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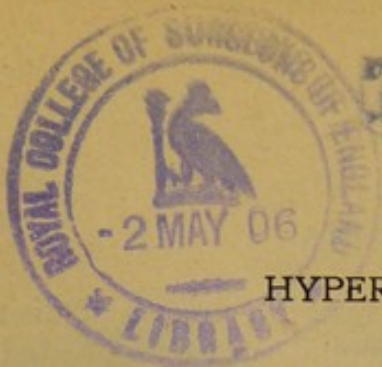
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F. G. Bushnell

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HYPERNEPHROMA.

By F. G. BUSHNELL, M.D.,

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Anatomical Description of Tumor.—The growth retains the general shape of the kidney, and raises the surface in places to about one centimetre. It is composed of discrete and confluent yellow nodules and is separated from the kidney substance by a capsule. This is very thin where the growth bulges in nodules of varying size externally, and internally where it distends the pelvis of the kidney. It is situated in the upper half of kidney, extending from the upper pole to the hilum, occupying the pyramids and cortex. The pyramids are distinct in remainder of kidney. A small portion of kidney substance only is present at the pole. The length of the kidney is 15.5 c.m., its breadth 9.0 c.m., and its depth 5.5 c.m. Its maximum girth is 21.5 c.m. Its capsule is slightly thickened, but strips easily. Its weight is 14 ozs. The growth measures 10 x 9 c.m. A layer of kidney substance surrounds the growth, but is less than 1 m.m. thick over superficies. On section it has a variegated or foliated appearance; its color is mostly yellow, but bands of semi-opaque, whitish-red tint are present, which divide it into rounded compartments, the largest 2 c.m. diameter, the smallest 2 or 3 m.m. These have a somewhat honeycombed look, and in places contain dark reddish plugs. In places the tumor contains dark red areas, as of hemorrhage. It is firm generally to the touch, but friable in places. The pelvis does not appear to be invaded. The calices and papillæ are lost where the growth is situated.

Pathologic Histology.—The growth is composed of stroma and cells, and it may be described as an adenomatous type of epithelial tumor. The stroma is composed of fine vascular connective tissue on which the tumor cells rest. In most places this may be described as a capillary meshwork. In places the stroma consists of wider bands of fibrous tissue. This contains endothelial-lined spaces and in places collections of round cells and golden brown granules of pigment. The cells vary in appearance greatly. Mostly they are large and polyhedral, and have a pale, swollen appearance, somewhat resembling the cytoplasm of sebaceous gland cells. Osmic acid and sudan iii. show these to be in an advanced stage of fatty degeneration. Owing to this condition micro-chemical tests did not demonstrate the presence of glycogen (1). In places

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the cells have a frothy appearance, being in process of disintegration, but as a rule the cell membrane can be traced. Cells are high and sub-columnar in other places where an adenomatous or tubular appearing picture is seen in rounded compartments. Papillary masses grow into the spaces of the stroma here. The resemblance to tubules is explained as due to the disposition of cells in single or double rows, or to the arrangement back to back in the rows. Hemorrhages recent and old have occurred in these areas. A delicate meshwork of fibrin which takes the Weigert stain lightly, occupies large spaces. A very minute coccus-like body, in rows of four or five, and sometimes in fours, is seen among and in the degenerating cells of the growth. The nucleus is rounded and somewhat pale as a rule and contains nucleoli and a moderate amount of chromatic network. It is often surrounded by clear perinuclear space. With eosin and methylene blue (Unna) the nucleoli take a deep blue and the linin and nucleoplasm pink color, but the reaction is not constant. Some cells have eosinophilous, nuclear-granulated and blue nucleoli. Toluidin blue and acetic acid show a vacuolated appearance of the nuclei, but no meta-chromatic staining. Though many of the cells were extremely large, there were no true giant cells seen. Mitoses were not examined for specially, and heterotypic mitoses were not seen.

The adjacent portions of kidney show compression of tubules and marked frothy, degenerative changes of parenchyma with a few interstitial foci of round cells. There is some thickening of intima of small arteries, a very small coccus in places. The glomeruli are widely separated from the capsule of Bowman, and appear compressed or shrunken, and are compressed in capsule of growth. Everywhere the renal tissue is sharply demarcated from growth.*

Nature of Growth.—The term hypernephroma has been applied to these tumors by Birch Hirschfeld, as signifying any tumor of adrenal genesis.† Their morphology is variable and classification is impossible or very difficult on histological distinctions. Some are said to resemble carcinoma (especially in metastases), others sarcoma (Kelynack justifies this by the acceptance of the mesoblastic origin of suprarenal body). In 1883, Gravitz claimed an adrenal origin for these growths which were known as renal lipomata, and described them as

