were present in the crude product substances for which the acid had incomparably greater attraction than it had for water. When purified from these substances, it is indeed soluble in water, but only in small amount; and being so feebly held by water, it is free, when in watery solution, to act upon other matters for which it has stronger attraction. Thus was explained the remarkable germicidal energy of a lotion containing only a twentieth part of carbolic acid, as illustrated by the foul sore in the hand before referred to.

With linseed oil, on the other hand, the acid could be mixed in any proportion, and being firmly held by the oil, it was mild in action, though present in the large proportion of 1 to 4, as used in the carbolic putty. The 1 to 4 carbolic oil is bland when applied to the tip of the tongue, whereas the 1 to 20 watery solution is intolerably pungent.

The acid in the watery solution, while potent in action when applied, is soon dissipated, whereas it is slow in leaving the oil. Hence the watery solution, powerful but transient in operation, was admirably adapted for application to a cut surface as a detergent, while the carbolic putty, bland in action and serving long as a store of the antiseptic, could be used with good effect not only for abscesses, but also as an external dressing for operation wounds; and for that purpose I long employed it. The putty was used in a layer spread on calico, freely overlapping the skin around the wound, and covered with a folded cloth to absorb the serum that flowed from beneath its edges. Although this mode of dressing gave place in time to others which were more convenient, the change effected under its use at that early period was of the most striking character: healing without suppuration, pain or fever, instead of being the rare exception, became the rule, and operations were safely performed which had previously been utterly prohibited on account of the danger that attended them; while pyaemia and hospital gangrene, which had before been disastrously rife, were banished from my wards.

Epidermis is a substance for which carbolic acid has special attraction; and this, coupled with the facility with which the acid blends with oily matters, renders it peculiarly fitted for purifying the skin about the seat of operation and the surgeon's hands. Another property which aids its action as a detergent, is its great penetrating power, not limited by the products of its chemical action upon organic substances.

I used the 1 to 20 watery solution for rendering the patient's skin and the hands of myself and my assistants aseptic throughout the forty years during which I practised on the antiseptic principle, and I never had any reason to doubt its efficacy. No long time is required for its action. In my private practice the purification of the skin was as a rule not begun till I entered the patient's room to perform the operation. The part concerned was then thoroughly washed with the 1 to 20 carbolic solution, and was kept covered with lint soaked with the same lotion while the instruments were being attended to and the anaesthetic administered; the whole process occupying only about a quarter of an hour. Yet experience showed that this brief period was sufficient.

It may perhaps be argued that under the carbolic putty or any other dressing containing carbolic acid, that volatile agent was perpetually acting on the skin and may have made up for deficiencies in the original purification. But during several years before I gave up practice, the dressings did not owe their virtues to any volatile antiseptic.

I may mention in illustration one of my latest operations. The patient was a lady advanced in years, with a large ventral hernia below the umbilicus. It was producing serious symptoms; and attempts to reduce it having failed, her condition had become exceedingly grave. I only began to disinfect the skin when she was already partly under the influence of the anaesthetic. The umbilicus contained some drops of opaque liquid of a highly offensive character. I cleansed its folds carefully with the 1 to 20 carbolic solution and washed the skin over and around the sac with the same lotion. The sac was opened by a median incision, the upper end of which extended to the umbilicus. Into further details of the operation I need not enter. On changing the dressing (of cyanide gauze) it appeared that, in her frail condition, the margins of the skin at the upper end of the incision had

lost their vitality over an extent of about $\frac{1}{2}$ in. in length and $\frac{1}{10}$ in. in breadth at each side. I afterwards left the dressing unchanged for several days, when I found that the sloughs, the upper ends of which encroached on the umbilicus, so foul before the operation, had been replaced by new living tissue, and complete cicatrization had occurred without the formation of a particle of pus.

I cannot but think it a happy circumstance that the substance which I employed first in endeavouring to apply the antiseptic principle should have been so admirably adapted for detergent purposes. And it has grieved me to learn that many surgeons have been led to substitute needlessly protracted and complicated measures for means so simple and efficient.*

As an instance of trouble misapplied in this matter, may be mentioned preliminary washing with soap and water. If carbolic acid is the disinfectant used, such washing is not only wholly unnecessary, but is, I believe, positively injurious; as it must tend to check the penetration of the germicide into the substance of the epidermis, by saturating it with water for which carbolic acid has so little affinity. That this practice is superfluous is, I venture to think, proved by my experience, as I never in any case adopted it.

The incomparably greater attraction of carbolic acid for epidermis than for water was strikingly illustrated by an experiment not hitherto published.

Here my letter was broken off, in consequence of other engagements. But I afterwards wrote to Sir Hector Cameron what I had intended to say on this subject and he was good enough to incorporate my remarks in his second lecture (see BRITISH MEDICAL JOURNAL, April 6th, 1907, p. 799).

CYSTIC TUMOUR OF THE SUPRARENAL BODY SUCCESSFULLY REMOVED BY OPERATION,

WITH NOTES ON CASES PREVIOUSLY PUBLISHED.†

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INTRODUCTORY REMARKS.

MANY observations have recently been published about the pathology, diagnosis, and treatment of tumours of the suprarenal body and of new growths developing in other organs from "rests," as they are termed, of adrenal tissue. An instance of the latter type of tumour was reported by myself last year.‡ In the autumn of 1906 I removed a kidney subject to "hypernephroma," the patient surviving the operation for three months, but there were secondary adrenal deposits, one appearing as a vaginal polypus. Eleven months later I removed a tumour situated in the left lumbar region. It proved to be a cyst of the suprarenal body itself, unilocular and full of a bloody fluid. Henschen would rank it as a *struma suprarenalis cystica haemorrhagica*. I will now relate my case and afterwards make some mention of previously reported instances of cystic tumour of the suprarenal body large enough to be of clinical and surgical interest.

