panied with vomiting and ascites, the surgeon should make a very careful and accurate examination of the abdominal organs, especially the stomach.

The fact that so many of the patients in Schlagenhauser's list had been submitted to ovariectomy and the gastric cancer overlooked in spite of the presence of typical signs, such as persistent vomiting and progressive emaciation, illustrates what may be called occupation bias, for the gynaecologist would allow the existence of a definite tumour in the pelvis to fill up the foreground of the clinical picture. Ten years ago I saw two cases in which bilateral solid tumours of the ovaries as big as cocoanuts were removed from women under the impression that they were primary; the patients suffered from persistent vomiting, and died in a few days. At the necropsy carcinoma of the pylorus was found. These cases were used to illustrate the coexistence of two primary malignant neoplasms, an erroneous opinion in these patients at least. Dust has been thrown in the observer's eyes, so to speak, by the unusual size which these metastatic deposits attain in the ovaries.

Even in cases in which widespread dissemination of the disease has existed in the peritoneum, accompanied by moderately-enlarged ovaries secondary to gastric cancer, the ovaries have been erroneously regarded as the primary source of the disease. It is also significant that whenever surgeons have made inquiries into the remote results of ovariectomy they have been astonished to find that many of the patients have perished from recurrence in the abdomen or from intestinal obstruction. These new facts offer an explanation of some of these unhappy sequences.

I will now endeavour to show that the pathological side of this question is as interesting as its clinical aspect, and that those cases of cancer of the ovaries secondary to primary cancer of an abdominal viscus, which are not due to direct implication as a result of propinquity, may be due to permeation. Handley has shown in his admirable investigations that cancer of the breast spreads by permeating the deep fascia, and slowly creeps along the lymphatics of the fascial plexus till it reaches the epigastrium immediately below the ensiform cartilage; at this point the cancer-filled lymphatics of the fascial plexus are, in the middle line, separated from the subperitoneal fat only by a thin layer of fibrous tissue. Through this weak defence the cancer cells slowly find their way into the general peritoneal cavity and engraft themselves on to the omentum and other suitable visceral plots whereon they thrive and grow into metastatic nodules or lumps. It is conceivable and probable that many of these infecting cells find their way into the pelvis and lodge on the ovaries, pelvic peritoneum, and uterus. The fluid normally present in the general peritoneal cavity serves as an admirable vehicle for the transport of such cells into the recesses of the pelvis and there relatively undisturbed they grow into tumours.

If we extend Handley's observations on the spread of breast cancer and apply them to a primary cancer in an abdominal organ, especially in the stomach, colon, or rectum, which often grows very slowly, we may read its course in this way: Arising in the mucous membrane the cancer cells slowly permeate it and implicate the submucous and muscular coats, finally infiltrating the peritoneal covering. The cancer cells escaping into the great serous cavity are distributed by the fluid, aided by the movements of the bowels and gradually fall into the pelvis among other recesses of the belly. In the pelvis the most obvious organs for them to fall upon would be the ovaries, as they so often rest on the floor and are fairly proximate. In this way the ovaries may be fairly pictured in the mind receiving a light covering of falling cancer cells, as evergreen shrubs are clothed by snowflakes in winter. This is not a fanciful picture. The escape of cancer cells into the general peritoneal cavity can be demonstrated; for example, in cancer of the gall bladder I have seen a small bud-like process standing out on the peritoneal surface shedding its surface cells, which became distributed throughout the belly by the movement of the intestines and giving rise to hundreds of minute nodules of cancer. I have also seen the same thing in connexion with cancer of the body of the uterus. Therefore, if the dispersal of cancer cells can be demonstrated in such a gross way, it is undeniable that they may be silently and insidiously shed from the surface of the

infected peritoneum covering a carcinomatous focus in the stomach or the intestine.

When the nature of solid malignant tumours of the ovaries comes to be more thoroughly appreciated by those who devote their attention to the surgery of the pelvis, it may enable them to contemplate the clinical aspect of the case with a wider knowledge of its surroundings, and perhaps save themselves and their patients much acute disappointment.

THE SURGERY OF SARCOMA IN KASHMIR.

By ARTHUR NEVE, F.R.C.S.E.,

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THERE has been a concentration of interest upon cancer of recent years which has relegated sarcoma almost to the shade of oblivion. In the textbooks of the last generation the group cancer included many of the sarcomata. Were the distinction one of malignancy and not one of pathology some of the sarcomata might contend for the first place. There is something terrible in their growth which impresses the imagination—the early age at which they may appear, the swiftness with which they grow and infiltrate surrounding tissues, their proneness to disseminate themselves in other parts of the body, not restrained by any lymph channels, but swept here and there by the blood current—all of us must have seen cases which were tragic. Fortunately all sarcomas are not of this type; many grow very slowly, do not disseminate, and can be quite eradicated.

