through the anterior wall, and exhibiting an extensive series of small villous growths in clusters on the mucous membrane.

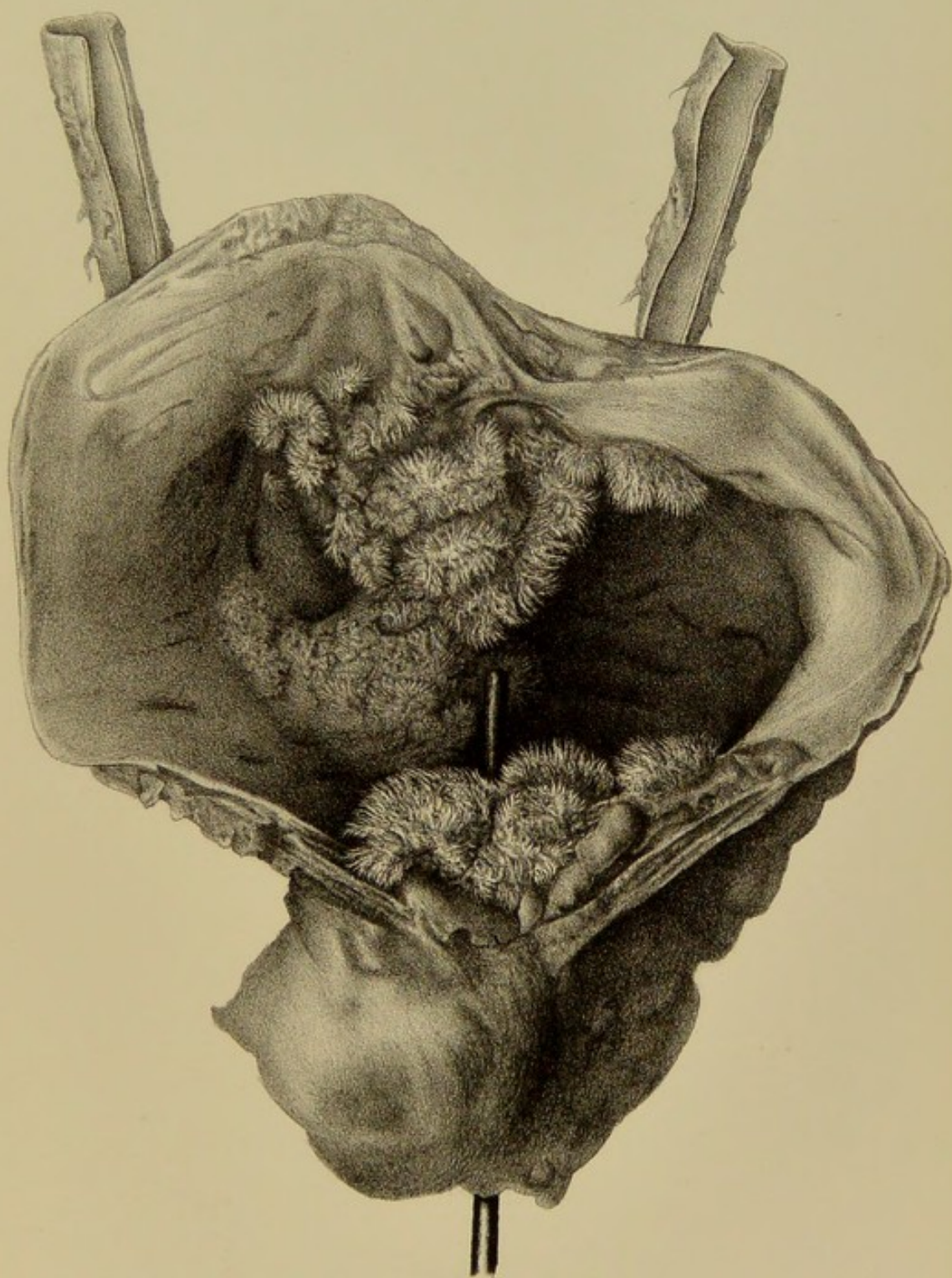
The chief mass surrounds the urethral orifice, except at its posterior part (as was ascertained by laying open the urethra). A probe has been passed through the prostatic portion of the urethra.

The other growths lie mainly on the posterior wall of the bladder. Both ureters are to about the same degree dilated.

The bladder is somewhat hypertrophied.

The history of the case has not been recorded.

R. MINTERN, *del.*



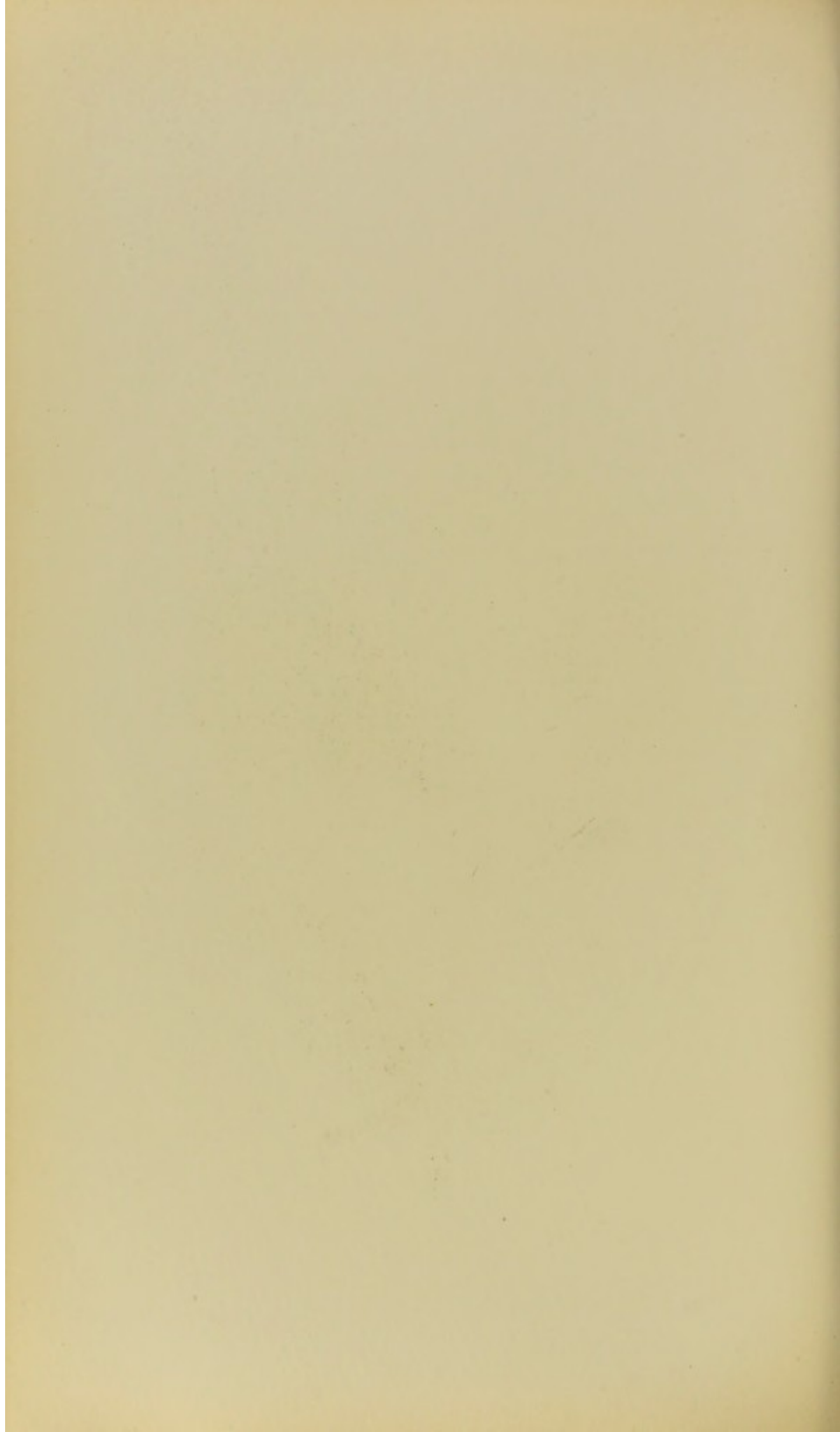


PLATE XXIX.

INFLAMED PROSTATE AND EPITHELIOMA OF
THE BLADDER.

CASE 55. Page 196.

The bladder and prostatic portion of the urethra have been laid open from the front.

The prostate is uniformly enlarged and encroaches considerably on the cavity of the bladder, the urethral orifice being displaced inwards and the prostatic portion of the urethra commensurately lengthened.

The prostate generally is inflamed; its free surface is covered with muco-pus and phosphates.

The mucous membrane of the bladder is deeply congested and almost black from inflammation.

Each of the ureters is enlarged to about twice its natural size.

From the left side of the posterior wall of the bladder there projects a small tumour (epithelioma).

FORD, *del.*





PLATE XXX.

A VERTICAL SECTION OF THE INFLAMED PRO-
STATE REPRESENTED IN PLATE XXIX.

EPITHELIOMA OF THE FEMALE BLADDER.

CASE 55. Page 195.

FIG. 1.—A vertical section of the bladder shown in the preceding plate.

The degree of projection of the hypertrophied prostate within the bladder is more plainly recognisable, as well as the extent to which the prostatic portion of the urethra is increased in length.

The urethra behind the verumontanum is sharply bent forwards, and its orifice is overlapped by a thick deposit of muco-pus and phosphates.

- a.* Verumontanum.
- b.* Membranous portion of the urethra.
- c.* Left crus of penis cut short.

FORD, *del.*

CASE 54. Page 192.

FIG. 2.—The bladder and urethra (female) have been laid open from before to show a lobulated epitheliomatous tumour growing from the left side and posterior wall of the bladder.

The mucous membrane of the bladder is congested from inflammation. Several enlarged vessels are visible in it.

MR. A. BRUCE, *del.*

Fig. 1.

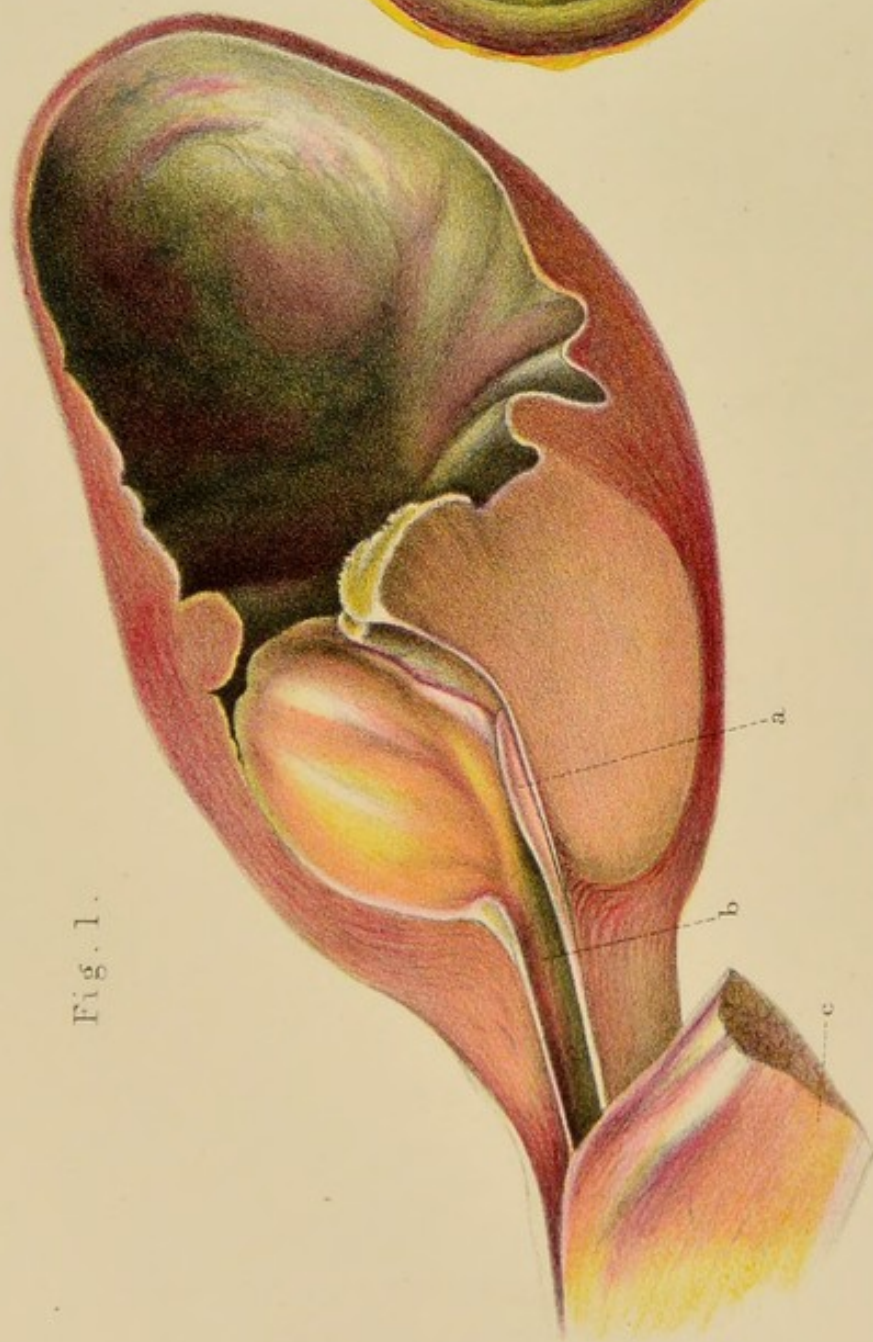
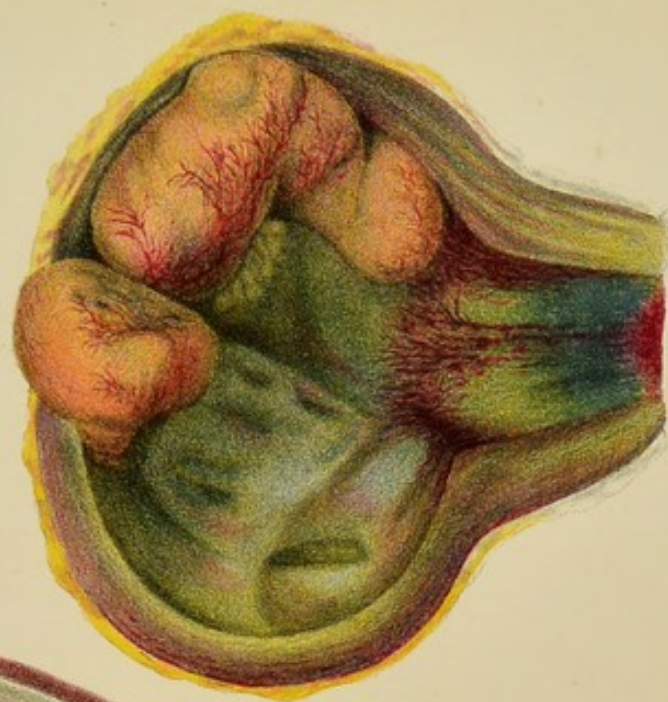


Fig. 2.