THE CASE.

C. L., aged 62, was admitted into my wards in the Samaritan Free Hospital on October 1st, 1907, on account of an abdominal swelling and pain.

She had been married for thirty years, and had borne nine children, the last confinement occurring eighteen years before admission. There had been no abortions. All the patient's labours were normal except the last, when the forceps was applied. She had never suffered from any puerperal complication, but enteroptosis developed during the later pregnancies.

In 1897 she was laid up with influenza, which left her very weak and liable to bronchitis; at the same time she suffered from frequent attacks of pain after food and vomiting. The influenza troubled her again several times; on the last occasion, which was in 1904, she became deaf in the left ear.

History of the Present Illness.—The dyspeptic attacks, which had never ceased entirely, became severe last summer.

* The fear sometimes expressed of poisonous effects from carbolic acid, as used in antiseptic surgery, is, so far as my experience goes, entirely groundless.

† Read at a meeting of the Surgical Section of the Royal Society of Medicine, June 16th, 1908.

‡ Malignant Vaginal Polypus, secondary to an Adrenal Tumour of the Kidneys. *Trans. Obst. Soc.*, vol. xlix, 1907, p. 182, and *Journ. of Obst. and Gyn. of Brit. Emp.*, vol. xi (June, 1907), p. 449.

and to them were added sharp abdominal pains, which were at their worst during the night, and were referred to a lump in the left side. She was under the care of Dr. Alexander Davidson of Cornwall Road.

Condition on Admission.—The patient was fairly well nourished. The abdominal walls were thin and, below the umbilicus, extremely lax, forming a flaccid swelling tympanitic on percussion. There was no evidence of separation of the recti.

A firm, oval body, freely movable, occupied the left loin.

When the patient lay in bed it retreated for the greater part under the ribs, its lower portion rotating upwards into the epigastrium. It could be pushed downwards and inwards to the extent of over 3 in., until its lower pole lay below the level of the umbilicus. When held downwards there was always more or less resonance on percussing its anterior surface.

The right kidney could not be felt. The urine was repeatedly examined. There was no history of hæmaturia and I never found any trace of blood, but there was always a little, rather dense, mucous deposit. The secretion was scanty, under 25 oz. in twenty-four hours, and the specific gravity low as a rule, ranging from 1008 to 1022.

On October 7th I made a cystoscopic examination of the bladder with the kind assistance of Mr. Malcolm. The mucous membrane was pale, the right ureteric orifice normal, whilst slightly turbid urine was seen issuing from the orifice of the left ureter.

These appearances are worth recording as they naturally led me to suspect that the left kidney was the seat of the tumour—which was not the case.

The tongue was clean, the appetite good, and the bowels regular. The pulse was 72, small and regular. The maximum temperature during the first week after admission was 98.8°.

The uterus had undergone senile changes; the menopause was complete by 45. No part of the tumour in the left loin could be pushed down to the level of the pelvic brim.

The nature of the tumour was somewhat obscure; but altogether it appeared to be renal.

The Operation.

On October 15th, 1907, I removed the tumour, assisted by Dr. William Griffith, Mr. Morley administering the anaesthetic. The patient was placed in the horizontal position. A vertical incision was made through the left rectus muscle near its outer border, beginning about 2 in. below the costal cartilages and extending 4 in. downwards. I passed my hand into the peritoneal cavity as far as the right loin; the right kidney was in its normal position and was not enlarged. The splenic flexure of the colon lay in front of the lower part of the tumour, which was drawn downwards and exposed by an incision made through the peritoneum on the outer side of the descending colon.

The tumour lay in a capsule made up of connective tissue, whence it was easily enucleated in front, outside and behind, without any subsequent oozing. There were several large vessels running into the tumour internally and from above. The tumour now proved to be a thick-walled cyst; the left kidney lay entirely behind and mostly below it. The tail of the pancreas, which I could feel, did not touch the tumour. I secured the vessels with No. 4 China twist close to the cyst wall, and fixed on a Doyen's clamp in two places, as the tumour was heavy and threatened to tear itself away from its connexions. On dividing the vessels and surrounding connective tissue, it was set free, and the tissue included in the two clamps was carefully tied. By the aid of the manoeuvres no large vessels were endangered by the application of clamps and ligatures to parts not thoroughly exposed, and no oozing occurred.

I pushed up the kidney and sutured the cut edges of the peritoneum with continuous catgut, uniting the muscle and integument with interrupted silk-worm-gut sutures. The patient was troubled with cough, and suppuration of the lower end of the wound occurred, but there was no evidence of any effusion or suppuration in the deeper structures whence the tumour had been removed.

On November 21st the left kidney could plainly be defined. It was not enlarged, and was quite free from tenderness. It lay almost entirely below the level of the last rib, and could

be pushed for about 1 in. upwards. The urine was clear, pale yellow, and slightly turbid, with a little mucous deposit containing renal cells but no casts. The specific gravity was 1010, and there was no albumen. The daily secretion was rather scanty.

Dr. Davidson has kept the patient under observation since her discharge from hospital. She suffered badly from cough in the winter months, which caused fresh trouble with the cutaneous part of the abdominal cicatrix. By the middle of February the cough had subsided, and the patient's general condition was satisfactory.

I once more saw the patient at the hospital on March 12th, 1908, five months after the operation. She was in very good condition, the abdominal cicatrix was strong, and the left kidney had almost regained its normal position; the lower end could be readily defined below the last rib.