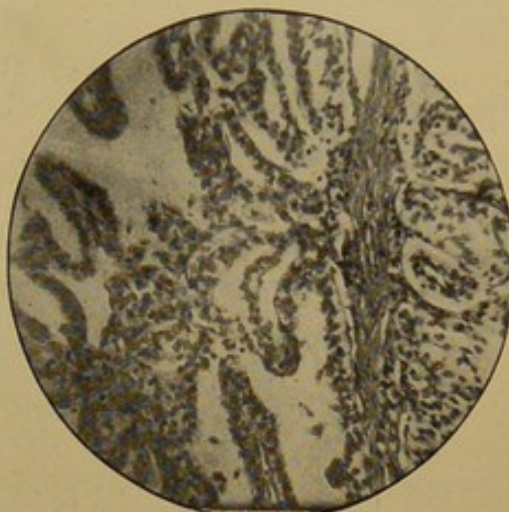
* McWeeny, Brit. Med. Jour., Feb. 8, 1896, p. 323, and Hektoen and Riesman, Text-Book of Pathology, p. 984.

† Kelly. Hypernephroma, Ziegler's Beiträge, xxiii, 280, 1898, p. 921, and Phila. Med. Jour., 1899, and July, Aug., 1898.



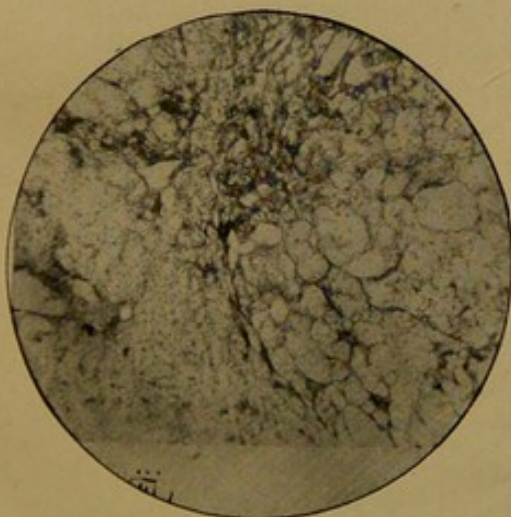
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1. Renal Glomeruli. 2. Fibrous Septum.
3. Villous Growth.

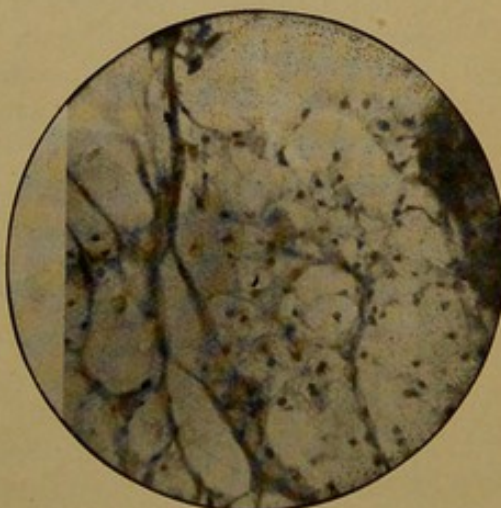


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High magnification of portion within circle (No. 1).