CASE 56. Page 196.

FIG. 1.—The bladder and rectum, together with the symphysis pubis, &c.

The bladder has been laid open from the left side, the tumour in this situation being divided, and a small portion removed; the morbid growth extends from the pubes to the hollow of the rectum.

A bougie has been passed from the perineum along the track of the wound made in lateral lithotomy for the extraction of a calculus.

- a a a.* Rectum.
- b.* Left ureter.
- c.* Vas deferens.
- d.* Peritoneum drawn down by a hook.
- e.* Cavity of the bladder, the wall of which is formed, except at the lower part, by the ulcerating tumour-substance.
- fff.* Portions of the tumour.

FAIRLAND, *del.*

FIG. 2.—A microscopic section of portion of the tumour.

- a.* Trabecula of connective tissue.
- b b.* Epithelial masses in alveoli.

MR. S. G. SHATTOCK, *del.*

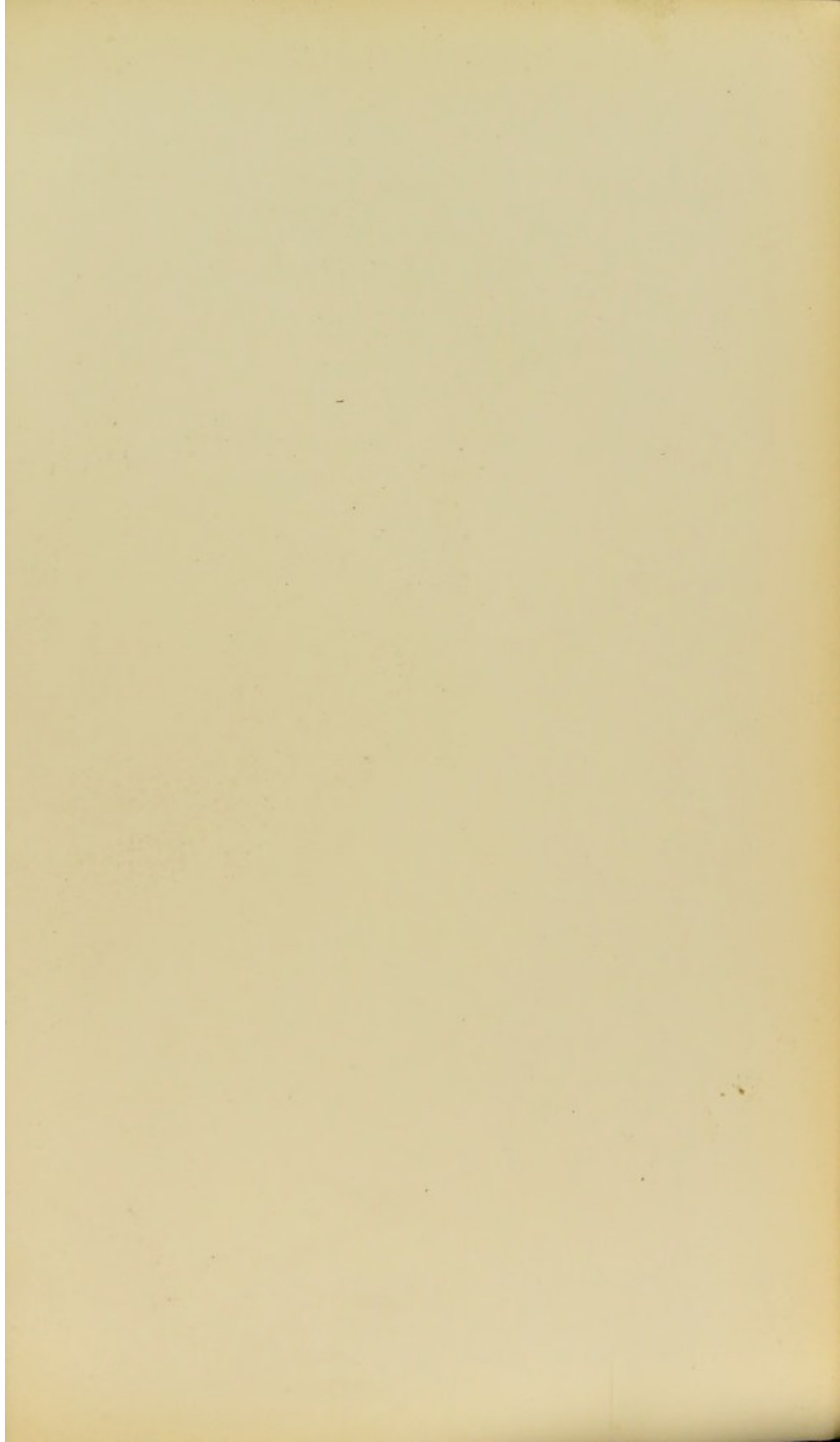


Fig. 1.

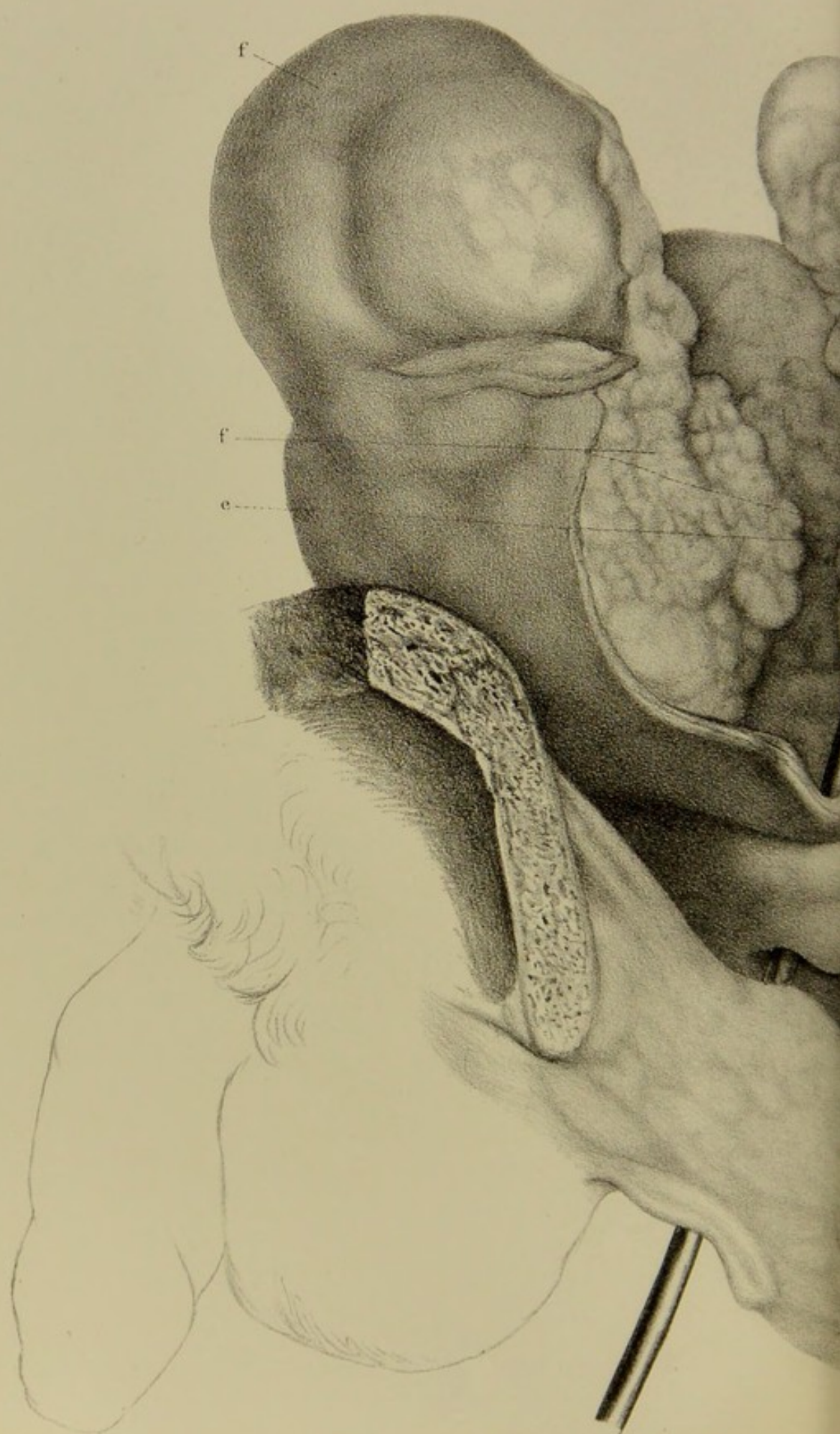
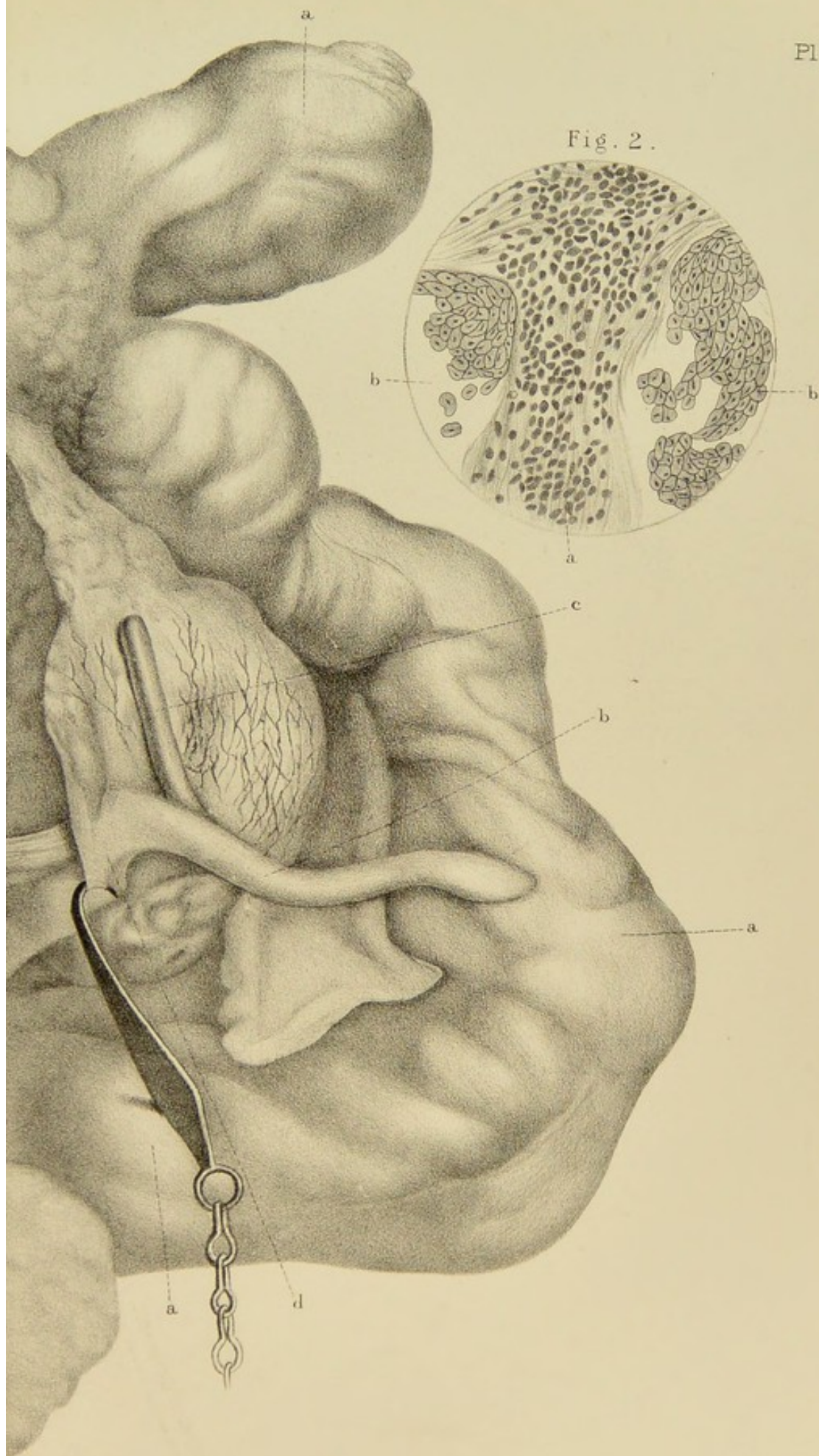


Fig. 2.