Description of the Tumour.

Before the tumour was taken to the College of Surgeons, it was accidentally dropped on to the floor of the operating theatre, so that it burst, and its contents, which consisted of about $\frac{1}{2}$ pint of bloody fluid mixed with broken-down tissue, were lost. When fresh, the surface of the tumour was of a deep purple-bronze colour. At the College it was put into a formalin solution, which became deeply blood-stained, and was repeatedly changed. Three months after the operation it was placed in a glycerine solution, which soon assumed a pale red tint. Mr. Shattock removed a piece of the cyst wall at the line of rupture, and prepared sections for the microscope.

Naked-eye Appearances.—The tumour had shrunk considerably after rupture, but its walls were from the first distinctly rigid, so that it became smaller without absolutely collapsing. When I examined it three months and a fortnight after its removal, its vertical measurement was 4 in., the horizontal $4\frac{1}{2}$ in., and the antero-posterior 3 in. It had lost its purplish tint, and assumed the dull reddish-brown colour of a cricket-ball. The surface was fairly smooth, except where some tracts of condensed connective tissue were adherent to it. The walls were from $\frac{1}{4}$ to $\frac{1}{2}$ in. thick, and of tough consistence. The cut surface was dull reddish-brown, as though uniformly stained with blood, being of precisely the same tint as the outer surface of the tumour. No fibrous or muscular structure could be detected, even by the aid of a hand lens, nor were any yellow spots, calcified patches, minute cysts, or lacunae exposed by the section; I could not even detect a blood vessel. The inner wall was rough from deposits of old clot on its surface. At one or two points the clot was very pale, but there were no yellow patches or tubercles. The cyst cavity was absolutely single, not a trace of even a rudimentary septum could be found on the inner wall. Thus, to the naked eye, the cut surface of the cyst wall did not show the appearances characteristic of a blood cyst of the suprarenal body. There was, in fact, no macroscopic indication of adrenal tissue; yet, by the aid of the microscope, such tissue was readily distinguished.

Microscopic Appearances.—On February 14th I examined

Fig. 1.

Fig. 2.

with Mr. Shattock some sections of the cyst wall which he had prepared for the microscope.

The cyst wall proved to be much less homogeneous than we suspected. There was a stroma of fibrous tissue without any plain muscle. Some large veins were detected, but there was no indication of angiomatous or of lymphomatous tissue. A nodule of adrenal tissue was seen imbedded in the stroma towards the outer surface of the wall, whilst deeper in the cyst wall lay a plexus of cells of the adrenal-tissue type arranged in a highly atypical manner (Figs. 1 and 2). There was no epithelial lining to the inner wall of the cyst, but a distinct layer of homogeneous tissue, apparently old coagulum, was observed. Under this tissue was another layer of fibres somewhat denser than in the deeper part of the cell wall. This appearance did not, in Mr. Shattock's opinion, favour the view that the tumour was originally a solid cancer of the suprarenal body, and that the interior had broken down.

CYSTIC TUMOURS OF THE SUPRARENAL BODY.

I will now make some mention of cases of this kind of tumour already published. By "cystic tumours" I mean cysts or new growths of more than purely pathological interest, mostly blood cysts, more rarely lymphomas or adenomas, which are true new growths. Several cases which I will relate have already been collected by Henschen and by Terrier and Lecène, but I have made some corrections after reference to the original reports, and added other cases. The first and second are interesting, because they were originally published in days long past by able observers who had not the resources of modern science at their disposal. I will therefore relate them at some length. A briefer abstract of each of the remaining cases will be sufficient, as they are recorded by surgeons and pathologists quite recently in publications to be found in most medical libraries.

CASE I (Greissellus).

The original report of this case, headed "Ren Succentauriatus monstrosus cum Ulcere," is to be found in a work published in Leipzig in 1670, entitled *Miscellanea Curiosa Medico-Physica Academiae naturae curiosorum, sive Ephemeridum Medico-Physicarum Germanicarum*, etc., Observatio lvi, p. 152 (Rayer misquotes the page). A copy of this work is preserved in the Library of the Royal College of Surgeons of England.

Greissellus of Vienna seems to have been a good anatomist and evidently conducted the *post-mortem* examination of this case with much care.

Contemporary French and German writers presently to be quoted seem justified in admitting this case as a genuine instance of the new growth under consideration. There can be little doubt that the tumour had developed in the suprarenal body, and it was, as in several recent cases, filled with bloody fluid.

Nobilis quidam 45 annorum temperamenti sanguineo-biliosi, post diuturnam colicam, eamque contumacissimam, generosissimamque remedia respuentem mortuus, à me apertus fuit, ubi Intestini Colli exteriorem tunicam absumptam, et quasi sphacelatam inveni, ex illa nempe parte quâ Reni sinistro adiacebat. Ren vero sinister tantus erat, ut figuram Lienis destruxerit, qui multis tunicis et membranis involutus erat, quibus resectis Ren verus in debita figura et situ inventus fuit: Ren vero succentauriatus tantus erat, ut totam illam quasi regionem a Diaphragmate (quod una cum Liene ex illa parte elevarat altius) usque ad muscolum Psoas deorsum occupaverit. In hoc Rene succentauriato erat ulcus, ita quidem apertum, ut Integro pugno transitus pateret. Materia ex hoc ulcere rupto effluxe, erat Aqua rubra ac si bolo armeno tineta fuisset ad libras xii quasi, intus vero adhuc haerens erat densa et glutinosa valde, fuliginemque redolebat ad instar carbonum terrae cum summâ nausea et horrore. Haec massa sine materia jam dum effluxa, et particula abrupta ponderabat liber (sic) 2, uncias iii. Notandum penes est, quod Nobili huius jam dum filii eodem putatitio Colico morbo mortui fuerint.—[D. Greissel. *comm. Viennae An D. Jung.*]