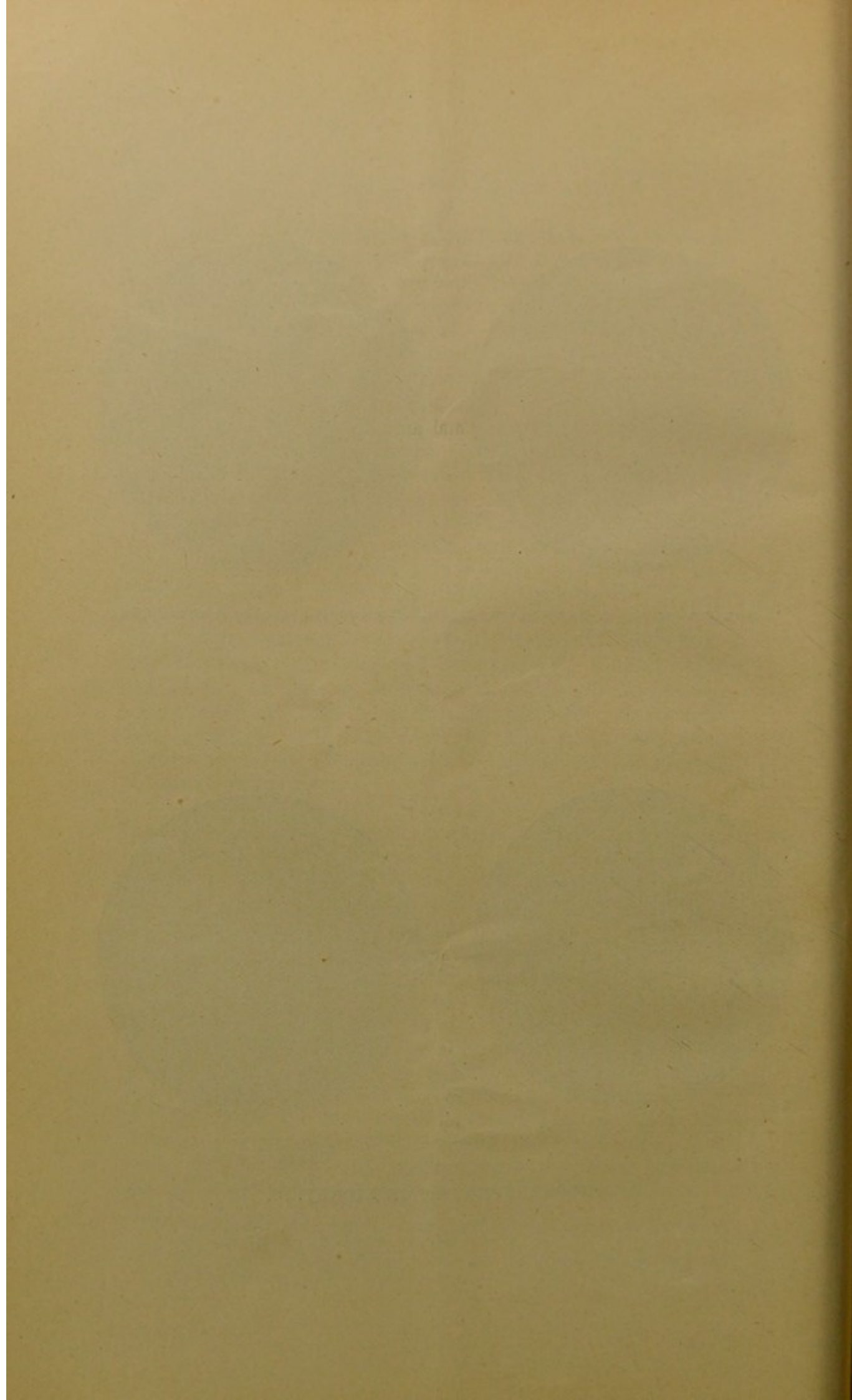
No 3.



No. 4.

High power of No. 3.

HYPERNEPHROMA OF KIDNEY.



strumæ lipomatodes aberratæ renis. Since then they have been variously attributed to the epithelium of the renal tubules (adenomata), and to the endothelium of the perivascular lymph spaces (angiosarcoma and endothelioma). The embryological origin of the adrenal cortex has been described by Weldon (2) as from the Wolffian bodies, which enclose blood vessels and nerves, or from the protonephros, in which case they would be epithelial (3). Balfour, Mitsukuri and Minot derive adrenals from a "mesenchymal anlage," the mesothelium on each side of vena cava forming twisted cords, separated by blood vessels, and from a sympathetic anlage of cells from sympathetic ganglia. These anlages unite closely (4). Creighton and Arnold consider the distinction between the cortex and medulla as arbitrary and the differences observed as produced by modification in the arrangement of compact parts, there being no real difference between the cells. At about the sixth month there is no special distinction between the cortex and medulla of embryonic human adrenal (5).*

Thus, although the medullary substance of the adrenal appears to be intimately related to the sympathetic nervous system, the entire organ is part of the urogenital apparatus in origin (6).

The presence of adrenal rests or supernumerary adrenals in urogenitary tract is stated by Bayard Holmes to be found in 90 per cent. of all post-mortems (7). R. Williams finds 1 primary adrenal growth in 8,378 consecutive cases of malignant disease. It is known that the suprarenal body is continuous with the front part of Wolffian body (Weldon, Tanosik, Lockwood) even to late intrauterine life, and may be derived from the front of the Wolffian body (the latter extends from lower end of adrenal along ureter to ovary or epididymis). Lockwood points out that at seventh week in human embryo the suprarenal body is larger than the kidney and extends by its lower end downwards in front and to inner side of kidney, occupies the hilum of the kidney and is continuous along the course of the ureter with upper end of Wolffian body. The glomeruli of the Wolffian body are also continued into lower end of suprarenal body (8). Though oftenest found in the connective tissue about the main adrenals, Morris states that bodies identical in structure with suprarenal capsule are found in cortex of kidney, in perinephric tissue, in mesentery and be-

* Good descriptions of the microscopical characters of these growths are given by Hektoen and Riesman, by McWeeny. Mallory and Southard describe the pathological characters in cases of Thorndike and Cunningham; also Boyd and McFarland.

neath capsule of kidney (9). Rolleston has also shown that even in adults the gland is often prolonged into renal hilum, and that supernumerary suprarenal bodies may be found along the renal and spermatic veins. Andrewes describes them in so-called fatty tumors of spermatic cord (10); Schmorl and Oberndorger in the right lobe of liver (11); Marchand (12) and Targett in the broad ligament of (fetal) uterus and in round ligament and in inguinal canal.