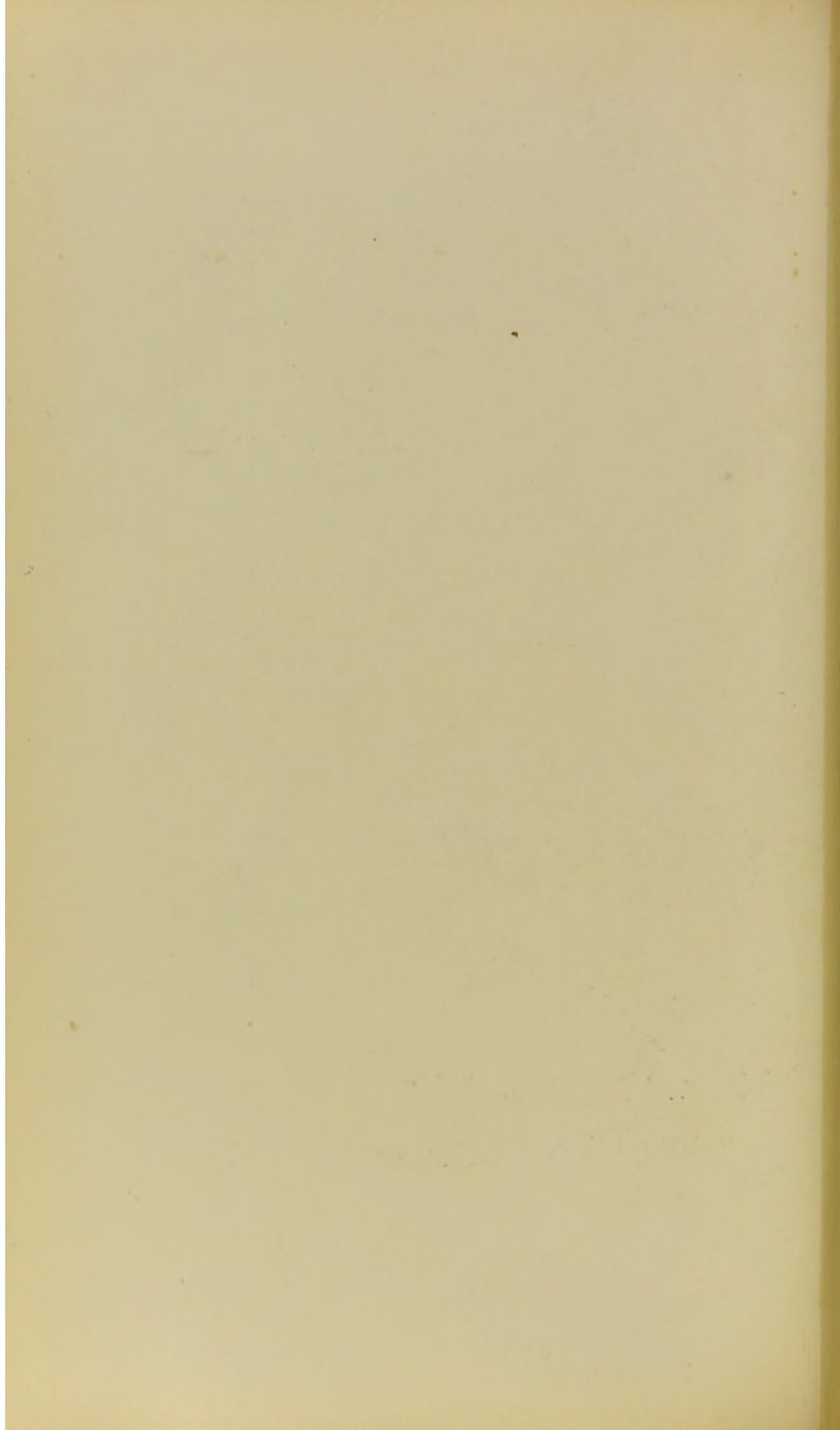


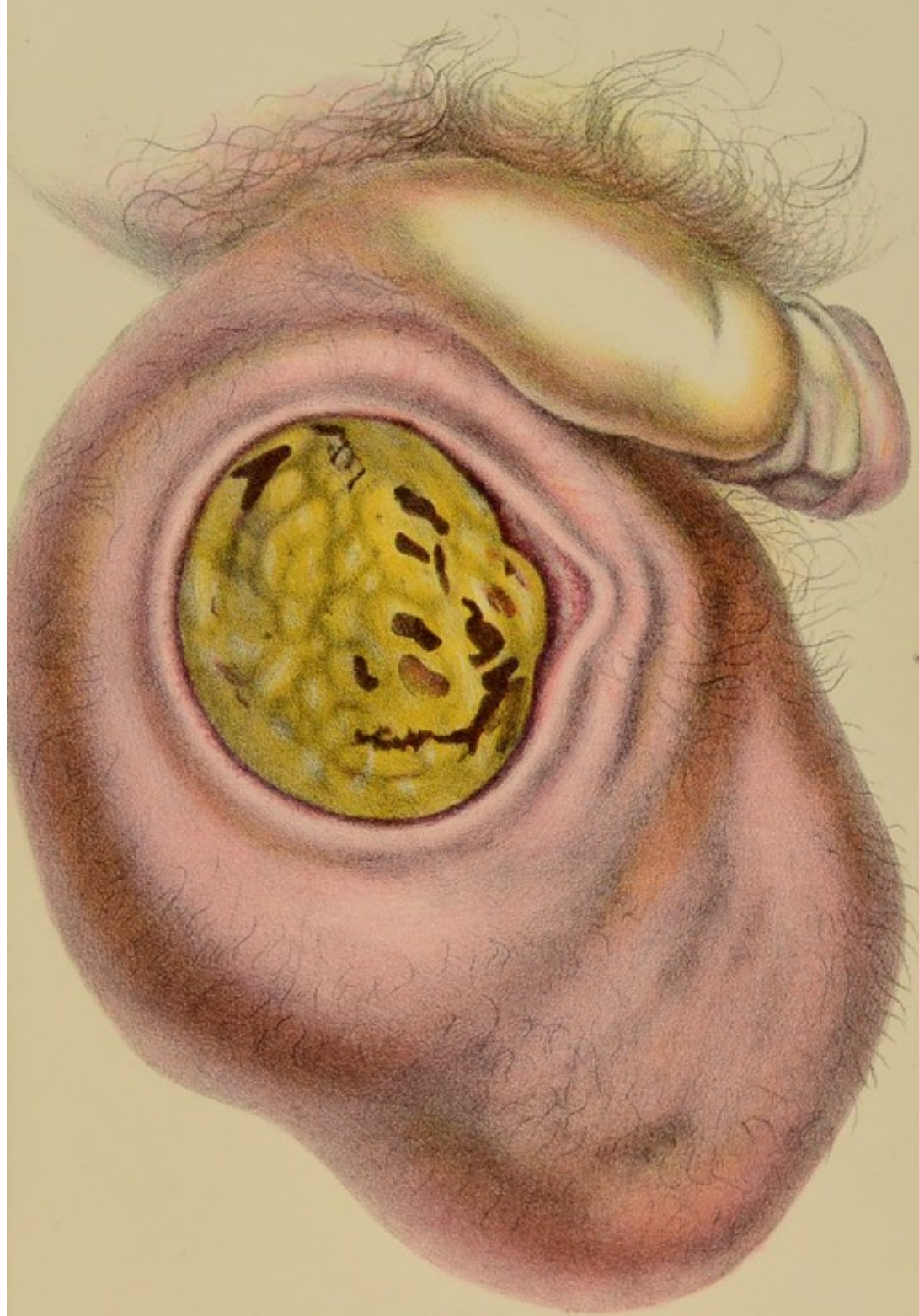
PLATE XXXII.

CHRONIC ORCHITIS

CASE 72. Page 241.

The ulcerating surface is covered with a dirty yellow, slightly protuberant slough, and the margin of the skin around is thickened and adherent.

FAIRLAND, *del.*



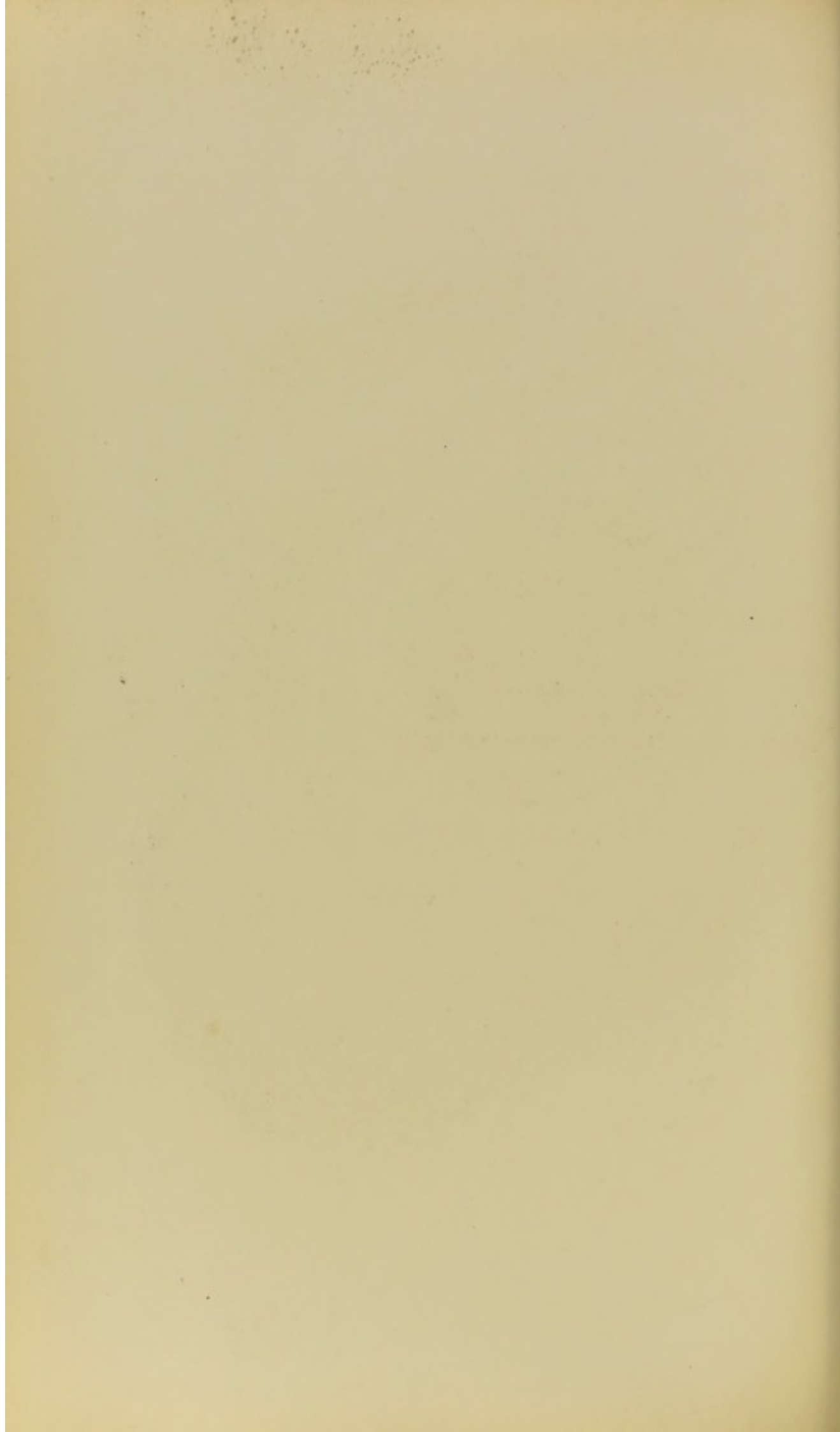


PLATE XXXIII.

CHRONIC ORCHITIS AND CHOLESTRATOMA TESTIS.

CASE 72. Page 243.

FIG. 1.—A vertical section of the tumour of the right side shown in the preceding plate. The section displays two large yellow masses; the lower of these (*a*) is nearly circular in outline, about $2\frac{1}{4}$ inches in diameter; the upper (*b*) is undulatory on its lower margin, and above it corresponds with the general surface of the testicle.

Both the masses of morbid tissue are of a dirty yellow colour, and appear in places to have been in process of softening.

FAIRLAND, *del.*

CASE 74. Page 250, *et seq.*

FIG. 2.—Cholesteatoma testis.

A portion of the side of the testicle has been removed by vertical incision. The divided surface shows many uniformly-scattered, small, whitish nodules, lying in the midst of the otherwise healthy gland substance.

- a.* Portion of the scrotum lying behind the testicle; in the middle of this is an ulcerated opening by which an abscess destroying the epididymis opened.
- b.* Spermatic cord.