In this hospital on an average 21 sarcomata are removed every year, and I have the detailed records of 184 cases which were operated upon by Dr. E. F. Neve or myself. A considerable number are quite inoperable when first seen. In Kashmir epitheliomata are far more common, chiefly owing to the use of the "kangri" or fire-basket. On an average 80 are removed every year, and of non-malignant tumours 160 per annum.

Sex.—Only 20 per cent. were females, as compared with 36 per cent. of females in the epithelial group.

Age.—The age incidence is as follows, per cent.:

Under 5	10	15	20	30	40	50	60	70
6	7	10	7	18	20	21	8	3

So that the mean age is under 40 years instead of over 50, which is the mean for epithelioma.

Duration.—Thirty-six per cent. were of less than one year's growth, 15 per cent. under two years, 30 per cent. from two to three years, and 10 per cent. over ten years' duration.

Varieties.—In Kashmir we recognize the same species of sarcoma as in Europe: (1) round-celled, (2) lympho-sarcoma, (3) spindle-celled, (4) myeloid, (5) alveolar, (6) melanotic. In any of these there may be myxomatous degeneration. The amount of stroma varies; usually in the small, round-celled variety there is very little and the tumour is encephaloid in substance; other round and oval-celled tumours are moderately firm, resembling fish hard roe—a common type in the parotid region. Of the tumours recorded, 1 was a lipo-sarcoma, 3 cystic round-celled, 5 myxomatous, 7 lympho-sarcoma—many of this species were seen but not operated on—7 myeloid, 8 melanotic, 5 pure spindle-celled, 12 round-celled, and the rest of mixed oval and spindle cells.

Locality.—The following list shows how wide is the distribution:

Scalp, 2; eye and orbit, 14; ear, 1; nose and pharynx, 3; upper jaw and malar bone, 13; lower jaw, 7; other parts of face, 5; cranial bones, 3; parotid and neck, 26; tongue and submaxillary, 3; larynx, 2; total in head and neck, 79. Upper extremity—clavicle, 2; scapula, 2; axilla, 1; arm, 5; forearm, 7; hand, 7; total, 24. Trunk—chest, 3; mamma, 1; shoulder, 1; side, 7; dorsal, 3; lumbar, 5; abdominal wall, 12; pelvic bones, 2; mesentery, 2; kidney, 2; liver, 1; uterus, 2; vagina, 1; testicle, 3; total, 45; in several of these removal was not effected, the operation being only exploratory. Lower extremity—thigh and groin, 16; leg, 16; foot, 4; total, 36. Grand total, 184.

Operation.—With this diversity in structure and in locality there can be no routine operation for sarcoma. The surgeon's problem is to remove each individual tumour as completely as possible. Every case has to be taken on its own merits, and in the case of many the diagnosis cannot be fully made without an incision, or,

indeed, as to its precise type, without the aid of the microscope. Whatever the microscopic character may be, the clinical characters must always be taken into full consideration. If of slow growth, whatever its cells may be, there is not infrequently a fairly well-marked capsule, perhaps more often in India than in England. Then the growth may have been towards the surface of the body so as to have but a narrow base. In such cases an absolute cure may be expected.

Even when there is a capsule the tumour should never be shelled out from inside it, but should be removed with the capsule, and, if practicable, some of the surrounding tissue, and this needs to be scrutinized with the keenest suspicion, lest at some point it may have become infiltrated. If the growth is in the substance of a muscle there can be no assurance of safety unless the muscle be removed far beyond the apparent limits of the tumour, and it is good practice to extirpate the muscle in its entire length. In a limb it often becomes a critical question whether an amputation should be performed or not. In two cases we amputated the arm, and in three the leg or thigh, on account of the extent to which the bones were affected. In several other patients we should have amputated at the hip-joint had it been possible to get their consent; some came too late, with secondary tumours in the pelvis or elsewhere.

In a country which is so isolated, and where the people are so ignorant, it is little surprising that many allow the tumours to attain a size inconvenient by their bulk before applying to us for their removal. Of those excised from the parotid region, some were as large as a coconut. Such required an incision from the temporal region to near the sternum, the facial nerve has always to be sacrificed, and often the common carotid, or perhaps also the jugular vein, ligatured. For many years past we have deliberately ligatured the common or the external carotid as a preliminary to excision of any malignant tumours of the parotid or upper jaw, not merely for the sake of facilitating the operation and diminishing the bleeding, but also with the view of cutting off the blood supply, and so tending to cause degeneration or atrophy of any portion of the tumour which may have escaped removal. The known recurrence in these cases was only about 20 per cent., and in at least two patients, in whom the removal was incomplete, the growth was quite arrested, and the patients were in good health years after.

