Four congenital tumors of the head and spine, all submitted to operation : I. Meningocele. II. Cervical spina bifida. III. Sacral spina bifida. IV. A tumor of the post-anal gut, in connection with a dermoid cyst : clinical lecture delivered at the Jefferson Medical College Hospital / by W.W. Keen.

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Clinical Lecture delivered at the Jefferson Medical College Hospital.

By W. W. KEEN, M.D.,

Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College.

[Reprinted from International Clinics, October, 1891.]

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CLINICAL LECTURE DELIVERED AT THE JEFFERSON MEDICAL COLLEGE HOSPITAL.[1]

BY W. W. KEEN, M.D.,

Professor of the Principles of Surgery in the Jefferson Medical College.

GENTLEMEN,—I shall have the pleasure of considering with you to-day four tumors which illustrate remarkably well some more or less allied forms of imperfect development, and some recent discoveries in embryology. The first three are associated with imperfect development of the posterior or neural arches of the vertebræ, and the fourth is a double anomaly, illustrating a very rare form of tumor arising from an obsolete canal, with another from developmental inversion of the skin.

The first and third I shall operate on before you; the second was a case in my private practice operated on in this hospital, and the fourth was operated on at St. Agnes's Hospital.

The first is a case of meningocele, in which the posterior arch of the occipital vertebra (for you know this bone is a vertebra) is imperfect and has an aperture through which the meninges of the brain and possibly some of the brain-tissue itself is protruding. The second and third cases are spinæ bifidæ, in which again the posterior or neural arches have failed to unite, and hence there has been a protrusion of the membranes of the spinal cord together with some nerve-filaments in one case. These three are all closely allied. The fourth is a tumor situated in front of and not behind the coccyx, and while in being congenital and in its position at the end of the vertebral column it is allied to the other tumors, yet its origin is wholly different. Adjacent to it is developed a dermoid cyst.

All of these tumors have one point in common: that they are congenital and the result of faulty development in intra-uterine life, and

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[1] The last case was actually operated on after the clinical lecture, but is included to complete the series.

in addition to this they are tumors which have only lately been attacked in an operative way with success.

CASE I.—MENINGOCELE; REMOVAL BY EXCISION; CURE.

These tumors are very rare. Ross states that a prominent London obstetrician in twenty-four years of practice never saw a case, Gibbs in five thousand births saw only one, and Winckel in twelve thousand saw only three. Of this kind of tumor there are three forms. First, a meningocele, a tumor formed by the meninges of the brain alone, and containing fluid which is extra-cerebral and not from the ventricles. It is the rarest form, and is thought by some to be a retrograde change from the next form. The second form is an encephalocele, a tumor in which there is protrusion through the bony aperture of brain-substance as well as the meninges. The third form, and unfortunately the most frequent and the most fatal, is hydrencephalocele, in which both the meninges and brain-substance protrude in a mass, usually of large size, and the protruding cerebral tissues are distended with the cerebro-spinal fluid of the ventricles, a sort of extra-cranial, internal hydrocephalus. These tumors most commonly occupy the middle line, and are especially frequent in the region of the forehead and occiput. Thus, Houel has collected ninety-three cases, in which sixty-three were occipital, sixteen fronto-nasal, and the remaining nine at the junction of the cranial bones at the sides and base of the skull. The most probable view of their origin is that they arise from intra-uterine hydrocephalus. They give rise not uncommonly to errors of diagnosis, having been mistaken for vascular growths, sebaceous cysts, herniæ of the superior longitudinal sinus, abscesses, etc. You can readily see that, if by an error of diagnosis they are operated on without a knowledge of what the operator will probably encounter, he may find himself in a most awkward position and be quite at a loss what to do.