Thus this patient, "a certain nobleman," aged 45, died after daily attacks of colic, which troublesome symptom his lordship neglected, rejecting with great contempt the very best remedies. Colicky pains have been noted in several recent cases; the history of colic in the patient's family is of little value. The report of the necropsy is clear; the left suprarenal body was converted into a big tumour which filled the left side of the abdomen, pushing up the diaphragm and the spleen, and extending downwards to the psoas. In its wall was an ulcer, evidently a rupture, big enough to admit the fist; 12 lb. of red fluid and over 2 lb. of fetid clot had mostly escaped into the peritoneal cavity. The left kidney was distinct from the tumour.

Traumatism seems highly probable in this case.

CASE II (Rayer).

This case has often been quoted, for it was published by a distinguished French physician over seventy years ago, and the tumour is figured in his (Rayer's) fine atlas illustrating his *Traité des Maladies de Reins*, Plate 54 and Plate 55, Fig. 3. The surgeon inspecting Plate 54 will note how closely the tumour was associated with several inches of the vena cava. The history of injury and pain was very clear.

A woman aged 75 was admitted into the Charité, Paris, for violent pains in the region of the right kidney. Since 2 years of age she had been lame in the right leg. Within the five years previous to admission she had fallen five times on the right side, without any immediate ill-effects. Five years before admission she suffered from an attack of agonizing pains in the right loin, running down to the pelvis, so that uterine disease was suspected. It is not stated whether this attack occurred before or after the first fall. A few milder seizures of the same kind followed, and another as bad as the first came on three months before admission. There was vomiting, which persisted and became very obstinate, and the pain extended to the right thigh. A tumour was observed about a month before the patient came under Dr. Rayer's care, and the lower extremities became oedematous.

The patient's skin was of a greenish yellow tint. There was a large tumour in the right flank, hard in its upper part, where it seemed continuous with the liver and fluctuating below. There was no tenderness on pressure. The patient died in hospital, long before the days of renal surgery.

The tumour weighed 4 lb.; it pushed up the liver and descended into the right iliac fossa. It contained 1½ lb. (*une livre et demie*, not *litre*, as in some second-hand reports) of black liquid blood. The kidney, greatly flattened and altered in shape, was found entire and adherent to the posterior aspect of the tumour; the renal tissue and ureter were normal. The left suprarenal body showed no sign of disease, the corresponding kidney was the seat of chronic inflammatory changes.

The above account is from Rayer's "Recherches anatomico-pathologiques sur les capsules surrénales (Capsulae atrabillariae)," *L'Expérience*, vol. 1 (November 10th, 1837), p. 17.

CASE III (Chiari).

A man "over 60 years of age,"* and very corpulent, died of heart disease. The place of the right suprarenal capsule was occupied by a spherical cyst nearly 6 in. in diameter. It contained old coagulum, its walls were thin and included circumscribed collections of the cortical tissue of the suprarenal body; no elements indicating a neoplasm could be found in the cyst, which was separated from the kidney by loose connective tissue. The left suprarenal body showed no signs of any change save senile degeneration. There was no bronzing of the skin, and the existence of the tumour had never been suspected during life.

CASE IV (Routier).

Woman, 35. Three years, epigastric pain and vomiting. Six months, tumour observed in left hypochondrium, extending from under ribs down to iliac fossa, dull on percussion, fluctuating at one point. Operation: Median incision. Retroperitoneal tumour discovered holding 1,600 grams of brown fluid. Relations not definable, deep adhesions, drainage, cyst wall tense, its sutures tore away; fatal peritonitis. Cyst found replacing suprarenal body, villous-like growths on inner wall composed of adrenal tissue.

CASE V (Pawlik).

Woman, 40. Two years, fall from a ladder followed by abdominal swelling. Spherical, tense, elastic, fluctuating tumour, descending colon in front. Operation: Incision to left of umbilicus. Cyst containing 17 pints of bloody fluid enucleated excepting a small piece left on a kind of pedicle close to vertebrae. Kidney seen on inner side of lower pole of the cyst. Recovery. A small piece of unaltered suprarenal capsule ran on to cyst wall. The tumour was defined as a large haemorrhagic cyst of the left suprarenal capsule. Its wall included islets of adrenal tissue.

CASE VI (Triepecke and Bierl).

Woman, 69. Tumour size of adult head right side of abdomen. Incision along outer edge of rectus; cyst tapped, 3½ pints of turbid fluid with coagula; drainage of cyst cavity, which was first scraped with the curette; death soon after operation from "shock." The cyst, which proved after death to be easily enucleable, occupied place of right suprarenal body; kidney pushed downwards into iliac fossa. In cyst wall adrenal elements associated with microcystic degeneration.

CASE VII (Oberndorfer).

Man, 34. No symptoms, death from intestinal obstruction. Round tumour, size of small apple, replaced greater part of left suprarenal body, the unaltered part capping the tumour, a thin-walled cyst, which contained clear, pale yellow fluid;

* Misprinted "68" in some second-hand reports.

† "Six" in the original report, misprinted "dix" in Terrier and Lecène's monograph.

‡ Triepecke, *Ueber Blutcysten in Nebennierensträumen*. I have not been able to procure or see a copy of this thesis; the above is quoted from Henschen, and Terrier and Lecène.

lymphangioectasis* of remainder of suprarenal body; right suprarenal body normal.