FIG. 3.—A. A microscopic section of one of the miliary nodules. It exhibits round, granular cells of uniform size and type, amongst and supporting which are fine fibres of connective tissue.

B. A seminal tubule of natural size.

C. Portion of a tubule, dilated and varicose, by pressure of the nodules described.

From drawings made under direction of PROFESSOR QUECKETT.

Fig. 2.

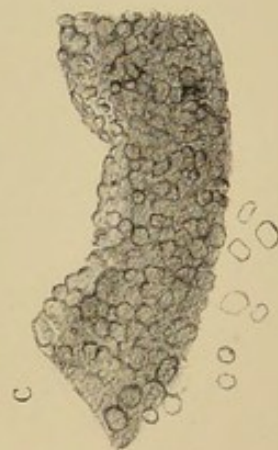
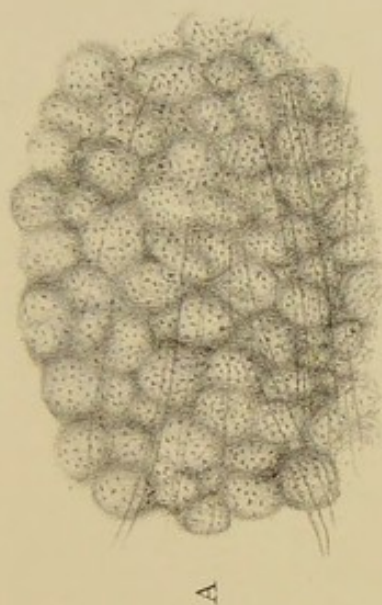
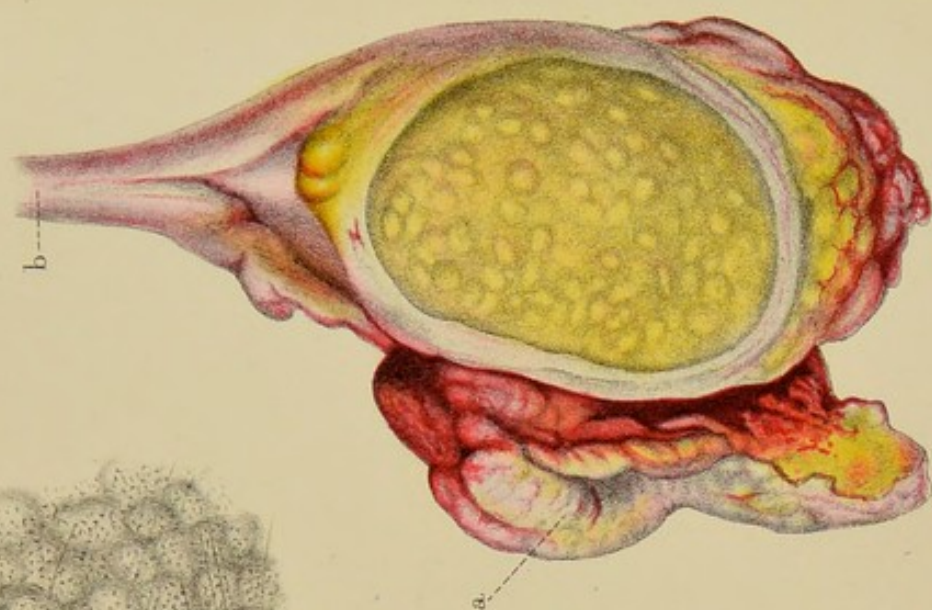
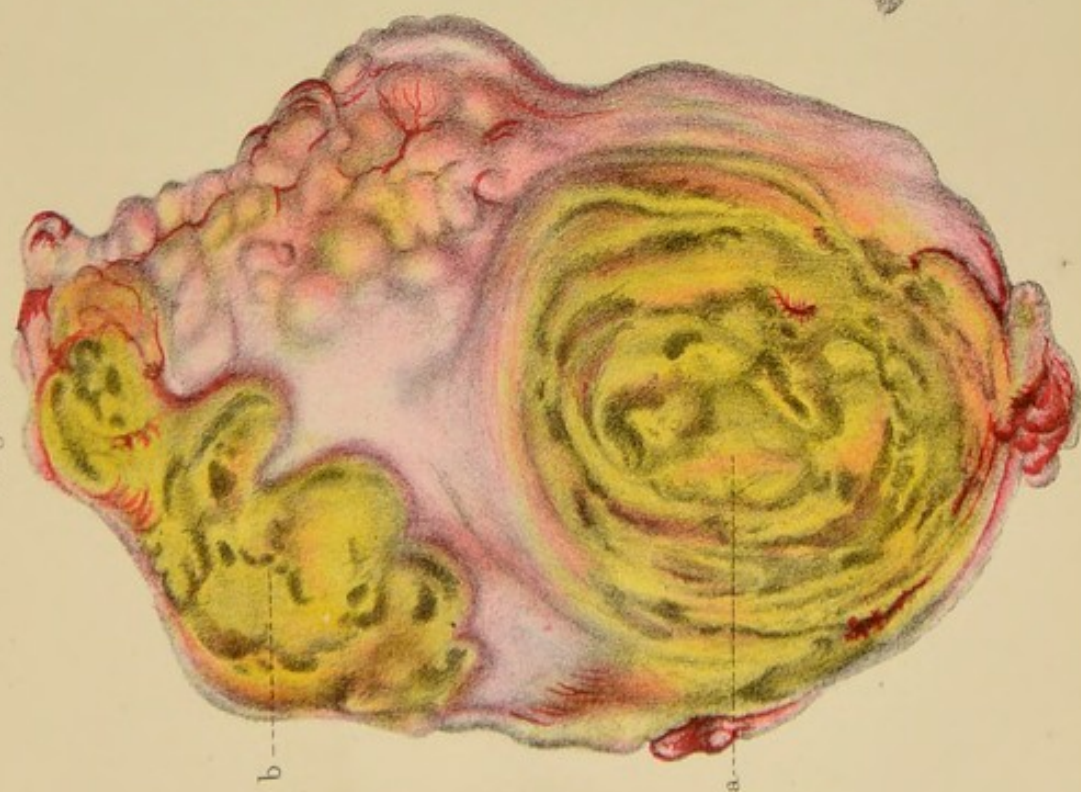


Fig. 1.



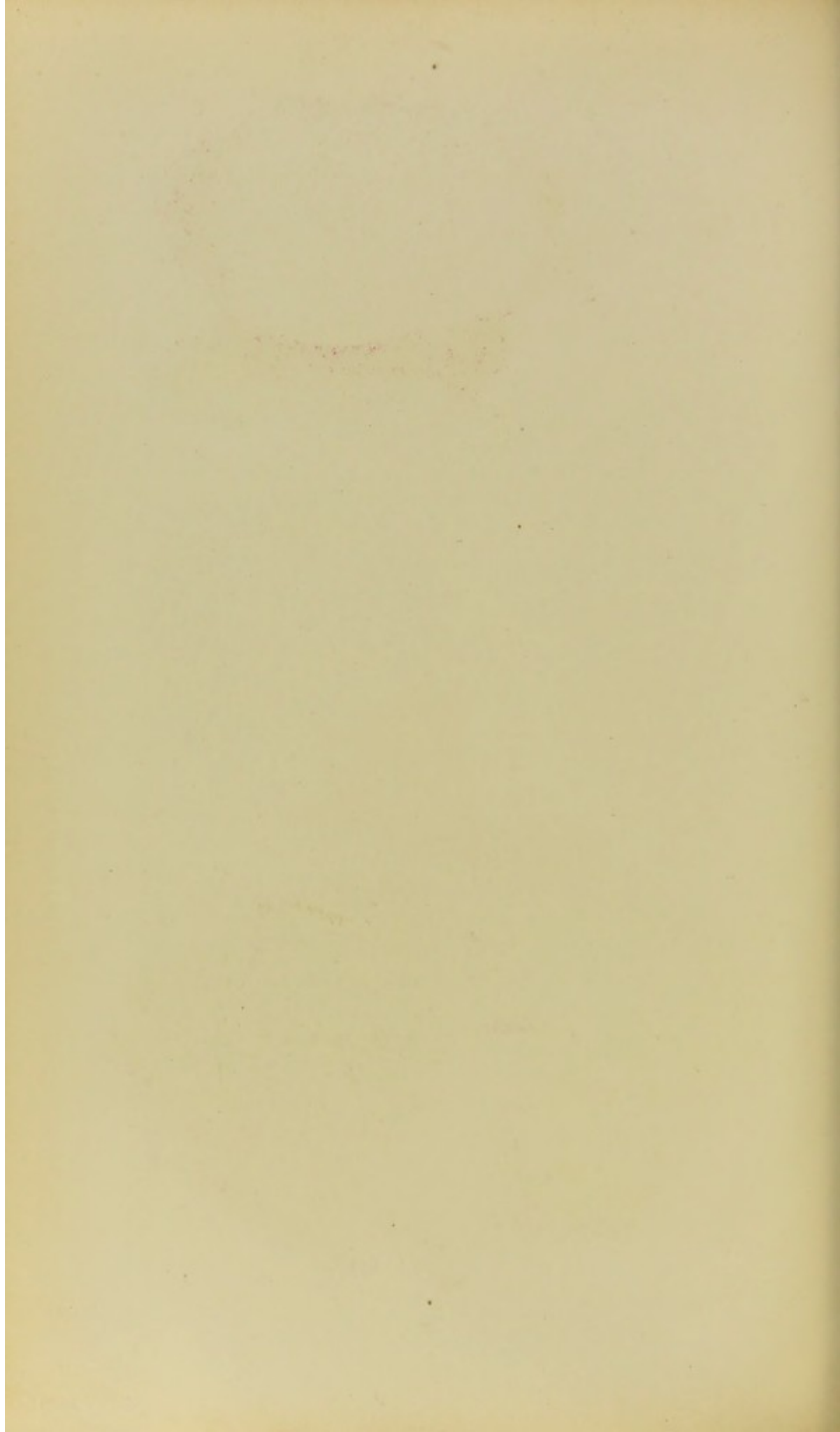


PLATE XXXIV.

ENCEPHALOID DISEASE OF THE TESTICLE AND
SEROUS CYSTS PROJECTING WITHIN THE TUNICA
VAGINALIS.

CASE 76. Page 255.

For detailed references to the various structures shown, see the outline on the succeeding plate.

JOSEPH PERRY, *del.*

Fig . 2 .

Pl . XXXIV .

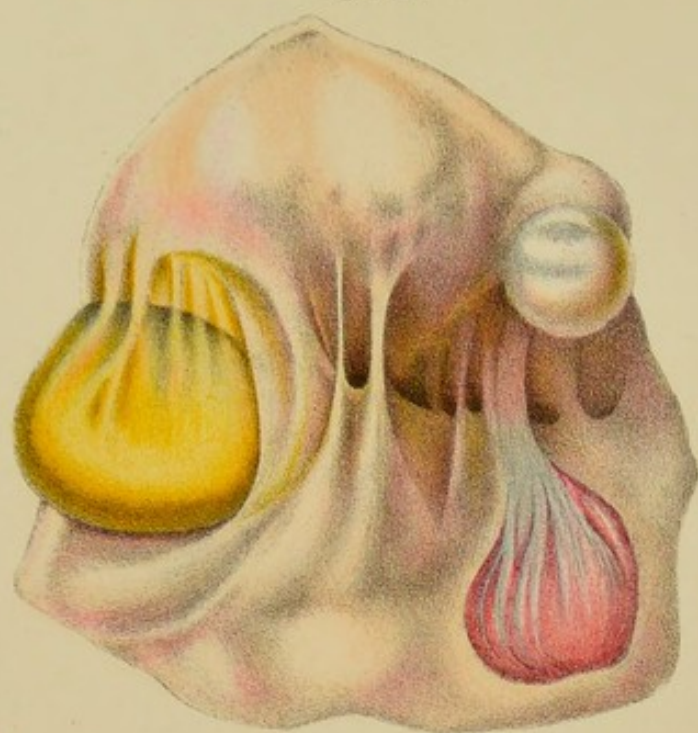
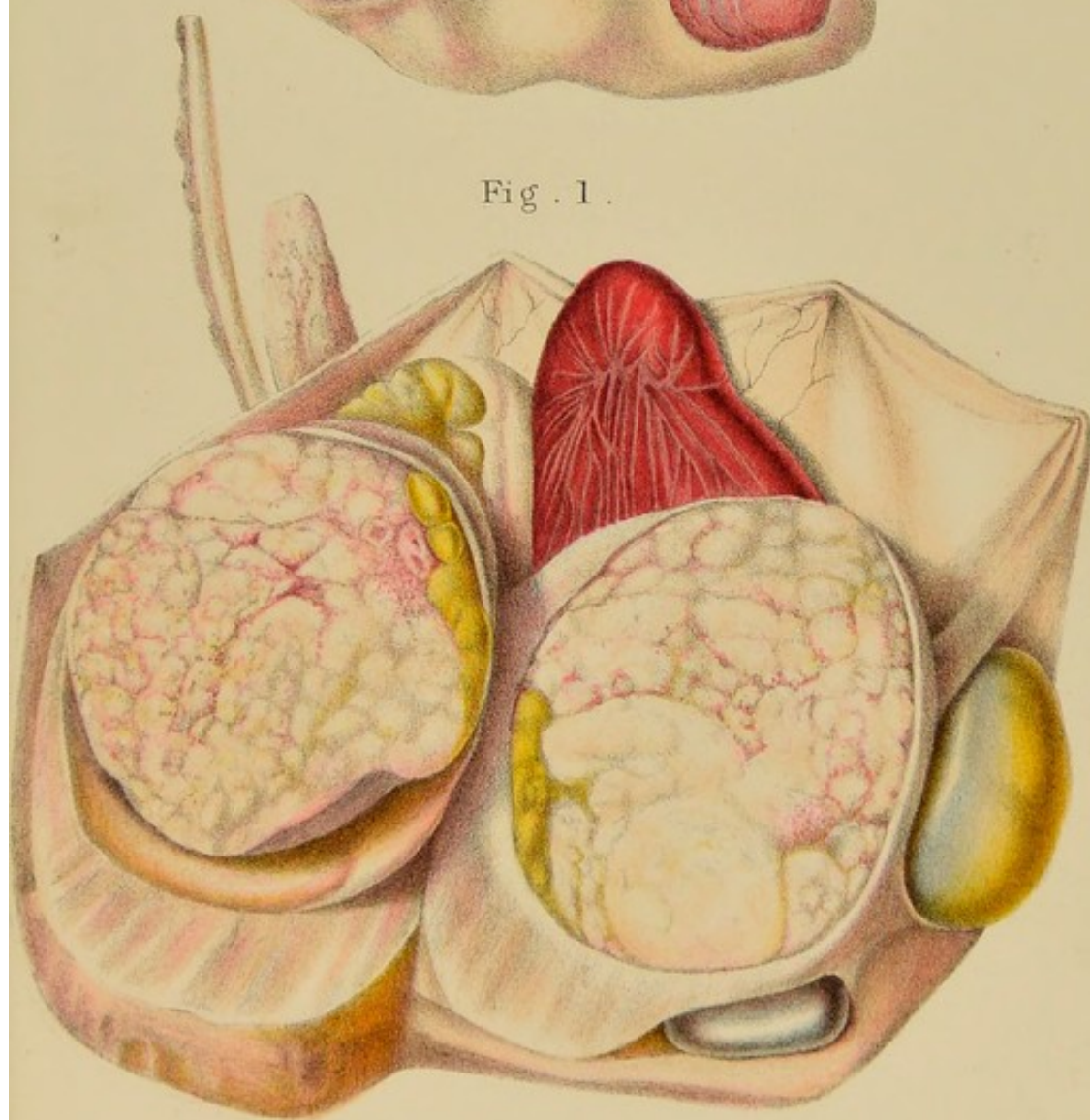