A few points will probably enable you to diagnosticate them more accurately. They are always congenital, as a rule median, and most frequent in the occipital or fronto-nasal regions. More commonly they differ in shape from our present case, being more or less rounded. Not uncommonly, as in this case, the defect in the skull can be felt, and very frequently the pulsation of the brain is perceptible. If this be the case, violent expiratory efforts, such as crying, sneezing, laughing, etc., will produce greater tenseness of the tumor. A meningocele and a hydrencephalocele are generally translucent; whereas an encephalocele, having more dense brain-substance in it, is usually opaque, and is

more apt to have a wide base, instead of being pedunculated as the other forms not uncommonly are.

The prognosis is very grave. Most such children, especially if the case be severe, die at or soon after birth. Should the child live, the tumor generally grows and finally bursts, an accident which usually causes speedy death. In a few cases the aperture will gradually close, just as the normal fontanelle closes, the communication with the brain is finally cut off, and spontaneous recovery may ensue.

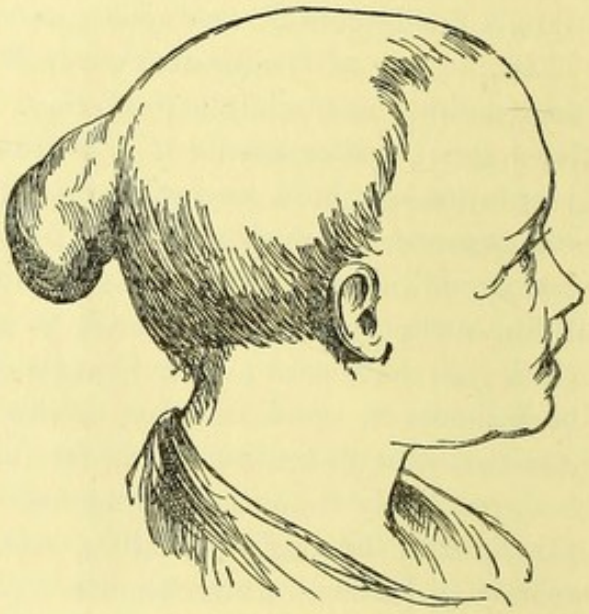
In the way of treatment often little can be done, and in the graver cases nothing save simple protection. Where the tumor is comparatively small, and especially if it is growing and threatens rupture, the great improvement in cerebral surgery during the last few years should lead us to do as I propose to do in this case,—namely, to operate with a view to radical cure. Of course in such a case as this you would use all the ordinary precautions, such as shaving, prior disinfection, etc., which you have seen me use in cases of trephining and operations on the brain itself. Not knowing in this case, also, whether certainly we have to deal with brain-tissue in the interior of the tumor, or whether, as seems likely from the incompressibility of the tumor, its want of translucence, the slight pulsation, and the slight influence of crying, we have to deal with a retrograde encephalocele with no communication, or only a slight one, with the brain, I shall be ready either simply to suture the parts together or excise any protruding cerebral tissue that I may find. I propose to attempt the closure of the bony opening with a piece of decalcified ox-bone, if, in the course of the operation, I find it a suitable procedure.

The patient is a boy three years of age, sent to the Jefferson College Hospital by Dr. Coplin, March 31, 1891. He is one of four children, all of whom are otherwise healthy. At birth he had a lump on the posterior aspect of the skull about as large as a hickory-nut. Now you will observe that it has grown very much larger, measuring one and three-quarter inches across the base and protruding one and three-quarter inches from the skull. (See Fig. 1.) At first it was very painful, but now it can be handled with impunity. It is situated at the posterior fontanelle, which is open, and it moves with every beat of the heart. The child's intelligence is good.

