TABLE II.—Reaction of Blood Serum in 21 Non-Malignant Cases.

No.	Sex.	Age.	Diagnosis.	Alkalinity to Dimethyl.	Remarks.
1	M.	35	Healthy	0.166N	—
2	M.	31	Healthy	0.182N	—
3	M.	17	Varicocele	0.182N	—
4	M.	29	Varicocele	0.165N	6 days after operation, 0.156N.
5	M.	20	Varicose veins	0.182N	8 days after operation, 0.182N.
6	M.	20	Varicocele	0.165N	9 days after operation, 0.155N.
7	F.	50	Dyspepsia	0.165N	—
8	F.	47	Dyspepsia	0.182N	—
9	F.	48	Gall stones	0.182N	—
10	F.	63	Pernicious anaemia	0.166N	Haemoglobin, 25 per cent.
11	M.	50	Tuberculous hip	0.166N	—
12	M.	55	Gall stones	0.165N	—
13	M.	42	Varicose veins	0.182N	6 days after operation, 0.182N.
14	M.	27	Inguinal hernia	0.182N	—
15	F.	18	Diabetes	0.166N	Urine contains di-acetic acid and acetone.
16	F.	45	Phlebitis	0.166N	—
17	M.	40	Malaria and dysentery	0.153N	—
18	M.	36	Lipoma of back	0.182N	—
19	M.	33	Colitis	0.166N	—
20	M.	28	Appendicitis	0.182N	—
21	F.	32	Endometritis	0.181N	—

Average ... 0.173N

TABLE III.—Six Doubtful Cases.

No.	Sex.	Age.	Diagnosis.	Alkalinity to Dimethyl.	Remarks.
1	M.	52	? Cancer of oesophagus	0.182N	—
2	M.	48	? Cancer of stomach	0.200N	—
3	M.	55	Cancer of tongue and cervical glands, removed 18 months previously. No signs of recurrence	0.165N	—
4	F.	37	? Cancer of uterus	0.200N	—
5	M.	51	? Cancer of oesophagus	0.182N	—
6	M.	33	? Cancer of pancreas	0.182N	No free HCl in gastric juice

in which the general metabolism is not seriously disordered—that is to say, in precisely those cases in which the diagnosis is most likely to be obscure, and in which early operation is most likely to benefit the patient. The reaction is obviously of little value in the superficial cancers—as of the tongue and cervix uteri—when tissue can be obtained for microscopical examination. There still remains, however, the large group of deep cancers, notably of the breast, stomach, and body of the uterus.

The figures 0.200N or 0.222N appear twelve times out of twenty-four in the first table, but not once in the 21 cases of the second. It can scarcely be hoped that they will never appear in records of non-malignant cases; but I have not yet obtained them, except possibly in the two cases in the third table which give the figure 0.200N. It must be noted that the word “doubtful” signifies “still doubtful.” Many of the other readings were obtained before the clinical diagnosis was certain.

The clinical evidence points to both of the two above-mentioned cases being malignant, but it would obviously be incorrect to consider them as such till the diagnosis is clear; their subsequent histories will be of some importance, and I regret that I cannot yet speak with certainty of them.

While the high figures afford some presumption of the presence of cancer, it is quite clear that low figures do

nothing whatever in the opposite direction; I believe that further work may bring a much larger proportion of cancer cases into line, but for the present any suggestion whatever of a negative diagnosis would be unjustifiable.

A careful study of Moore and Wilson's and West Watson's figures will show that they suggest similar deductions. West Watson makes a distinction between “advanced” and “inoperable” cases; such a distinction is very arbitrary and must be extremely difficult to draw, but I believe, nevertheless, that his point—that in advanced cases the increasing anaemia masks the altered reaction to dimethyl—is important. It is possible that a classification based on haemoglobin estimations may be useful; such a classification would still be very arbitrary, but it would at least be easily made.

I have purposely discussed my results very shortly, because it is clear that they are at present far too incomplete to justify definite conclusions. I hope later to have the opportunity to extend them. If the presence of a change in reaction of cancer serums to dimethyl or other indicators is confirmed, it opens up two very wide questions: (1) What is the chemical nature of the change? and (2) What is the cause—whether antecedent to, or produced by, the development of the cancer? It is impossible to do any work on the subject without considering these questions; but here, again, my views are at present too nebulous to merit quoting. For those interested in the subject it is necessary to read in full the extremely lucid and interesting papers of Professor Moore and his collaborators; suggestive facts will also be found in the writings of Grawitz,³ Mottram,⁸ and Royle.^{10, 11} The fullest bibliography that I know of the subject of estimation of the reaction of the blood on blood serum will be found in the article by Dr. Mercier Gamble² in the *Journal of Pathology* for 1906.