Fig . 1 .



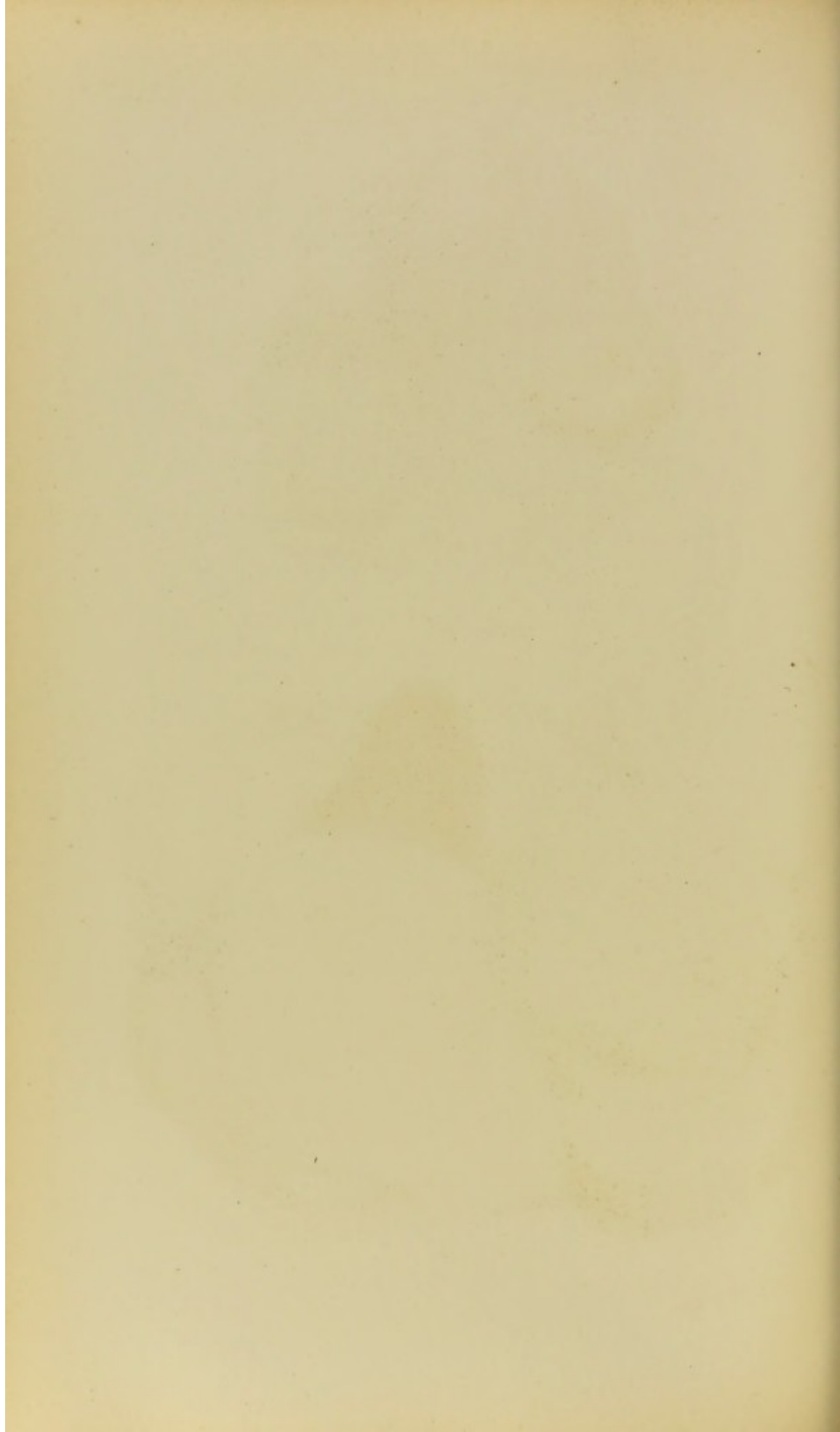


PLATE XXXIV_A.

ENCEPHALOID DISEASE OF THE TESTICLE.

OUTLINE OF THE PRECEDING PLATE.

FIG. 1.—The tumour, testis, and tunica vaginalis have been divided longitudinally, and the parts turned to each side.

A A'. Divided surfaces of the tumour.

- b.* Investing membrane of the tumour separate from it.
- c.* The same membrane approaching and connected with tunica albuginea.
- d.* Small cysts in morbid growth.
- d'*. Tubular structure of the gland.
- e.* Tunica albuginea.
- f.* Tunica vaginalis divided and drawn out.
- g.* Section of glandular structure.
- h.* Both parts of tunica vaginalis adherent together.
- i.* Newly-formed cysts in cavity of tunica vaginalis—one contains blood.
- k.* Vas deferens.
- l.* Spermatic cord.
- m.* Upper end of epididymis.

FIG. 2.—Portion of fibro-serous coat of testis and of parietal layer of tunica vaginalis.

- n.* Portion of fibro-serous coat.
- o.* Portion of parietal layer of tunica vaginalis.
- p.* Adhesive bands between the two.
- q.* Cyst between the serous and fibrous layers of the investment of the testis.
- r.* Cyst.
- s.* Separate cyst held on by cellular pedicle.

Fig. 2.

Pl. XXXIV.

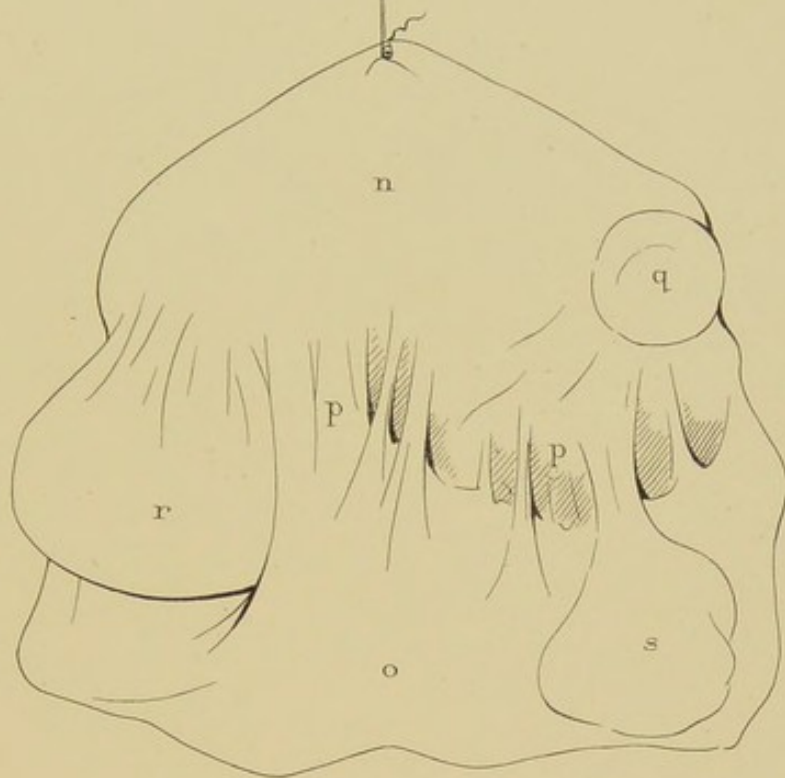
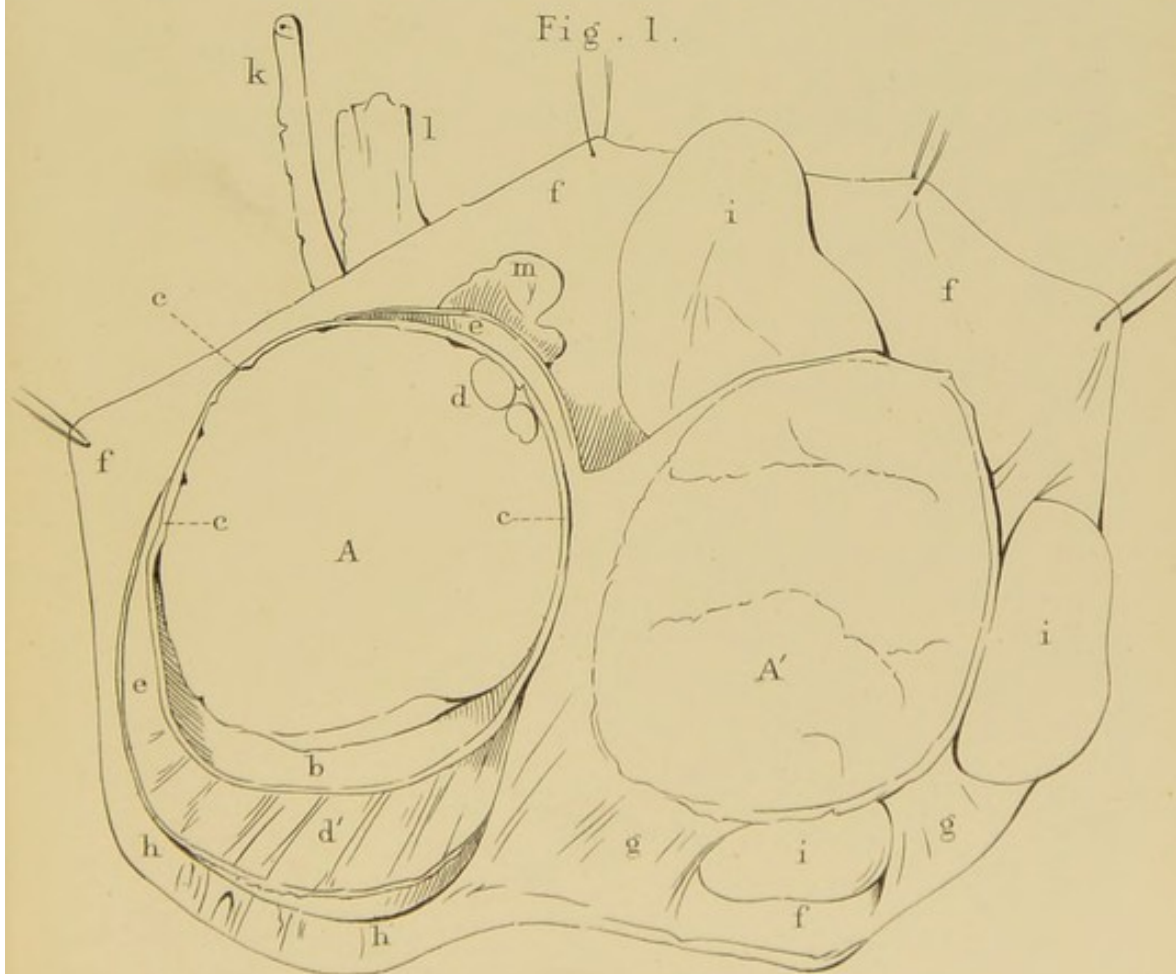


Fig. 1.