I shall now proceed to do an exploratory operation with a view to the removal of this tumor, by an elliptical incision near the base of the tumor. I have dissected back the flaps until I reach the pedicle, which, to my gratification, I find is only about as large as my little finger, though I find the opening in the skull to be one and one-quar-

ter inches across. I do not find any cerebral tissue in the pedicle, so far as sight and touch indicate. I shall therefore ligate it in three sections and close the wound as quickly as possible. Having ligated it and excised the tumor, I next insert a piece of decalcified ox-bone with a view to the possible occlusion of the gap in the bone, though I confess I have not much hope of success in this, as fortunately the edges of the opening in the skull have not been exposed. It will, however, do no harm to make the attempt. Next the flaps are sewn together at very close intervals. I have used no drainage. You observe that the pedicle of the tumor is quite spongy, and that some drops of apparently cerebro-spinal fluid oozed from it. Although I have no fear of the escape of the fluid, any more than in the last case I operated on before you a little while ago, yet at the same time I want to arrest the escape of the fluid if possible. The most careful antiseptic dressings will be applied.

FIG. 1.



CASE I.—Meningocele.

After-History of the Case.—For four days after the operation the wound was dressed daily on account of the abundant oozing of cerebro-spinal fluid. It was then painted with aristol collodion, which arrested the flow except at the posterior part of the wound. Two days later a drop or two of pus exuded from the posterior part of the wound.

On the eighth day the child had an attack of earache, and his temperature rose to 100.2° F., but quickly subsided on syringing out the ear. On the 13th day, when he had a little intestinal disturbance, the temperature rose to 99.2° and a very small amount of pus was discharged from the lower part of the wound. At the end of three weeks, as the child was a little restless, I gave him some ether and re-opened the wound. I found only a small fragment of the decalcified bone remaining. The stump which had been ligated was a yellowish, cheesy mass, which was well scraped and the wound swabbed out with pure carbolic acid. There was no rise of temperature after

the operation, and the restlessness, which had been quite marked for several days, entirely disappeared. The wound was packed with gauze and allowed to granulate.

The child left the hospital on the twenty-eighth day, and was then cared for by Dr. Coplin until entire healing took place, at the end of eight weeks after the operation.

Dr. Coplin carefully examined the tumor and reported as follows: "The skin covering the tumor was thin and highly elastic near the pedicle, while beneath it was a thin layer of fat. The integument covering the posterior distal extremity of the growth was thickened and firmly attached to the body of the tissues below without the intervention of any fat whatever. The base and body of the cyst were covered with a moderately thick coat of hair, while the posterior surface was smooth, from the constant rubbing, as shown by the presence of abundance of hair-follicles on section. Immediately beneath the skin there was a layer of white, fibrous tissue, composed apparently of organized embryonic or inflammatory tissue, some points showing a recent, small round-celled exudate. This fibrous layer contained nerve-fibres in small numbers. In the centre of the growth (or cyst) was a small cavity, rod-shaped in outline, about three-quarters of an inch in length and one-quarter of an inch in its transverse diameter. This was filled with a clear, serous fluid of about the consistency of egg albumen, possibly not quite so dense, and existing evidently under pressure, for when opened it poured out very much as does a tense hygroma. The wall of this cavity was lined by a layer of flattened connective-tissue cells."

Evidently the case was one of retrograde meningocele in which the communication with the brain had closed and yet the tumor was growing in size.

CASE II.—CERVICAL SPINA BIFIDA; REMOVAL; OPERATIVE RECOVERY; DEATH FROM ENTERITIS.

The case I shall now relate to you is allied to the next one I shall operate on, as well as to the preceding case. She was a hearty, double-chinned baby, four months of age. When born a small lump was noticed on the back of the neck. This grew, slowly at first, but later quite rapidly. She was admitted as a private patient to the Jefferson Hospital, April 15, 1890. The tumor was nine inches in circumference, the pedicle being slightly smaller than the body, and corresponded to the three or four middle cervical vertebræ. (See Fig. 2.) It was translucent, and by transmitted light the cord was evidently

absent, and there was no evidence of nerve-roots. It became quite tense when the child cried, and pressure on the tumor and on the anterior fontanelle reciprocally was felt at both points.