In extensive operations about the face it is impossible to avoid a certain amount of sepsis, and it may be that in some of these incomplete removals the benefit that undoubtedly followed was due, not to the interference with the blood supply, but to the action of a mixed sepsis with its toxins on the embryonic cells, in the same way as Coley's fluid acts. I consider that it is worth while to give a patient the chance, even when the extent of the disease precludes any hope of making a clean sweep of the disease with the knife. In many cases one may hope to alleviate the pain of pressure and the distress of bulk, and in others to prune off foul and fungating portions which are a dangerous source of haemorrhage, and render the patient a trial to his friends.

In two cases the whole scapula was excised. In one, a young woman, the sarcoma had not infiltrated the surrounding tissues widely, and cure was complete; in the other I assisted Dr. Gaster to remove a widely-diffused tumour. All visible disease was excised, including all muscles down to the ribs, and from the spine to the upper part of the humerus; but six weeks later I had to excise a growth in the arm, and then there was further recurrence in the back of the neck.

Many of the tumours from the flank, abdominal wall, or lumbar region were very extensive, and of these few appeared to have recurred; perhaps we may have dealt with fewer of the really inoperable cases in this region. In one man I was drawn into an operation which cleared away all tissue from the tenth rib to the iliac crest back to the spine and down to the peritoneum, and in one place the pleura, which was buttonholed. I put in large skin grafts, and for a time all went well, but there was inoperable recurrence originating from the pelvis.

It is well to make a careful exploration before committing oneself to an excision, deciding by a microscopic examination of a scraping, and by the relations of the tumour to vital structures, whether to push the matter to a final issue. Thus, in one case, Dr. E. F. Neve found that

the phrenic nerve was involved, and hiccup was set up when exploring the lower roots of a neck tumour, so he closed the wound. So, too, in several of the abdominal cases the operation was merely exploratory.

Altogether, 11 exploratory operations were done, in 12 others the removal was incomplete, in 16 there was recurrence, and in 10 others it was doubtful whether extirpation was complete. Three cases died in hospital or soon after leaving, the remaining 132 are regarded as probably cured, which gives a percentage of about 70 of success.

THE COLOUR OF THE HAIR IN OVARIAN DERMoids.

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In a philosophical letter upon the colour of the hair in ovarian dermoids (February 10th, 1906), Mr. C. J. Bond puts a series of questions on which he asks for information, and in the course of these makes the interesting statement that in one case of bilateral ovarian dermoid, he had found the hair in one cyst dark and in the other light.

In the *BRITISH MEDICAL JOURNAL*, November 5th, 1904 (Report of a meeting of the Pathological Society), I have pointed out that the ovarian dermoid does not bear classifying in the same group as that of the face or trunk. As long as the dermoid of the ovary was not differentiated from such, it was thought sufficient to point to the epiblastic origin of the Wolffian duct as the explanation of it. At the most, such a view can hold only for a simple parovarian dermoid or a simple dermoid of the hilum of the ovary, and is quite inadequate to explain the common complex ovarian cyst with its bone and teeth, or (as in the specimen I then described) with a distinct acephalous monster, provided with rudimentary limbs and a coil of intestine, projecting into the cavity of the cyst.

The theory I there advanced, and for which I ventured to revive the term (in a new sense) of epigenesis, was that the teratomatous or so-called dermoid cyst of the ovary resulted from the fertilization of the primordial ova in the embryo, so that the embryo furnished a second imperfect individual, the origin of which was not, therefore, synchronous with, but later than, itself. The actual impregnation I supposed to take place from surplus spermatozoa which perforated the investing membrane of the original ovum at its impregnation, and afterwards lay between the cells of the blastoderm ready to fertilize the primordial ova of the resulting embryo. This theory, like that of parthenogenesis, would involve a histological "maturation" of the ovum. The phenomenon of parthenogenesis is limited to forms so low in the animal series, however, that it is difficult to think it obtains with such great frequency in the human subject as the common occurrence of ovarian teratomata would necessitate.

The difference in the colour of the hair in bilateral ovarian cysts, noticed by Mr. Bond, would on this theory of epigenesis be an example only of the difference in colour so frequently witnessed in children born of the same parents, or still more closely, in heterologous twins, whose hair may be of different colours. In the case of homologous twins, which arise from a single ovum, are formed on a single blastodermic vesicle and enclosed within a single amniotic sac, the hair is of the same colour and the sexes alike, although the same concurrences are not, of course, excluded in the case where twins arise from two ova, whether discharged from the same or opposite ovaries. In double monsters the sex is always the same, the view generally held being that such monsters result from the misdevelopment of homologous twins. The colour of the hair in such is, I find, invariably alike.

Since reading Mr. Bond's letter, I have inquired into the colour of the hair of the patient (a single woman, 33 years of age) from whom the teratomatous cyst already referred to was removed.

Mr. Bell, the obstetric registrar at St. Thomas's Hospital, was good enough to trace the patient and obtain a sample of her hair. I placed this in the spirit in which the teratoma is preserved in order to institute a just comparison between the two. That of the teratoma consists of a tuft growing from the pubes, the parasite being