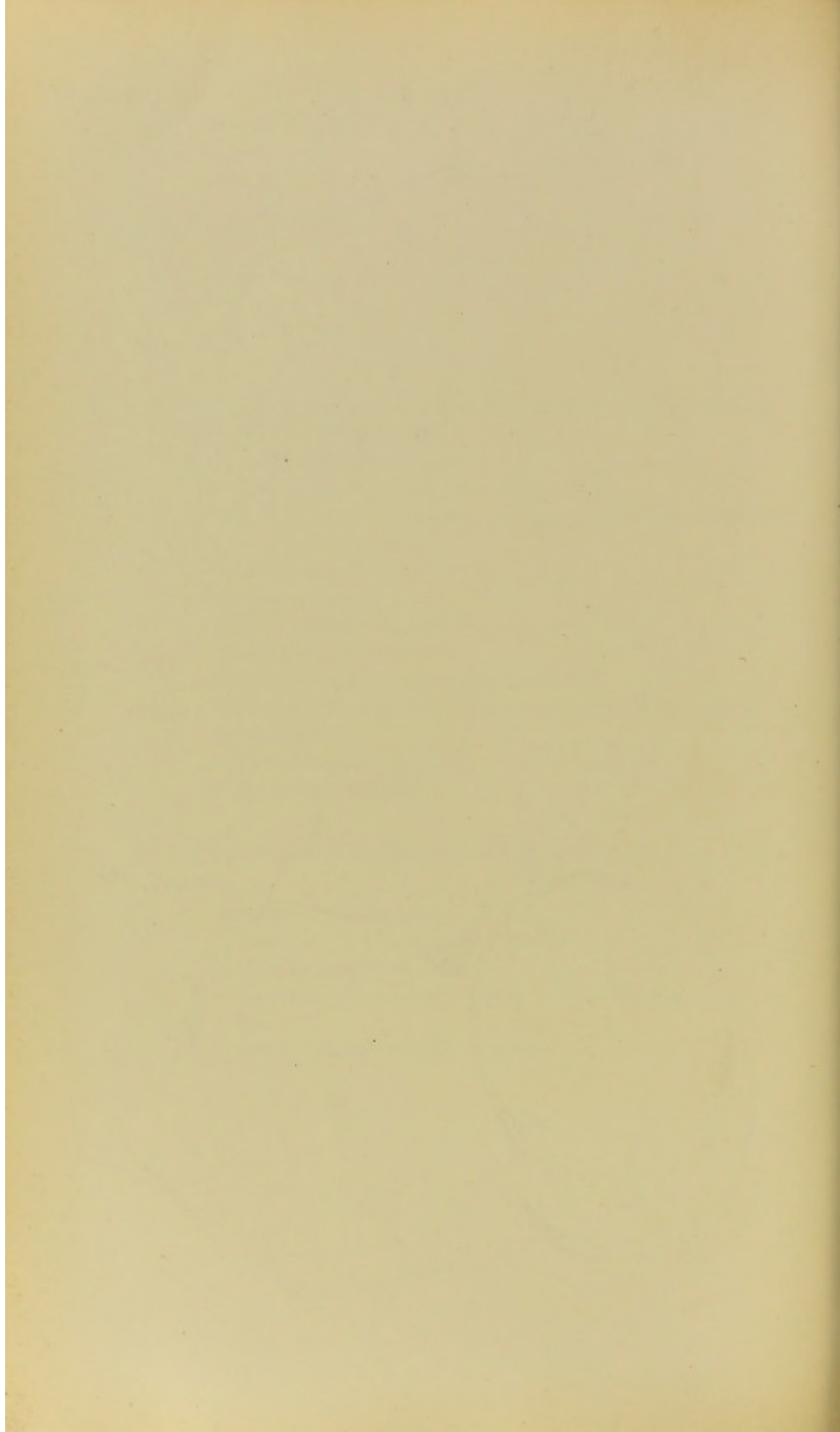


PLATE XXXV.

ENCEPHALOID DISEASE OF THE TESTICLE.

CASE 75. Page 253.

FIG. 1.—The tumour has been bisected, and its halves turned apart.

The surface of the section is white, slightly marked out into lobes, and blotched with extravasated blood.

a. Spermatic cord.

b. Terminal convoluted part of the vas deferens and globus minor of the epididymis—healthy.

JOSEPH PERRY, *del.*

FIG. 2.—Isolated cells examined fresh in water, from a tumour of the testicle removed by Mr. Liston, and which presented general characters the same as those of the preceding. The cells are granular, oval, or pyriform, and mostly nucleated: one cell has three nuclei. In some the nucleus has a nucleolus. On the right side are some nuclei set free during the preparation of the specimen.

From a drawing by PROFESSOR ELLIS.

Fig. 2.

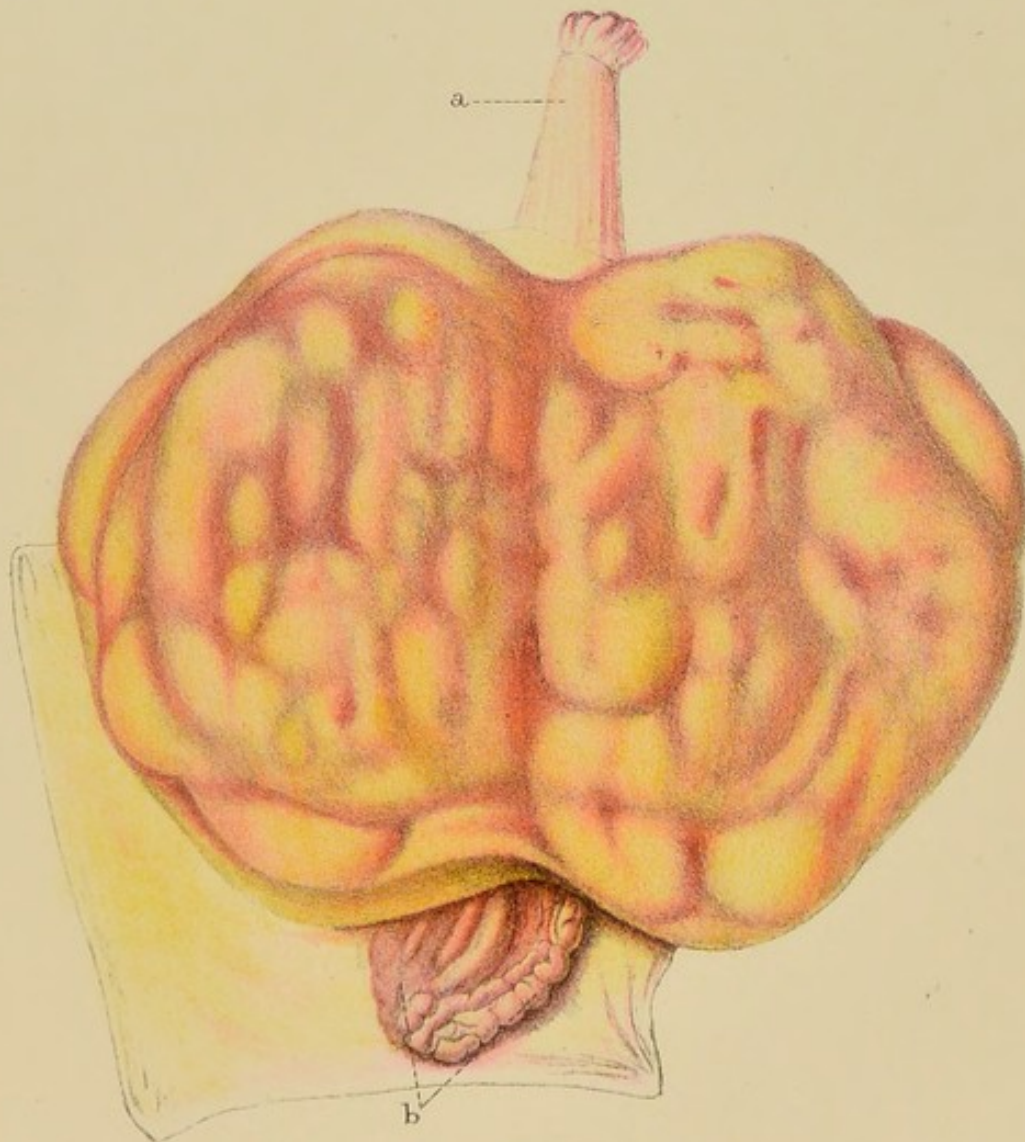
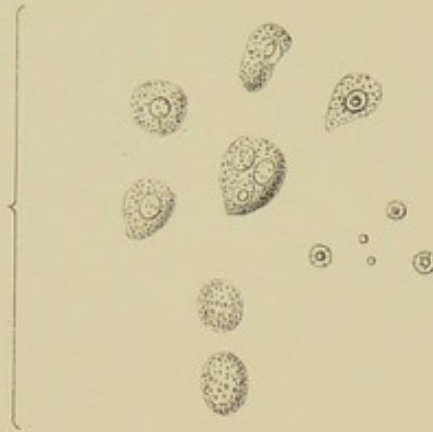


Fig. 1.

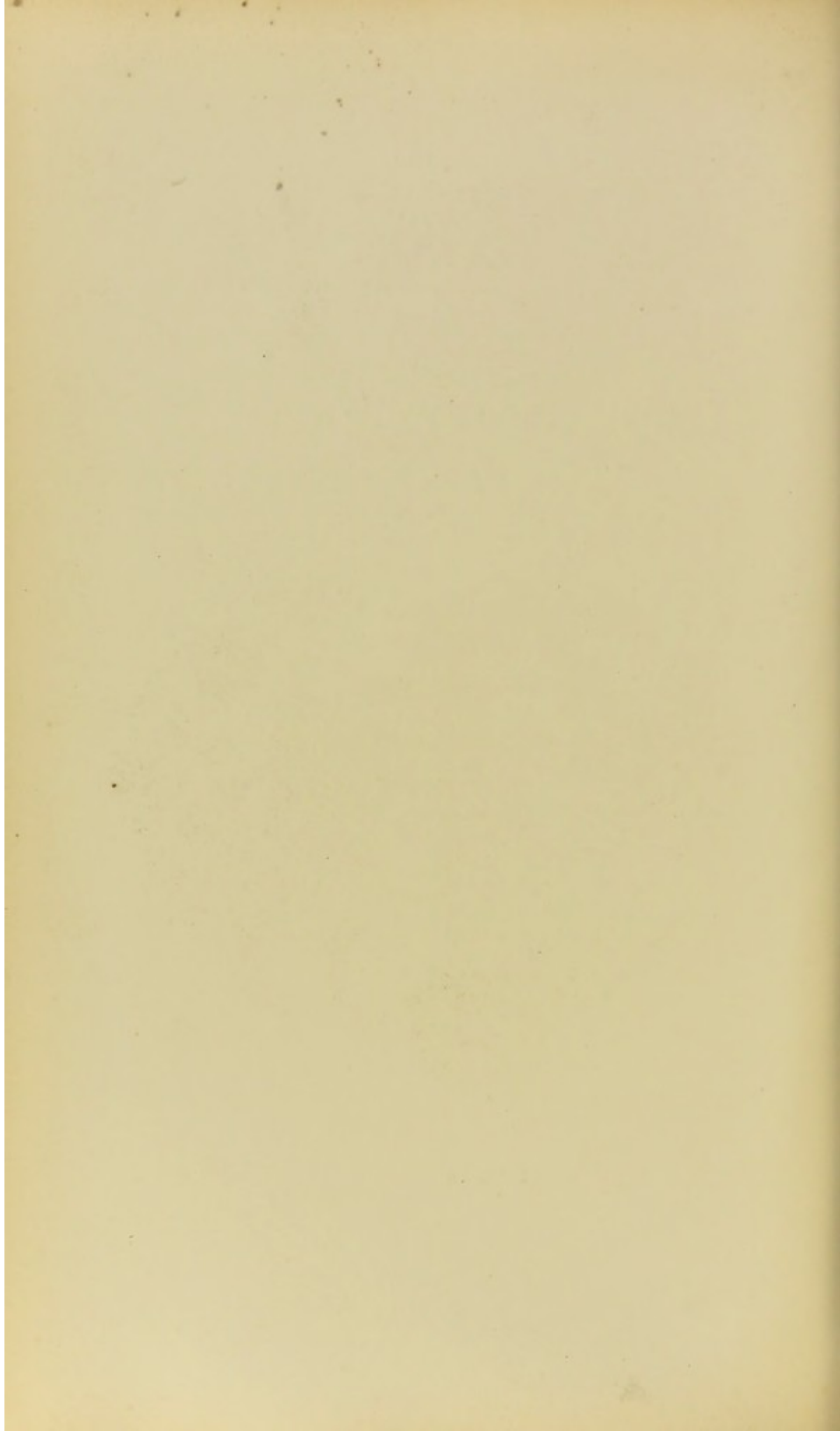


PLATE XXXVI.

CYSTIC TUMOUR OF THE TESTICLE.