As there was danger of rupture, operation was recommended and readily assented to, and I operated on April 17, 1890. A vertical elliptical incision was made, the sides of the ellipse corresponding to the line where the thin skin over the centre of the tumor changed to the thick skin around the base. Care was taken not to open the sac. With considerable difficulty the flaps were dissected away, the strong adhesions to the sac being cut through until the tumor was entirely loose excepting its pedicle. Long silk sutures were now passed through the lateral flaps of skin. These were so long that they could lie loosely, the upper six in loops above the base and the lower six below it. A silk ligature was next tied tightly around the neck of the sac, and the entire sac rapidly cut away just posterior to the ligature. The sutures in the skin were now tied as rapidly as possible, and a sublimate dressing applied, with a binder's board splint at the back of the head and neck to secure rest as far as possible.

FIG. 2.

CASE II.—Cervical spina bifida.

April 18, *First Day.*—The wound was dressed and looked excellently. The temperature rose at four P.M. to 104.4°. It was now learned for the first time that the child's bowels had been seriously disturbed for two days before the operation. The bowels were opened frequently, and the rise of temperature was probably due to this. The child was placed upon peptonized milk in addition to what it took from the mother, and small doses of pepsin were given each time it nursed. In addition to this astringents and minute doses of opium were given.

April 21, *Fourth Day.*—The temperature continued high until last evening, when it fell to 100.4°. The wound looked well, but a little cerebro-spinal fluid escaped.

April 22, *Fifth Day.*—The temperature fell to-day to the normal. A sudden gush of fluid took place in the afternoon, wetting the dressing, night-dress, and pillow. This was accompanied with dilatation of

the pupils and some contraction and twitching of the fingers, especially the thumb.

April 23, *Sixth Day.*—The stitches had torn out and the wound gaped open, but looked very well, there being no suppuration. Six stitches were introduced, uniting the edges very well. Renewed disturbance of the bowels took place, however, and the temperature rose to 102.4°.

May 18.—The stitches gradually cut through again, leaving the wound gaping about half an inch at its lowest part. The disturbance of the bowels continued up to the tenth day, with the temperature fluctuating between 101° and 104°. The dressing had to be changed daily, and sometimes twice a day, on account of the free escape of cerebro-spinal fluid. This, however, seemed to do no harm. About the 15th day the temperature fell to 100°, and continued so for ten days. By this time the wound had entirely closed.

On the twenty-eighth day the temperature again rose to 104.4° with renewed disturbance of the bowels, and the child died, exhausted, on the thirty-first day after the operation, the wound having been healed for a week. No post-mortem could be obtained. Examination of the sac showed that it consisted simply of membranes without any nerve-roots within it.

Had I been informed of the disturbed condition of the bowels I should have postponed the operation, but I was not made aware of it until the diarrhœa after the operation called attention to it. In this respect it resembles the next case, in which there was also an undisclosed digestive disturbance. I cannot but think that the lives of both children were sacrificed by the unintentional concealment of this important fact. Both of them were practically well from the operation and died as a result of the digestive disturbance. The continued and free escape of cerebro-spinal fluid is worthy of note. The number of operations on the brain has of late been very large, and in a great many the escape of cerebro-spinal fluid has been very free, as also in numerous cases of operations on the spine. Formerly such an escape was deemed to be either dangerous or, possibly, necessarily fatal; but a larger experience has shown that unless the loss has been so sudden as to cause convulsions there is no especial danger connected with the free escape of cerebro-spinal fluid. Had this child not died from the enteritis, there is every reason to believe that she would have recovered from the defect; not, of course, that the bony defect would have been made good, but the removal of the thin skin over the central portion of the tumor and the thorough union of the thick skin around the base

over the defect would have protected her, I believe, from all harm or probable accident, and she might have lived to an ordinary adult age.

The treatment of such cases by iodide of potassium and iodine dissolved in glycerin was introduced and has been successfully employed by Morton in England and others elsewhere with very fair results; but it does not seem to me to be so rational a form of treatment as that by operation, and it also does not seem to be without danger. By our modern surgical methods we can cope with cerebral and spinal defects so successfully that I believe the knife will replace attempts at medication, saving in such cases as may be unsuited to operative interference.