These findings may be summarized as follows (13) as favoring the adrenal origin:

1. The situation of the tumor beneath the kidney capsule, the usual site of aberrant adrenal tissue.
2. The similarity of adrenal tumors and of those in question.
3. The sharp distinction between the growth and the renal tissues.
4. Dissemination by the blood stream, *via* the veins, rather than by the lymph glands of the kidney.
5. The resemblance of the tumor cells to those of suprarenal cortex.
6. The presence of fat drops and glycogen in the cells, as is usual, not in the adrenal, but in its new growths.
7. The staining quality of the nucleoli, differing from that of the nucleus, rarely, if ever, seen in renal adenomata.
8. The presence of giant cells, as in growths of adrenal.
9. The existence of an abundant capillary network, as in suprarenal cortex.
10. The presence of lecithin in amounts approximating to those characteristic of suprarenal tissue.

These growths are to be distinguished from those arising in remains of the Wolffian bodies which may be retro-peritoneal in site. According to Birch Hirschfeld, those "embryonal mixed tumors" (Brusse) known as "adenosarcomas," may also arise from renal rests of these bodies. They are characterized by their enormous size, by the presence of muscle cells, striped and non-striped, and by early metastasis.

These latter and hypernephromas show well the intrinsic relation that exists between "abnormal growth" and neoplasms; both show the phenomena known as metaplasia and heterology of tissues. Their complexity of growth is clearly associated with their origin. Yet in neither, in certain respects, is the deviation from the typical characteristic of heterology carried so far as in carcinomata. In mixed tumors of children there is no true bursting through of basement mem-

brane, no true peripheral growth of epithelial cells. Again, hyperemia may be benign, but is usually malignant. While it grows rapidly, recurs locally after removal, and disseminates by the blood stream, not by lymph canals, it is, as a rule, not so malignant as carcinomata or sarcomata. The malignant hypernephroma (whether of the cortex or medulla) bears the same relation to the benign or latent form as teratoma to dermoid, or carcinoma to cystadenoma. They resemble "general thyroid malignancy" in their power of mimicry of the adrenal structure in secondary deposits (14). In short, they are instructive examples of the links in structure that unite simple and malignant growths, and which I have pointed out before (15).

It is hoped that further work may be done on the biochemical and physical changes producing and accompanying this aberrant form of growth.

P.S.—I take this opportunity of expressing my thanks to Mr. A. H. Buck, F.R.C.S., for permission to publish the case, and to Mr. G. Bate, M.B., F.R.C.S., Senior House Surgeon, for the beautiful microphotographs, and to Mr. Henry Morris and Mr. Bland Sutton for their kind references.

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NASAL ACCESSORY SINUS DISEASE.

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These post-graduate clinics serve many useful purposes, one of which is the opportunity they give to discuss some of those diseases we overlook so easily, because they do not occur frequently enough to keep our attention directed to them. Nasal accessory sinus disease belongs to this class. A patient may carry around for many years a septic tank in the way of an empyema of one of these sinuses. For example, a man in London, England, consulted quite a number of physicians, each of whom treated him for a different ailment—neuralgia, tic-douloureux, the protean forms of gastro-intestinal disturbances, etc, with little if any relief. At last he consulted a rhinologist, who detected antral disease. An opening was made and the sinus washed out. The patient returned in two weeks and said, "These are the first two weeks of good health I have had in ten years." The repetition of such histories suggests the question, viz., "Do not our errors in diagnosis and our inefficient treatment vie with the brazen advertisements of the daily press in aiding the charlatan?"

I shall endeavor, in the few minutes at my disposal, to call your attention to the position of these nasal accessory sinuses, their relation to one another, the pathological conditions produced by disease, the etiology, symptoms and treatment.

The Maxillary Sinus is a large cavity, hollowed out of the superior maxillary bone. At birth the alveolar process is almost in contact with the orbital. During the first decade of life these processes are separated by a deposit of cancellous or spongy tissue, which becomes absorbed during youth and early adult life. The other cavities are also absent at birth, and, as they develop in the same way, this condition need not be referred to again.

This sinus varies very much in size. The average height is about 1 1-2 inches, breadth, 1 inch, and depth (antero-posterior) 1 1-4 inches. The walls may be quite thick or mere shells. The cavity may be divided by partitions. This fact explains the difficulty sometimes experienced in finding pus after an opening has been made. The partitions have to be broken down, and the whole cavity explored. I wish to call your attention to the position of the opening between the