CASE VIII (Marchetti).

Woman, 50. Died in hospital of purulent peritonitis; uncertain origin, but not connected with tumour, which was tense, elastic, fluctuating, and situated in region of right kidney. Autopsy: Cyst, bilobed, remains of right suprarenal body ran into its wall above; vertical diameter of cyst $4\frac{1}{2}$ in., contents thick, pale yellow fluid; a complete fibrous septum internally. Cyst adhered to vena cava. Adrenal tissue in cyst wall and septum. Compensatory hypertrophy, left suprarenal body.

CASE IX (Henschen).

Woman, 41. Twenty years pleurisy, from then attacks of pain in left hypochondrium, with vomiting. Three years, puerperal thrombosis. During attack of acute rheumatism, big, tense, smooth tumour discovered extending from left hypochondrium to loin, and pushing ribs outwards. Operation (Krönlein): Left pleura tapped, much chocolate-coloured fluid; oblique incision under border of ribs to loin, tapping of cyst, chocolate-coloured fluid as in pleural cavity; complete enucleation; adhesions to diaphragm and tail of pancreas, inferior mesenteric vein damaged and ligatured. Left kidney lay internal to cyst. Gauze drainage. Death fifth day, from severe thoracic complications. Tumour a unilocular cyst; on inner wall opaque yellow deposits consisting of adrenal tissue.

CASE X (Terrier and Lecène).

Woman, 52. Four years constipation and attacks of pain in umbilical region, mostly to right. Oval, smooth, distinctly fluctuating tumour, size of ostrich's egg, in left loin. Operation (Terrier): Median incision above umbilicus. Peritoneum external to descending colon incised; enucleation of tumour easy; only half of it removed, being taken for a pancreatic cyst; base drained. Left kidney found to be distinct from cyst. Contents of cyst, lemon-coloured fluid. Walls thin, contained suprarenal tissue. Right parotiditis fifth day; recovery; no fistula in cicatrix.

CASE XI (Bosanquet).

Woman, 56. In hospital for carcinoma of stomach. Freely movable, firm, rounded tumour below left costal cartilages, not tender on pressure. Fatal haemorrhage from malignant ulcer (spheroidal-celled carcinoma ventriculi). Tumour an almost spherical cyst, over 3 in. in diameter, in front of left kidney, descending colon on its outer side. "The left suprarenal body was attached to the upper and back part of the tumour and looked normal." Author defines tumour as "cystic adenoma of the adrenal." [I will return to this interesting point further on.] Cyst wall thick and fibrous, lined with cells of the adrenal type; contents a semi-fluid, turbid, orange jelly, evidently mucoid degeneration of the adrenal tissue. Right suprarenal body bore small white nodule, an adenomatous growth showing fatty or early mucoid degeneration.

CASE XII (McCosh).

Woman, 45. Three years dull pain radiating from left loin. Severe attacks of lancinating pain. Slight bronzing of skin. Smooth, globular, elastic, fluctuating tumour in left side of abdomen, pushing out ribs; colon on its inner side. Operation: Oblique incision, complete enucleation of universally adherent cyst, attached to aorta and bodies of lumbar vertebrae; contents, 9 pints of dirty yellow fluid. Left kidney much displaced downwards. Forcible pressure and drainage, recovery; bronzing of skin disappeared. Wall of cyst thick, containing distinct adrenal tissue.

CASE XIII (Author, related above).

DOUBTFUL CASE (Lockwood).

Woman, 20. Two years, painless swelling, slow growth. Freely movable tumour size of ostrich's egg, hard, tense, in left hypochondrium, reaching downwards to level of umbilicus; colon defined to its outer side. Operation: Incision outside left rectus, easy enucleation after incision through descending mesocolon; end of duodenum adhered to inner side of tumour. Ureter lay behind tumour. "Recovery" (private correspondence). Thick-walled cyst, fibrous tissue, inflammatory changes; "no glandular structure of any kind could be discovered." Contents, altered blood clot.

Remarks on Lockwood's Case.—Considered from a clinical and surgical standpoint, this cyst reminds us of several of the blood cysts in the above series. In outward appearance it closely resembles the tumour which I removed and which is preserved in the Museum of the College of Surgeons, and it also seems very like that described and figured by Henschen. I may refer the pathologist and surgeon to Mr. Lockwood's specimen, which is to be found in the Museum of St. Bartholomew's Hospital, Pathological Series, No. 3,372a. The thick wall, bloodstained as in my case, and the single cavity containing "a chocolate-coloured semi-fluid mass," are features very distinct in

the "haemorrhagic suprarenal cyst." Lockwood himself, referring to the researches of Weldon, Janosik and Rolleston, implies that his cyst might have originated in the suprarenal body, which organ is probably developed from, and is certainly down to a late period of intra-uterine life continuous with, the front part of the Wolffian body. I cannot help suspecting that there may be, in the walls of Lockwood's cyst, some adrenal tissue which has been overlooked. The pathologist, doubtful about the homologues of Lockwood's important case, should study that surgeon's original report in conjunction with Henschen's well-known monograph.

Mr. Lockwood informs me that about a year ago he removed a similar tumour which adhered to the lower end of the right kidney. The same authority describes in the report above quoted a case of *multilocular retroperitoneal cyst* removed by Mr. Bowlby, who tells me that the patient was free from recurrence nine years after the operation. It resembles a case of a similar cyst presented by Dr. Bantock to the Museum of the College of Surgeons (Path. Series, 303a). The splenic flexure and descending colon lay on its surface. The patient is living, twenty-two years after the operation for its removal. Mr. Shattock has kindly examined sections from the wall of Bantock's multilocular cyst, but cannot find any adrenal elements. This case and Bowlby's are even more doubtful as to their nature than Lockwood's, as far as origin from the suprarenal body is concerned.†

SUMMARY.