CASE III.—SACRAL SPINA BIFIDA; EXCISION; OPERATIVE RECOVERY; DEATH FROM ENTERITIS.

The region of the sacrum and coccyx is apparently a favorite one for the development of congenital tumors. They were all formerly classed under the name of "sacro-coccygeal tumors," and, curiously enough, are developed much more frequently in girls than in boys, for Moltke has collected fifty-eight cases, forty-four being in girls and but fourteen in boys. Recent investigations have thrown a great deal of light on their pathology, and they may now be divided into three classes.

First, a more or less complete development of a supernumerary fœtus. This may consist of the most rudimentary fœtal development, and from this pass through all grades up to an almost complete attached fœtus. Sometimes there will be but the stump of a single member, such as a leg or an arm, and sometimes an almost complete second being.

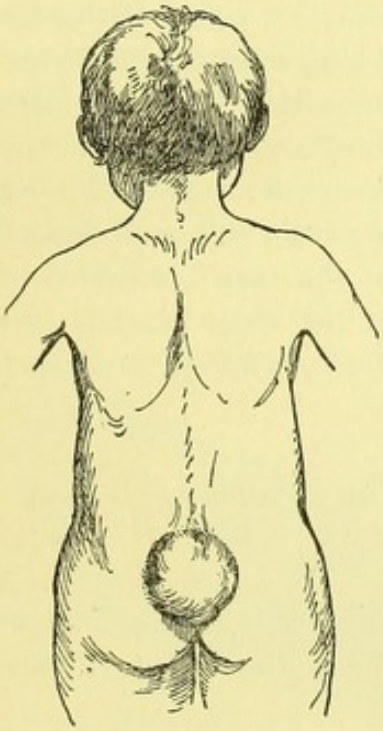
Second, a spina bifida proper, of which our present case is probably an example.

Third, directly at the end of the spinal column, in the region of the coccyx, a tumor may develop in either one of two positions. If posterior to the end of the spinal column it is most apt to be a spina bifida and should be placed in the second class, and not, as it often is, among the teratomata or congenital monstrosities, such as the first class or attached fœtuses are. If anterior to the coccyx they form a still more curious group, which were formerly thought to be a cystic degeneration of Luschka's gland. Of this our fourth case is an excellent example, with a curious added complication, of which more anon.

The present case is a little girl of six years. Her mother is living, but her father died of phthisis. At birth there was a small tumor over the middle of the sacrum. This has gradually grown larger, but

of late with marked rapidity, so that now it measures both vertically and transversely five inches, and is about two inches above the level of the skin. (See Fig. 3.) It is neither tender nor painful. By palpation I can feel obscurely an irregularity, which I judge to be of the bone, although most of the mass seems to be rather dense fibro-fatty tissue, which makes it difficult to be certain of the condition of the spine. There have been no phenomena referred to the legs. Examination by the rectum shows that the anterior surface of the sacrum is normal. The child has entire inability to control the bladder, and has also a beginning talipes equino-varus of the right foot. Not uncommonly you will find such deformities as club-foot, cleft palate, etc., combined with spina bifida. In other words, the same obscure cause which has led to the defective development of the spine has led to defective development elsewhere.

FIG. 3.



CASE III.—Sacral spina bifida.

Inasmuch as this tumor is growing and threatens the child's comfort, and probably hereafter its life, I have determined to operate in your presence immediately by a small elliptical incision on each side of the middle line, vertically. I next dissect back the flaps from the fibro-fatty matter. I must now separate this mass laterally from the sacrum, step by step, and I soon come upon a funnel-shaped pedicle one and one-fourth inches long and an inch and a half wide, which evidently consists of the membranes of the spinal cord protruding through the opening in the back of the sacrum, as I had suspected. This funnel-like pedicle is in the middle line, nearly circular, and with quite thick walls. I find that the left side of the sacrum is elevated an inch above, that is posterior to the right side. Having now dissected the tumor entirely loose, excepting the pedicle, I make a small opening in this, when, as you see, the cerebro-spinal fluid begins to escape. Beginning at this small opening I cut loose the entire tumor, leaving enough of the membrane at each side to be approximated by sutures. In doing this a number of nerve-filaments are seen attached to the walls of the sac, each one of which is cut through. The edges of the membranes are now approximated with catgut and the skin with silk,