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SARCOMA OF THE UTERUS.

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SARCOMA of the body of the uterus being a rare disease, the following notes may be of interest:

A married lady, aged 45, consulted me about excessive menstruation. She had been quite regular until about twelve months earlier, when the periods became irregular and there was an excessive loss of blood. There was no intermenstrual leucorrhoea. She appeared markedly anaemic, with a peculiar yellowish tinge, almost suggestive of pernicious anaemia. Although married for twenty years she had never been pregnant. There was no loss of flesh, and a thick layer of abdominal fat prevented detailed palpation.

Vaginal examination revealed an enlarged uterus, not, however, reaching above the pelvic brim, but feeling broader and harder than normal.

As the patient seemed so anaemic, and there were anaemic bruits over the mitral and pulmonary areas, and as she suffered agonizing pain every few weeks when semi-solid masses of maternal like blood clots were expelled from the uterus, hysterectomy was advised. I found that the temperature at night varied from 99° to 100° F. A diagnosis was made of sloughing fibroid, infecting the peritoneum and causing pain and rise of temperature.

Although the patient was in a poor state of health, removal of the uterus seemed her only chance, and she entered our nursing home, where, with the valuable help of my colleague, Dr. J. B. Hughes, I did a supravaginal amputation of the uterus. The operation proved difficult. The omentum was adherent to the fundus of the uterus and to the ovaries and Fallopian tubes.

Both tubes were inflamed and much enlarged. The uterus was about 4 in. long and 3 in. to 4 in. in width. It felt of stony hardness, and on its peritoneal surface were three hard masses as big as large peas. It extended well into the pelvic peritoneum on either side. After separating all adhesions, I first removed both tubes and ovaries, and then by strong traction on the fundus with a broad volsellum tied off the broad ligaments and uterine arteries and excised the supravaginal portion of the

uterus. The peritoneal flaps were stitched together, the cavity carefully dried, and the abdominal wound closed.

She made an uninterrupted recovery and went home at the end of a fortnight. On slitting the uterus up a mass of sloughing tissue was seen half embedded in the wall, and half projecting into the uterine cavity. It was about the size of a small Tangerine orange. The half of the uterus containing the sloughing tumour was sent to the Clinical Research Association, and the following report was furnished: "This is a malignant growth arising in the endometrium and having the characters of a round-celled sarcoma. It is made up of rather large cells enclosed in a delicate stroma with thin-walled vessels, and is infiltrating the muscle. It is not in the least like a fibromyoma."

Hart and Barbour state that sarcoma of the uterus is extremely rare. Gessner in his article on sarcoma uteri, in Veit's *Handbuch d. Gyn.*, states that he found only 18 sarcomata in 9,133 cases. Roger Williams found only 2 sarcomata in 2,649 uterine tumours.

The diagnosis of the condition is not easy. In this case pain at intervals was a marked feature, and was of the character described by Gusserow as "intense and rending." Clay and A. R. Simpson, however, state that the absence of pain is a marked feature of sarcoma as opposed to carcinoma.

The absence of the "free rice-water discharge" was noteworthy, though during the later stages the blood-clot-like masses which were expelled would probably have shown sarcoma cells if they had been microscopically examined. The peculiar cachexia certainly suggested malignant disease, but the excessive loss of blood and severe attacks of pain appeared to account for that condition. Had I suspected malignancy at the time of operation I would certainly have done total hysterectomy.

THE AUTOPLASTIC OVARIAN GRAFT AND ITS CLINICAL VALUE.*

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A YEAR ago I showed before the Birmingham Branch of the British Medical Association a patient upon whom I had performed heteroplastic ovarian grafting—that is, the transplantation of the ovary from one patient to another. Shortly after reading this paper an opportunity occurred of trying the effect of an autoplasmic graft; in other words, the transference of ovarian tissue from its normal position in the pelvis to a site elsewhere in the same subject. The result of this experiment has so far been entirely successful.

The details of the case are as follows:

The patient, aged 29, was sent into the General Hospital, Birmingham, by Dr. Branday of Handsworth on April 3rd, 1912, with a history of repeated attacks of pelvic inflammation. The woman had been confined to bed for one or two months with severe pain during each year for the three years previous to admission. Dysmenorrhoea had been severe for the last two years, following the birth of her last child. During this time the catamenia had been regular.

On admission the patient looked anaemic and ill and was considerably wasted. Bimanual examination showed that the uterus was fixed by adhesions, and that a very tender rounded swelling was present in the region of each uterine appendage, occupying the corresponding posterior quadrant of the pelvis.

Operation.