Surgical Pathology.—The blood cyst is not a true new growth; it owes its origin to haemorrhages into the medullary substance of the suprarenal capsule. There was a history of injury in Rayer's and in Pawlik's cases, which was very probably the cause of haemorrhage in either one or both; perhaps some pathological change within the organ contributed to the development of the blood cyst. Such changes, on which it is not necessary to dwell, are probably the sole cause in the majority of cases. The operator, should he recognize the true character of the tumour during the operation, need not search for any extension of disease in its vicinity, and when he can make sure that it is a blood cyst he need not fear recurrence.

It is certain that adenoma, lymphoma, and other new growths seldom convert the suprarenal body into a cystic tumour of interest to the surgeon. Henschen gives in his monograph a good synopsis of the pathology of these cysts, of which there is in the above series one instance of lymphangioma (Oberndorfer) and one of cystic adenoma. Marchetti's bilocular cyst and Terrier and Lecène's big cyst might have owed their origin to old haemorrhages, as pale yellow fluid is often seen in very old blood cysts elsewhere.

Those who are interested in the genesis of cysts of the suprarenal body will find much valuable information in the writings of H. D. Rolleston, Ogle, Raymond Crawford, and Charlewood Turner. The latter writer reports an instance where there were also cysts in the cerebellum, liver, and kidney; the adrenal tumour was, I must add, of the size of a fist, but the patient died of the cerebellar disease, and the primary seat of cyst formation was not clear. One point very much to our purpose was clear—the cyst in the suprarenal body was certainly not due to haemorrhage.

Lastly, I may turn the reader's attention to a preparation which is to be seen in the Museum of the College of Surgeons (Path. Series, 3517), taken from a woman aged 55, who died after ovariectomy. It shows "a suprarenal capsule in section, with a large, rounded mass in its substance. The remainder of the capsule is distended into a cyst. The enlargement is due to a hypertrophy of the cell columns of the suprarenal capsule with fatty degeneration of the contained cells." I may add that this report was made by Dr. Goodhart. The preparation may, I think, explain how, in a case of cystic disease of the suprarenal body, the greater part of that organ may be found on the cyst wall, as in the tumour, included in the above series, described by Bosanquet.

Symptoms and Diagnosis.—The number of cases of cystic tumour of the suprarenal body remains small, yet the

* Bossard reports a case of lymphangioma-cysticum of the right suprarenal body discovered at an autopsy on a woman, aged 25. See Henschen.

† I have recently published a clinical report of these two cases, with notes on Monprofit's account of the removal of a Wolffian cyst (Cases of Multilocular Retroperitoneal Cysts in Women, *Journ. of Obstet. and Gyn. of Brit. Empire*, vol. xiii, 1908, p. 257).

above records show that it gives rise to fairly definite symptoms. I have already noted that a history of *injury* has been obtained in more than one case. Pain appears to be the rule; it usually assumes the characters of dyspepsia or fits of colic, and leads to the discovery of a tumour. In my own case it was very definite, and the above abstracts show that distinct pain was specified in those reported by Grelsellus, Rayer, Routier, Henschen, Terrier and Lecène, and McCosh, making in all seven, to which we may safely add as an eighth Bosanquet's case, where, as the original report explains, this subjective symptom seemed mainly, though not entirely, due to coincident malignant disease. The tumour in this respect differs from a simple hydronephrosis, although attacks of renal colic may be associated with the latter. Fluctuation seems far less marked than in hydronephrosis, nor does the cyst descend so readily, as the suprarenal body is more firmly supported than the kidney or, we must add, the spleen. In my own case the cyst was, I admit, freely movable, but it always slipped up again when drawn down, and did not naturally lie well below the ribs under the abdominal wall, after the fashion of renal and splenic tumours of its own size. The cystoscope may aid in diagnosis, as will be seen in the original report of Pawlik's case. The descending colon is usually anterior to the cyst, but this point is not always accurately indicated. Other symptoms seem far less marked, whilst one, so familiar in association with another disease of the suprarenal body, deserves special notice.

Bronzing of the Skin.—This well-known symptom of Addison's disease was only observed in McCosh's patient. It was slight, yet distinct, and disappeared soon after the operation. McCosh's experience seems to be unique. Henschen, who wrote before the case was published, declares that this "classical symptom" is always wanting (*immer fehlte*) in cases of benign cystic suprarenal tumours, and is absent "almost without exception" in patients subject to other tumours of the same organ. I may add that in my own case of malignant vaginal polypus secondary to an adrenal tumour of the kidney there was distinct bronzing of the skin during the patient's last days three months after the operation. The left suprarenal body was found to be free from new growths or any other visible morbid condition. The state of its fellow remains uncertain; it was not found at the autopsy. I mention this case because it shows that cutaneous bronzing, which Dr. W. T. Evans informs me was much more distinct in this instance than my own report would lead the reader to believe, may be present in a subject where one suprarenal body is healthy and where there is no evidence of Addison's disease. None of the cystic tumours described in this communication were bilateral.