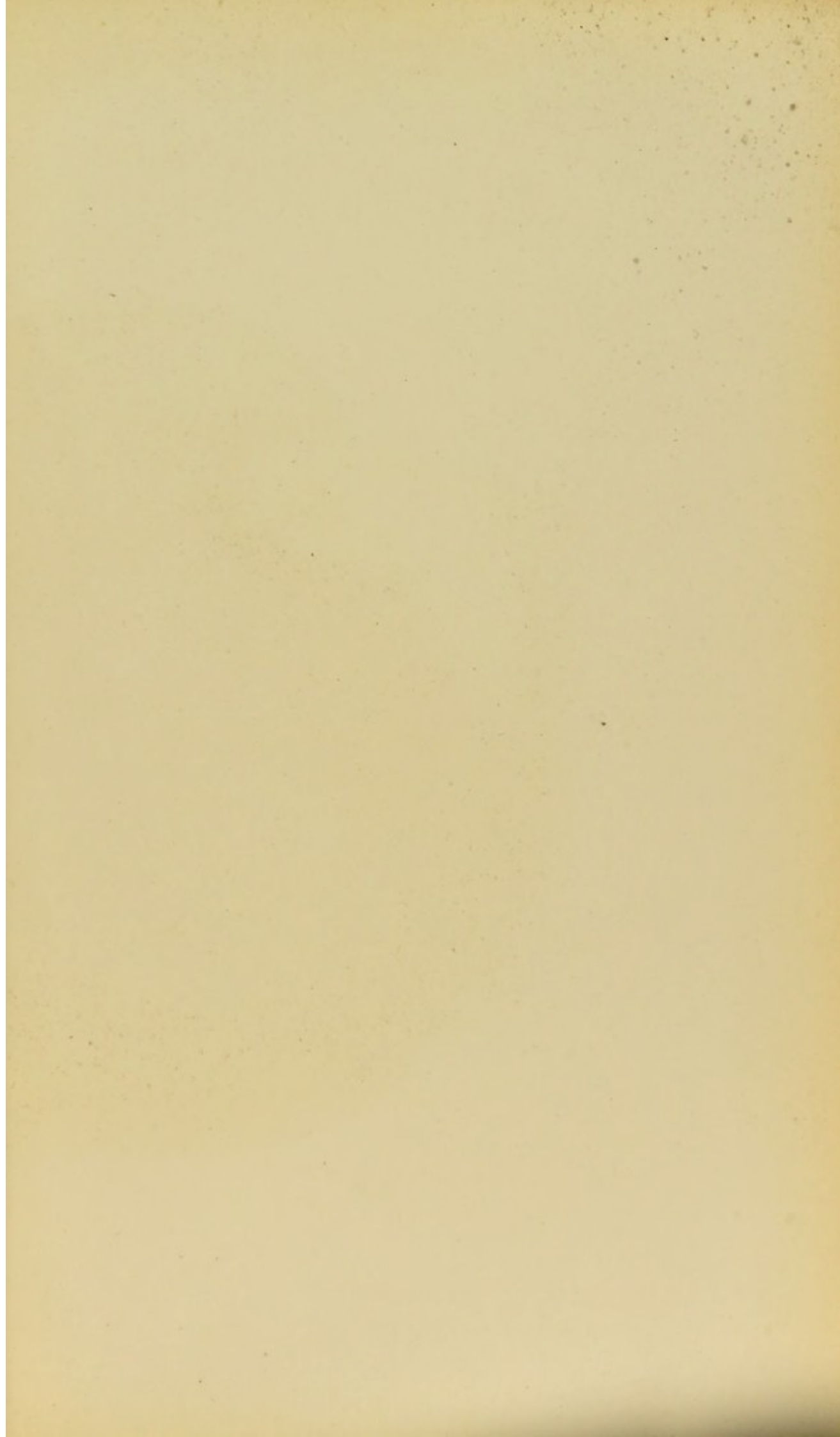
CASE 78. Page 261.

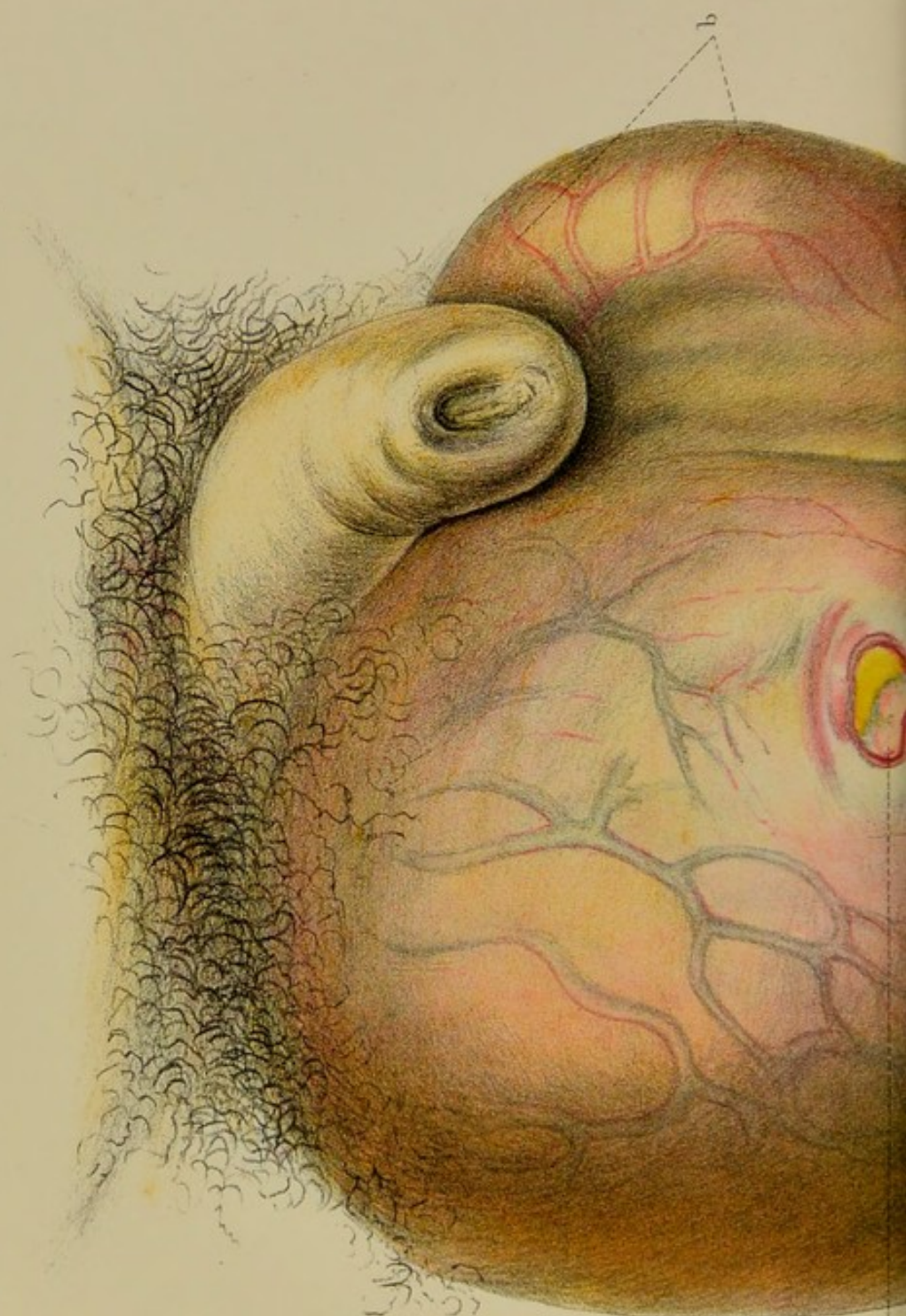
a. A small oval sharply-defined ulcer of the integument, exposing the surface of the tumour.

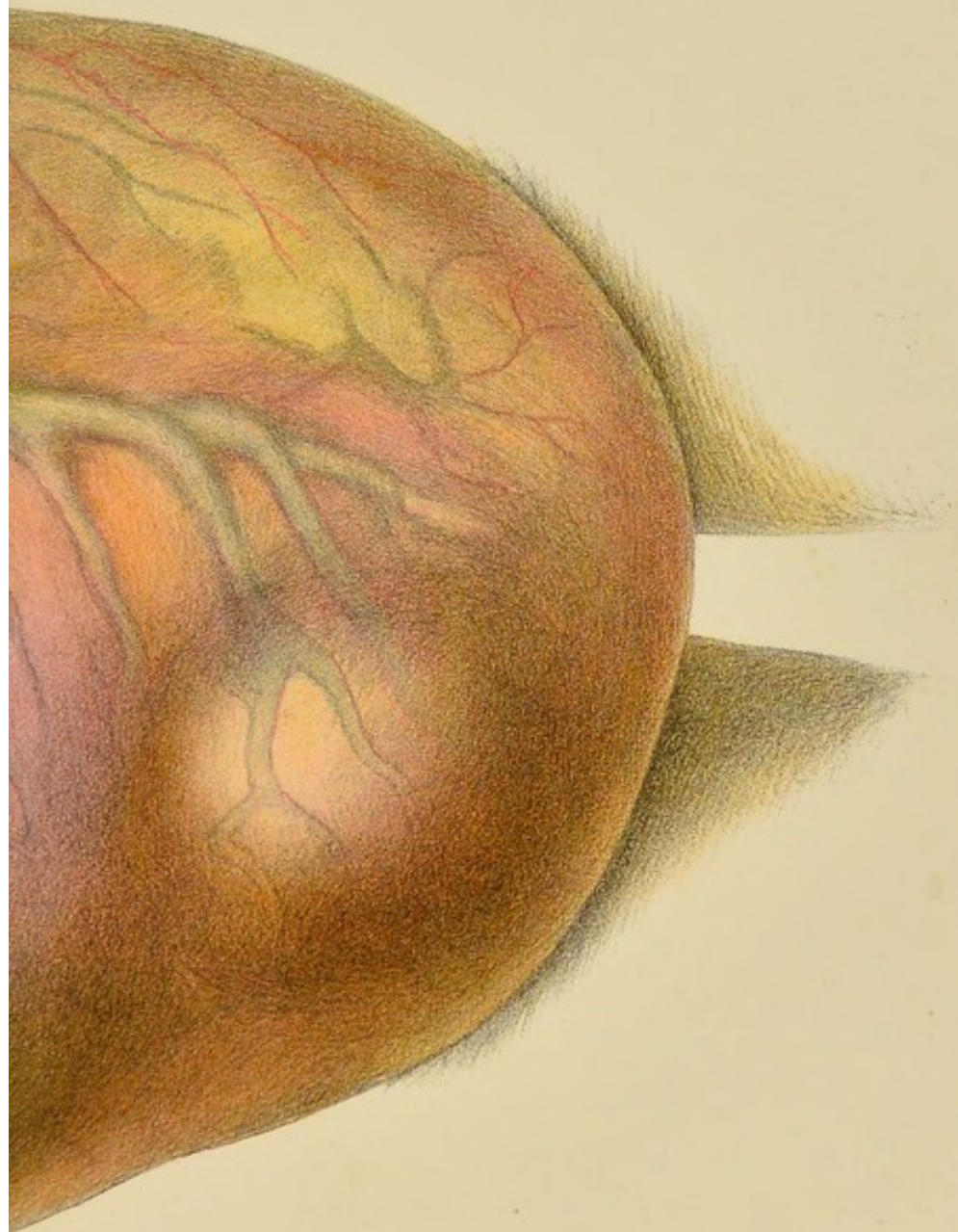
b. Prominence caused by the left, unaffected testicle.

Many enlarged veins ramify beneath the skin, which is unnaturally vascular.

FAIRLAND, *del.*







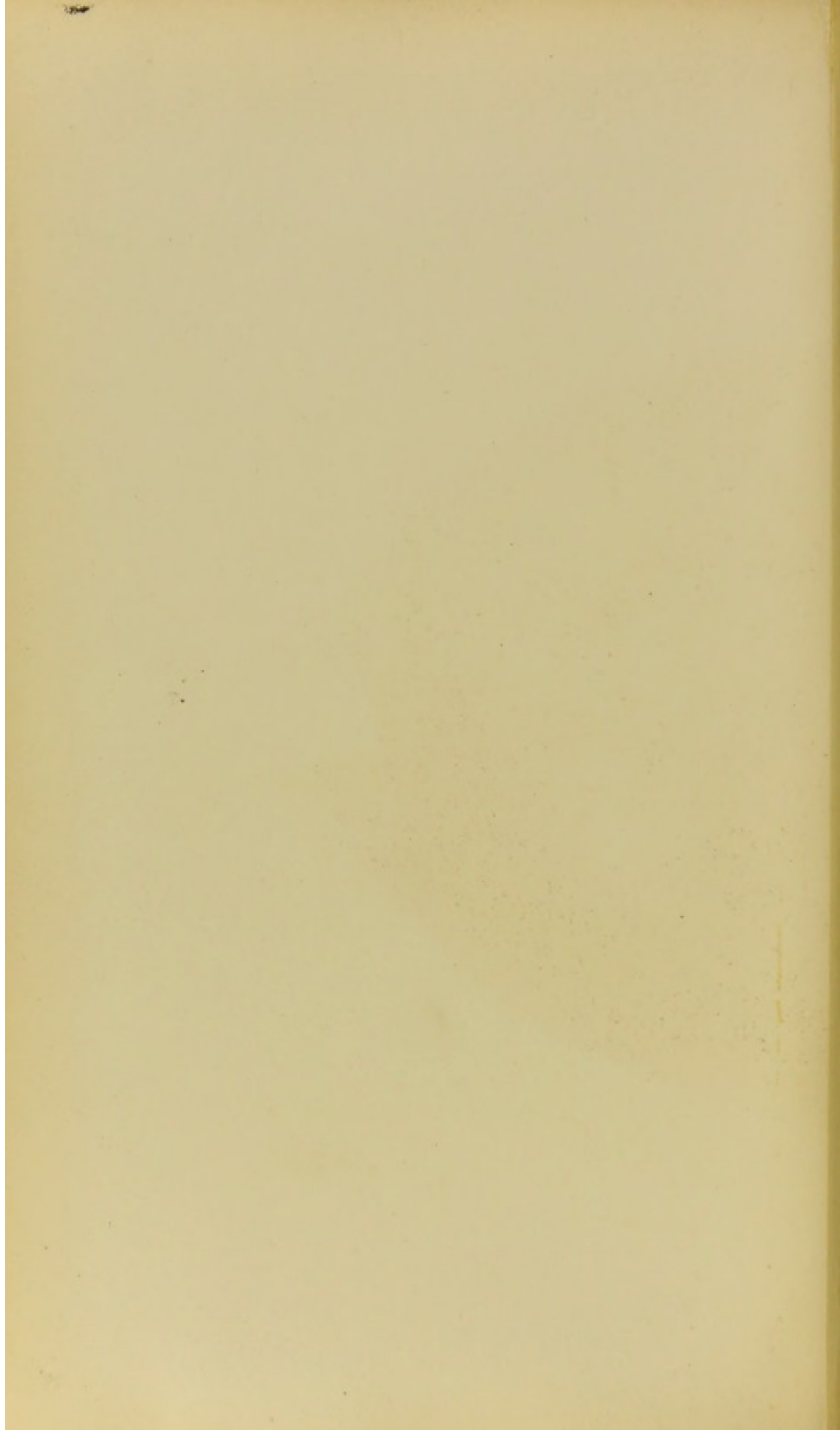


PLATE XXXVII.