On April 4th, 1912, I performed laparotomy through a vertical 4 in. incision over the right rectus muscle, and found both uterine appendages in a condition of severe chronic inflammation; in fact, far too advanced for any conservative measures to be employed. The right ovary was the seat of a suppurating leucine cyst, the size of a small orange and was firmly adherent to the corresponding Fallopian tube. The left ovary was strongly bound down to the left tube and had to be removed with the latter, which was also chronically inflamed. The uterus, although presenting numerous adhesions on the peritoneal aspect, appeared normal, and was left *in situ*. Both uterine appendages were removed, but before the abdominal wall was closed, a portion of the left ovary was grafted into it. The healthy half of the organ was cut into minute fragments, and these were scattered into the sub-peritoneal connective tissue and within the rectus muscle and rectus sheath. Care was taken never to remove the grafted material from the body fluids. Until it was required, it was

allowed to remain in Douglas's pouch. The abdominal incision was closed in layers and no antiseptics were applied to the wound.

The patient made an uninterrupted recovery and the incision healed by first intention. No undue tenderness has been noticed by the patient in the line of the incision either during convalescence or since.

After-History.

The after-history of the patient is quite satisfactory, and it appears certain that some of the ovarian grafts have established themselves and are functioning. I heard no more of her until the end of January, 1913, when I communicated with Dr. Branday, and he very kindly made arrangements for me to examine her. The patient told me that she had not suffered from any "flushing," palpitation, or nervous phenomena usually associated with the artificial menopause. The most important evidence, however, consists in the menstrual history since operation. The first period occurred from April 6th to 16th, 1912, commencing two days after the operation, when it was normally due. The next period began two months after leaving the hospital and lasted ten days. The following period occurred three months later, lasting six days. On January 12th, 1913, a normal period occurred, and on February 13th uterine haemorrhage again commenced. The last three periods have occurred at monthly intervals, and it appears, therefore, that regularity is established. During the catamenia rather severe headache has been present, but this has not been noted at other times. No dysmenorrhoea has occurred, and there has been no tenderness in the abdominal scar during the periods.

Inquiries as to the sexual life since operation showed that no dyspareunia is present, and that the sexual functions are exercised in a perfectly normal manner.

The case has not been recorded until almost a year after the operation in order that a fair estimate might be made of the result. So far this is as satisfactory as could be desired. Various criticisms may, of course, be urged against the acceptance of the graft as the cause of success. It is well known, for example, that even after double oophorectomy menstruation may continue for a few months. It rarely continues, however, as long as ten months after the operation, and furthermore, the periods progressively decrease in duration. In the present case there is certainly no diminution, and, if anything, the flow is excessive. Again, it may be asked whether the uterine haemorrhage is really of the nature of menstruation. The periodicity and the association of moulins in the form of headaches certainly strongly favour this view. The point may be settled by an examination of the menstrual fluid, and the demonstration in the same of an excess of calcium salts and absence of fibrin. This investigation will shortly be undertaken. Another criticism may be offered in the suggestion that all ovarian tissue was not removed from the pelvis, and that it is particularly easy to leave a portion or an accessory ovary when numerous adhesions are present. In the case here recorded I am inclined to think that this fact need not be entertained. The uterine appendages were removed without difficulty, the right ovary was replaced entirely by an abscess cavity, and the left organ was adherent to the corresponding Fallopian tube only and not to the neighbouring viscera. At the time a careful search was made for any displaced ovarian tissue or accessory ovary, and none was seen as far as macroscopical appearances were concerned.

Literature.

The subject of ovarian grafting is a fascinating one, and I am convinced that it can take a very definite and important place in gynaecological surgery. The literature upon the subject is scattered, but is yearly increasing in amount, and a sufficient number of authentic cases are now recorded to prove that autoplasmic grafts can be successfully made, and that for a time at least they will functionate. The work of Scott Carmichael of Edinburgh,¹ Higuchi of Tokyo,² Natrass of Melbourne,³ and others, has proved that in animals, especially in the dog and rabbit, it is possible to transplant ovarian tissue, and that the grafts are usually successful in producing the specific internal secretion. Natrass's³ experiments are extremely important in this respect. He was able in the case of the rabbit to transplant ovarian tissue into the subcutaneous tissues, and on to the peritoneum, kidney, spleen, and periosteum. At first, fatty degeneration of the stroma cells takes place, and it appears that this occurs in inverse ratio to the vascularity of the tissues into which the graft is made. When the tissue is examined at a later period, absorption and repair of the pathological products has occurred, and the production and maturation of Graafian follicles takes place. That the transplanted organ exerts its influence

* A paper read before the Birmingham Branch of the British Medical Association.