Surgical Treatment: Results of Recorded Operations.—Without doubt, the right treatment for a cyst of this kind is removal by operation. It should be enucleated from the kind of capsule of connective tissue in which it lies. The suprarenal body is normally kept in its place by fascia which separates it from the capsule of the kidney, and holds it well up, far back in the loin. Hence the suprarenal body does not descend with the kidney when the latter becomes movable. When the suprarenal body, on the other hand, becomes converted into a heavy cystic tumour, it descends along the outer border or anterior surface of the kidney, stretching its supporting connective tissue, which forms a capsule. The operation essentially consists in the enucleation of the cyst from this capsule.

Diagnosis is difficult; if the cyst be taken for a renal tumour and exposed through a lumbar incision, enucleation might be effected with ease and safety, but in some of the above cases that incision would have proved very unsatisfactory. Therefore the cyst is far more safely dealt with if exposed by a vertical incision through the outer margin of the rectus, as Mayo Robson recommends in operations on solid tumours of the suprarenal body. It allows of efficient exploration, and the above series of operative and *post mortem* experiences teach us that in dealing with a tumour of this kind exploration should be very efficient, seeing that the cyst may adhere to the vena cava, aorta, or pancreas.

Incision and Drainage.—Experience teaches us that this incomplete procedure is unsatisfactory. The cut edges of the cyst have been fixed to the edges of the abdominal wound ("marsupialization"), unfortunately the cyst walls, though thick, are not tough like those of the more

familiar pelvic and renal cysts. In Routier's case the sutures cut through the tissues, so that the cyst retracted, and some of its contents escaped into the peritoneal cavity, with fatal results. In Triepcke and Bier's case, it was found after death that enucleation would have been easy. Terrier encountered no difficulty when he enucleated the anterior portion of his cyst, but suspecting that it was pancreatic he refrained from completing the process and "marsupialized" the base. The patient recovered, but convalescence was retarded by inflammation of one parotid.

Complete Removal by Enucleation should always be undertaken if possible; it may be attended with dangerous complications. I have related how Krönlein, in the case reported by Henschen, bravely completed a very difficult operation; but the patient was the subject of pulmonary disease of very long standing, with fatty degeneration of the heart and sclerosis of the coronary arteries, so that the fatal result was not surprising. McCosh's tumour was attached internally to the wall of the aorta. When the connective tissue capsule was incised to allow of enucleation very large vessels were divided, some lay so deeply that they could not be ligatured; three long artery forceps were applied to them and left on for a time. We are not informed how long after the operation the forceps were removed. The patient recovered. The dangerous proximity of the aorta in McCosh's case reminds us of the observations of Rayer and Marchetti on subjects in the *post mortem* room. Both these writers publish drawings of their cysts, which were in the right suprarenal body; they were closely connected with the vena cava.

Pawlik had to deal with a kind of pedicle which ran inwards towards the lumbar vertebrae. It was not secured without much difficulty, and when it was divided after ligature a piece of cyst wall as big as a shilling remained on its proximal portion, which receded so far that the operator feared to draw it down in order to excise the fragment. The patient recovered. The after-history of this case and of Terrier and Lecène's—where still more of the cyst wall was left behind—would be of interest.

In my own case enucleation was unattended by any difficulty; I was careful to apply the pressure forceps to all large vessels within sight, avoiding the dangerous practice of pinching tissues in the dark. The surgeon operating on a tumour in the lumbar region is liable to assume that it is renal, and this assumption may induce him to fix a clamp forceps on a part of the aorta, vena cava, pancreas, or intestine, when he is under the impression that he is simply securing the renal vessels. Lockwood found no difficulty in enucleating his cyst of doubtful origin, although the small intestine adhered to its wall.

In conclusion, I may observe that the pressure forceps, that invaluable invention of Koeberlé generalized by Spencer Wells, must be the sheet-anchor of the surgeon engaged in enucleating a cyst of the suprarenal capsule.

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ADDENDUM.

[Since I prepared this report the patient came once more under the care of Dr. Davidson for attacks of vomiting, which were successfully cured by the end of April by

small doses of ipecacuanha, and the constipation and distension associated with the vomiting also subsided. On April 27th I examined the patient. I found that the left kidney was tender to touch, and all of it, except the upper pole, lay below the level of the last rib. There was no tumour nor hardening in the left loin, abdomen, or pelvic cavity. The enteroptosis had rather increased. Dr. Davidson saw the patient at the end of May, in very good health.]

TWO CASES OF LATERAL SINUS THROMBOSIS.

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CASES of lateral sinus thrombosis are not yet so common but that instruction may be obtained by the narration of isolated cases. The two following have recently been under treatment, and show the need for early operation. The first case, which was the most eventful, recovered, while the second, no less instructive from the surgical point of view, died.

CASE I.

E. F., aged 12, was admitted into the Hull Royal Infirmary on September 14th, 1906.

History.

For three weeks before admission he had suffered from an aural discharge and earache, and for a week had been vomiting. Some glycerine had been instilled into the ear, and the discharge had ceased. This history was, however, only obtained some days after admission, and was of no use in forming an early diagnosis.

Condition on Admission.

The boy was obviously ill; he complained of headache and pain in the right knee, which was slightly swollen. He only vomited once after admission, and this consisted of food he had just taken. His temperature was only 99° but on the evening of the day of his admission it rose to 103° , and on the following day to 104° . Some tenderness over the mastoid was then elicited, his intellect was quite clear, but he had a grey opaque complexion, and was evidently very ill.

First Operation.

On the third day after admission the mastoid was opened, and a little sanious fluid evacuated, and on the following morning he appeared to be relieved, but the same evening his temperature again went up to 102° , and the discharge from the mastoid became purulent. The fluid in the right knee-joint was absorbed.

Second Operation.