a drainage-tube having been introduced just underneath the flaps of skin. The bleeding has been but moderate, no ligatures being needed. I next apply a sublimate dressing. In consequence especially of the child's inability to control the bladder, I shall direct that she lie as much as possible on her face, and I shall also give twenty drops of paregoric three times a day for the first three days to prevent any infection by the fæces.

After History.—In ten days the wound was almost well. The drainage-tube was removed at the end of forty-eight hours. In spite of the greatest care, slight infection took place,—curiously enough, at the upper part of the wound,—with the discharge of a small amount of pus, but the wound was granulating and doing admirably. On the tenth day a sudden attack of enteritis, to which I now learned for the first time that she had been quite subject, set in, with twelve movements of the bowels and a rise of temperature to 102.6°. Two days later the temperature fell to subnormal, and fluctuated between 97° and 98° until her death, sixteen days after the operation. The diarrhœa and vomiting were constant, and the child wasted away and died of exhaustion. The wound in the membranes of the cord had healed by first intention, as well as the lower part of the outer wound. No spinal symptoms whatever were developed. Unfortunately, no autopsy could be obtained.

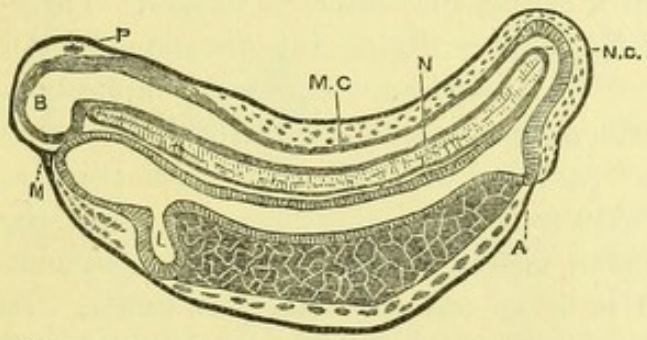
CASE IV.—A DOUBLE COCCYGEAL TUMOR, CONSISTING OF A TUMOR OF THE POST-ANAL GUT AND A DERMOID CYST; OPERATION; RECOVERY.

This case is so curious and so allied to those I have already brought before you that I propose to relate it to you in connection with the others, although it was operated on elsewhere.

In considering the last case, I mentioned to you that the coccygeal tumors which were posterior to the coccyx were really cases of spina bifida. Those which lie anterior to the coccyx belong to a totally different class, and their history and origin have only recently been well ascertained. The variety of congenital tumors known as "teratomata" usually arise in regions where the three original blastodermic layers are brought into communication with each other at some time in the development of the ovum, but this communication is only temporary. This temporary union is usually effected by canals to which Bland Sutton has given the name of "obsolete canals,"—that is to say, "canals which in the ancestors of mammals were functional, but which reappear in existing forms in obedience to the great law of heredity so ably

enunciated by Darwin." Examples of these are found in connection with the canal from the infundibulum to the mouth, the branchial clefts, the various genital tubes and ducts, and finally the remarkable canal which connects the central canal of the spinal cord with the alimentary canal. This is known as the "neurenteric canal or passage." In 1871, Kowalevsky drew attention to this curious temporary canal or passage. It runs from the central canal of the spinal cord around the posterior or caudal end of the notochord, and passes into the section of the alimentary canal termed the post-anal gut, because it lies posterior to the anus. The communication, however, is usually soon obliterated. Previous to this discovery the alimentary canal was thought to terminate in the anus, but Kowalevsky showed that in the embryos of amphioxus, ascidians, plagiostomi, and teleostei it is prolonged for some distance beyond this point into the tail. Later, the anal involution of the skin appears, and the gut posterior to the anus usually atrophies. The relation of the neurenteric passage to the central canal of the cord and the post-anal gut is shown in Fig. 4, copied from Goette's figure of bombinator igneus. At first it was thought that this singular arrangement was peculiar to the icthyopsida, but later researches go to show that it is an extremely generalized condition. Since attention has been called to the matter, a post-anal gut has been found in animals, from the amphioxus up to and including man (Sutton).