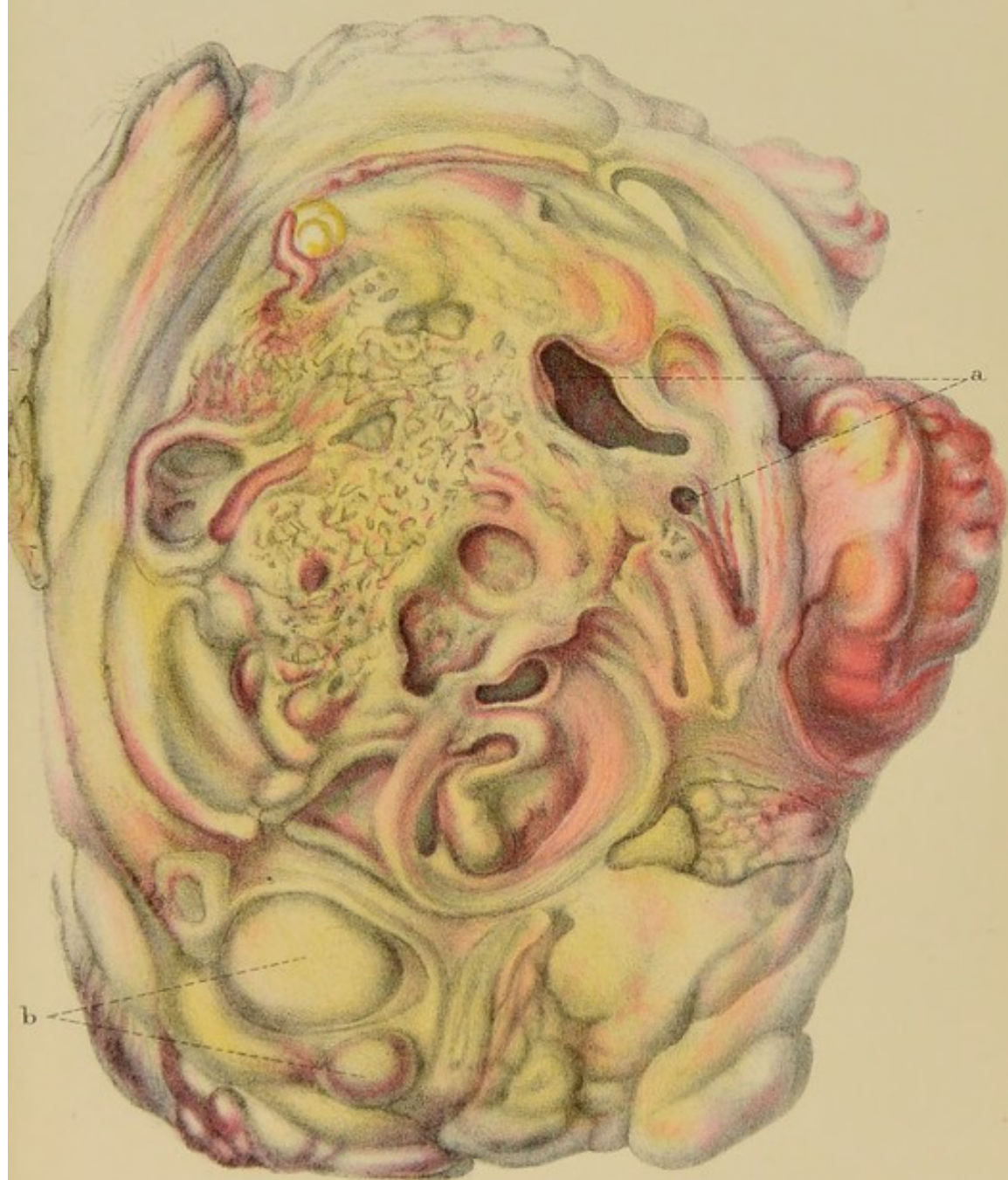
CYSTIC TUMOUR OF THE TESTICLE.

CASE 78. Page 262.

A vertical section of the tumour shown in the preceding plate.

- a a.* Cysts opened in the section.
- b b.* The projecting surfaces of unopened cysts.
- c.* Piece of the scrotum removed with the tumour.

FAIRLAND, *del.*



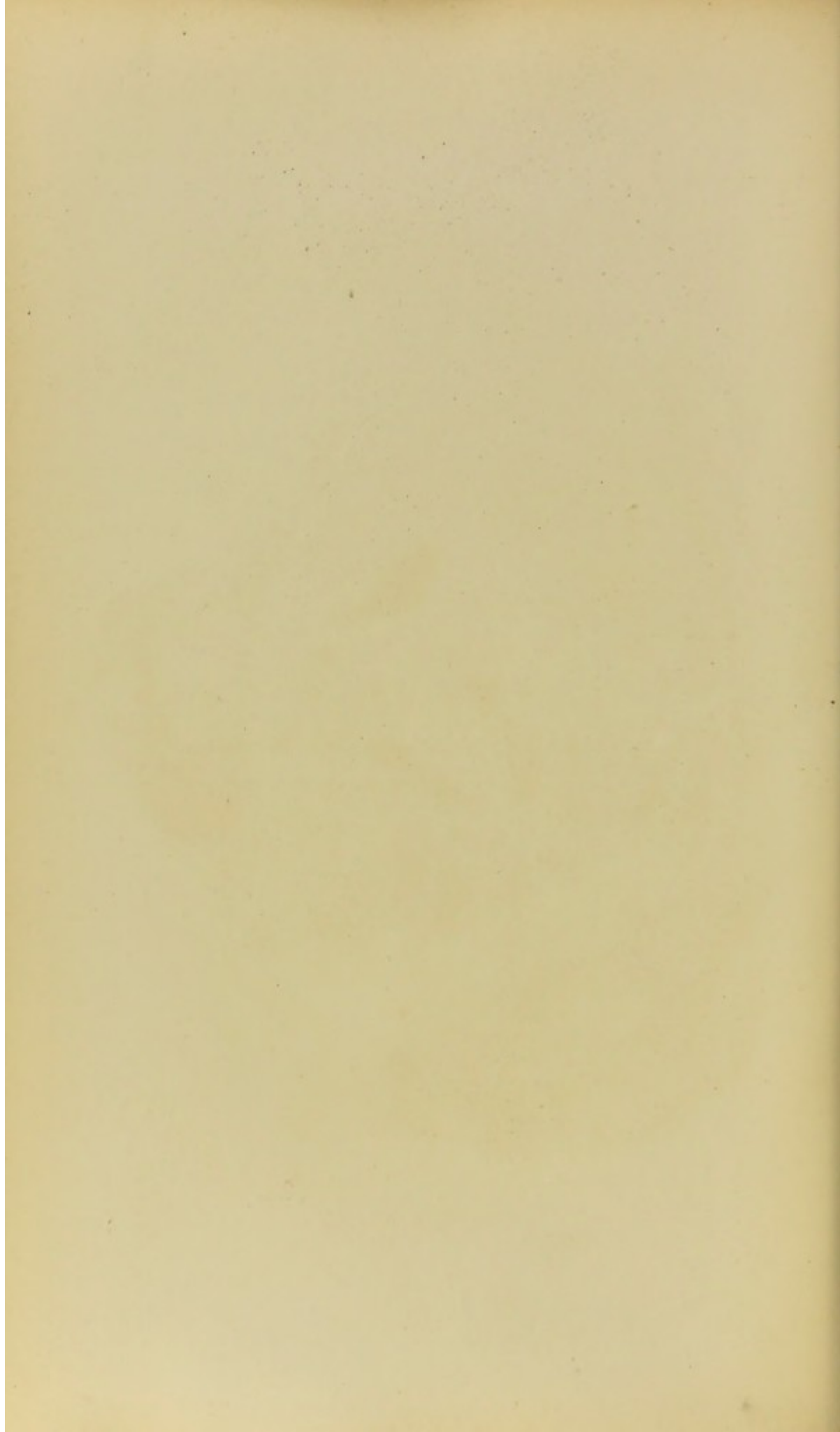


PLATE XXXVIII.

ENCEPHALOID DISEASE OF THE TESTICLE.

CASE 77. Page 259.

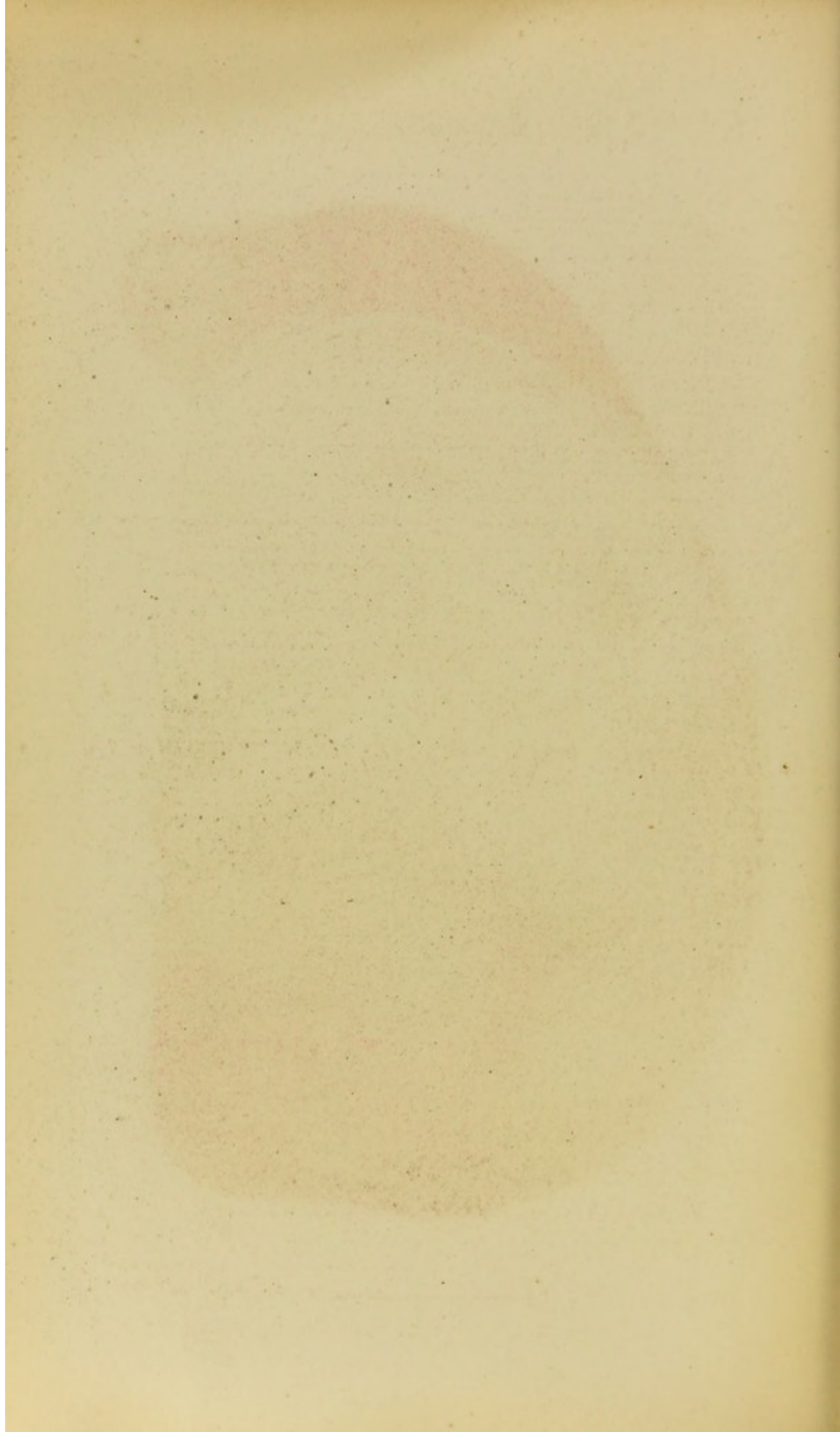
The figure represents one-half of the bisected tumour.

The morbid growth is pale, soft, and in many parts the seat of hæmorrhagic extravasations.

- a.* Portion of the sac of the tunica vaginalis, filled with blood.
- b.* Spermatic cord, enlarged.

FAIRLAND, *del.*





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