His temperature gradually fell till, on September 22nd, it was normal; but his condition was far from satisfactory, so a complete mastoidectomy was performed. The temperature fell for a day or two, but only to rise again, and he became slightly jaundiced and complained of pain over the sterno-mastoid, which made one suspicious of sinus thrombosis.

Third Operation.

This suspicion was intensified during the next few days, as, with a slightly raised temperature he had sudden exacerbations to 104° , and, on September 26th, to nearly 105° . These were, however, unaccompanied by rigors, so that I was reluctant to open what might prove to be a normal sinus in the close proximity to the discharging mastoid. The mastoid was accordingly again scraped and a quantity of foul grey pus removed.

Fourth Operation.

On the following day he had a rise of temperature to 104° , this time accompanied by a rigor. There was now no doubt that the sinus was affected, so this was opened and found to contain foul pus. This was temporarily plugged and the jugular vein cut down on, and as this contained fluid blood it was divided between two ligatures, and the wound in the neck closed and sealed to prevent infection from the wound above. The opening in the sinus was then enlarged and the cavity scraped out till blood flowed freely. A plug of gauze was inserted, which easily stopped the bleeding.

Operation on Knee.

The next day his condition was much improved, but this was not maintained, and in a few days his temperature rose again as before. It was then found that he had effusion in the left knee, so on October 2nd this was opened and drained. The fluid was opaque but scarcely purulent, and a culture from it showed streptococcal infection.

After-history.

He now rapidly improved in his general condition, he took his food well and gained flesh, though his temperature still remained above the normal.

On October 22nd the drain was removed from the knee and

he was put on the balcony for open-air treatment. On October 25th Dr. Eve was good enough to give him an injection of streptococci, after which his temperature fell somewhat, but no marvellous effect was produced.

His condition now gradually improved, so that on November 15th he had a normal temperature, and the wounds in the knee and mastoid were healed. The ligaments of the joint were very lax, and I anticipated that he would require some further surgical treatment for the knee, but he was sent to the convalescent home and then discharged. He was shown at a meeting of the East York Branch of the Association in January, 1908, when the movements of the joint were quite perfect, and he walked without any limp.

CASE II.

P. M. N., a male aged 34, was admitted on November 23rd, 1907, with a diagnosis of mastoid disease. I saw him shortly after his admission; he had a temperature of 100.4° , no pain, tenderness, or swelling over the mastoid, and no aural discharge. He was very deaf.

History.

The history was very indefinite; he seemed, however, to have had a chronic aural discharge which had recently ceased. On the following evening his temperature rose to 103.4° , and was about the same the next morning. He now developed decided tenderness along the course of the internal jugular vein, and there was some swelling. The mastoid region was not tender even on deep pressure, and he had no rigor. Lateral sinus thrombosis was diagnosed, and he was taken to the theatre.

Operation.

An incision was made over the jugular, and the margin of the sterno-mastoid sought for. This was so inflamed that an incision was made through the muscle. An enlarged gland was removed, and a search made for the vein. This was found to be represented by a thick solid cord. The facial vein was seen running into this, and was greatly distended; it was ligatured and divided. The incision was then prolonged nearly to the clavicle and the jugular vein traced downwards, when the lower third of it was found to contain fluid blood. An aneurysm needle was passed carefully under it, and the vein divided between two ligatures. The descending noni was seen, but not the vagus. The vein was then dissected up to the angle of the jaw, the superior thyroid, and other branches, which were greatly distended, being tied and divided.

The lower half of the wound was then sutured, the incision prolonged upwards behind the ear, and the mastoid region laid bare. An opening made with a burr in the lateral sinus showed this to contain clot of a friable character. The hole in the bone was enlarged so as freely to expose the sinus, the contents of which were scraped out until fluid blood flowed. A small plug was then placed to control the bleeding, and the jugular vein opened and scraped out up to the base of the skull, when I could wash out the sinus and vein thoroughly. The vein was cut off as near the opening of the jugular foramen as possible.

The mastoid antrum was then explored and found to contain grumous material, which was scraped and washed out. While doing this it was noticed that there was pulsation in the fluid in the antrum, which suggested a perforation into the cranial cavity. Gauze plugs were placed in the openings in the bone, and one at the upper part of the wound in the neck, which was then closed. Rather over 2 in. of the jugular vein was excised.

The operation, owing to the matting of the tissues around the vein making the dissection difficult, was tedious, lasting an hour and a half, and there was much trouble with the small congested veins. The bone, too, was very hard and thick.

Progress of the Case.

On November 30th the temperature had again risen, and pus was found in the neck; the wound was opened up and the sinus again scraped. Sutures were not again inserted, but the upper part of the incision left freely open; efficient drainage was thus assured.

For the next twelve days he had a temperature of pyæmic character, but no rigors, and his condition was otherwise good. He took food well, and was given quinine in full doses, purgatives, and rectal injections of saline.

On December 15th the temperature had become subnormal, and the wound looked clean and healthy, but there was still some pulsation in the mastoid antrum. The temperature remained subnormal for six days, when the pulsation in the mastoid had ceased, the wound was granulating, and his general condition seemed satisfactory. He was, however, rather apathetic, which might have been accounted for by his deafness, but I was disposed to suspect cerebral abscess. He, however, declined any further operation, and as the part looked now so well I did not feel inclined to press the matter.

During the next ten days the temperature regained the normal, and he was up and about the ward, and took an interest in his surroundings, so that I came to regard him as safely convalescent.

To my dismay, on January 2nd, 1908, he had a sudden rise of temperature accompanied by vomiting. This was repeated on the next day, and on January 4th he died suddenly.