FIG. 4.



LONGITUDINAL SECTION OF AN EMBRYO OF BOMBINATOR IGNEUS.—*B*, brain; *P*, pineal gland; *M.C*, spinal canal; *N*, notochord; *M*, mouth; *L*, liver; *A*, anus; *N.C*, neurenteric canal. (After Goette.)

The post-anal gut, it will be observed, therefore, normally exists, though really atrophied, and the neurenteric passage is an obsolete canal, which is cut off early in intra-uterine life from the central canal of the spinal cord, just as the tunica vaginalis of the testis is cut off from the peritoneal cavity. But under exceptional circumstances the mucous membrane and glands which line this post-anal gut and neurenteric passage persist and may develop into a tumor consisting of multiple cysts. These have been long known to surgeons, but prior to the discovery of the post-anal gut and the neurenteric passage they were thought to be due to a cystic development of Luschka's gland, or

the "coccygeal glomerulus." This is a small lobulated body about two millimetres in diameter and attached to the coccyx by a pedicle formed by the middle coccygeal artery and a sympathetic-nerve filament.

The origin of such a tumor from obliterated gut lined with intestinal mucous membrane explains to you how you can find in such a cystic tumor mucous membrane, follicles of Lieberkühn with non-striated muscular tissue, and solitary follicles. These solitary follicles are very abundant near the body openings, as, for instance, in the urethra and the mucous membrane of the nose and the anus. In some of these tumors even "gut has been found in them, agreeing in every respect with normally-developed intestine." These so-called teratomata should, therefore, be regarded no longer as such, but should be classed with the cystomata.[1]

You will observe that these tumors lie anterior to the coccyx, as in our present case. This is readily determined by rectal examination. Moreover, in this case the pressure on the coccyx had so far displaced this bone that it pointed distinctly backward, and had become a serious annoyance to the patient, rendering her unable to sit with comfort. I therefore excised this bone, and then proceeded to deal with the tumor itself as the case required. The tumor was not growing, was not malignant, and was not in itself a serious discomfort or danger. Therefore, as its removal seemed unnecessary during the operation, I let it alone. But during the operation I found an unexpected complication. You are familiar with the little dimple which always exists just behind the anus and is called the "post-anal dimple." This is a point at which an involution of the skin sometimes takes place and gives rise to a cyst in which the sebaceous matter of the inverted skin accumulates, and is often supposed to be an ordinary sebaceous tumor. Its real origin is, however, as stated above. I have operated on three of these small tumors in the past twenty years by simple incision, scraping, disinfection, and packing. Sometimes, as in this case, however, there are developed not only the sebaceous matter of the skin glands, but also hair and rudimentary teeth; all of them, you observe, cutaneous structures, making it a true "dermoid" cyst. In this case the dermoid cyst was as large as a small orange, but, as it lay wholly within the pelvis between the sacrum and the rectum, alongside of the external coccygeal tumor proper, its existence was not suspected. The small

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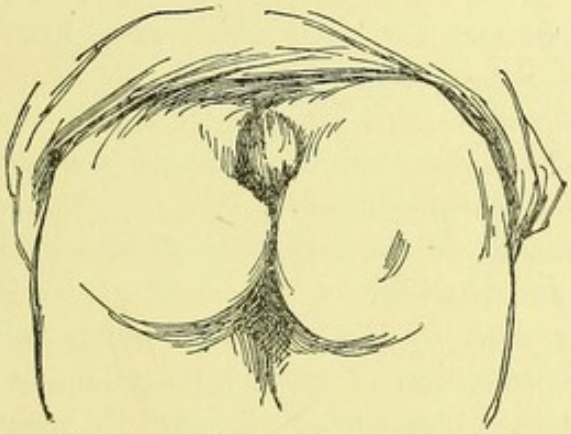
[1] M. Verneuil (Rev. de Chir., May, 1891, p. 401) relates a case of a fistula in the sacral region, which communicated with the cerebro-spinal canal, which may have had its origin in the neurenteric passage.

fistula that existed, which really opened into it, was thought to be an outlet of the visible tumor. It was filled with sebaceous matter, a considerable number of short, fine hairs, and curious flakes of carbonate of lime, exactly resembling fragments of egg-shell. They were probably an abortive attempt at the formation of teeth.

To proceed, then, with the history of the case: Miss C. F., aged thirty-one, was admitted to St. Agnes's Hospital, May 19, 1891, complaining of a small tumor in the region of the coccyx. She states that she has had this tumor from her birth, that it has grown very little, if any, but that it has gathered and burst several times, the last opening not yet having healed, and that she cannot sit with comfort. As her occupation is that of a carpet-sewer, it is a serious bar to earning her living. On examination I find a tumor, three inches long and two inches wide, situated directly anterior to the coccyx. It forms a projection of about an inch and a half, and presses the coccyx so far back as to interfere with sitting. The coccyx is both long and movable. Examination by the rectum shows that the tumor rests on the bowel; but does not communicate with it, so far as can be judged by touch. There is a small sinus on the right buttock an inch away from the tumor, which is discharging a little watery fluid. The edges of it are slightly red and inflamed. There are three other scars of former discharges, now healed.

FIG. 5.



CASE IV.—Tumor of post-anal gut with a dermoid cyst.

Operation, May 23, 1891.—An incision was made over the coccyx and the coccyx was excised, together with half an inch of the end of the sacrum, which was also displaced somewhat backward. While removing the coccyx a dermoid cyst anterior to it was opened and explored by the finger. It was found to be in contact inferiorly with the coccygeal tumor proper, which showed externally, the dermoid lying entirely within the pelvis and not being visible from the exterior. By rectal touch it could not be distinguished from the coccygeal tumor, the two tumors seeming to the touch to be one. The dermoid was about two and a half by three inches. Its deeper wall was immediately in contact with the rectum. Its contents consisted of sebaceous matter,

without the ordinary sour odor of such material, quite a number of hairs, one to two inches in length, and on washing out the cavity with a dilute solution of bichloride some twenty or thirty small fragments that resembled bits of egg-shell were washed out. These were distinctly gritty to the touch, but had not been perceived at all in a careful examination of the interior of the tumor. They are probably imperfect dentine.

During the manipulation of the dermoid tolerably free hemorrhage took place from the interior, which was checked by hot water, the application of which shrunk up the sac so that it was not over an inch in diameter. The incision was now prolonged into the coccygeal tumor to determine positively its nature. It was found to consist of a number of small cysts, such as are typical of such tumors, but, as it was so much smaller than had at first been supposed, and as it had not grown since her birth, and was not in itself a serious inconvenience, I decided to let it alone. Its removal could be accomplished at any time if it should grow. The dermoid cyst was now loosely packed with gauze and the wound closed and dressed as usual.

The temperature never rose above 99°, but the wound has not healed; a small sinus which runs into the shrunken dermoid still persists and will probably require another operation.

Dr. Coplin reports on the contents of the dermoid as follows: "It contained fat, cholesterin, hair, and lime salts. The small egg-shell-like fragments were closely examined by Drs. Thornton and myself, and were found to consist of the carbonates of sodium, potassium, and calcium, and some organic matter. One surface of these fragments was covered or lined by a thin membrane, microscopically identical with the membrane lining an egg-shell. No histological difference was found, but when both were washed in a salt solution, then in water, and then calcined, the egg-shell calcined white, while the fragments turned black and were slow to crumble."