at the Maternity Hospital he had steered a middle course. About the fifth day was when the patients got up.

The President suggested that, the subject being such an important one, the Society might postpone the discussion of Dr Ballantyne's paper, and take it as the first business of the next meeting. This was agreed to.

V. THE HISTOLOGICAL CHANGES ASSOCIATED WITH AN EARLY ABORTION, WITH SPECIAL REFERENCE TO THE VESSELS OF THE DECIDUA.

By B. P. Watson, M.D., F.R.C.S.E., Gynæcological Tutor, University of Edinburgh; Gynæcologist to the Cowgate Dispensary; and Henry Wade, M.D., F.R.C.S.E., Assistant Surgeon, Royal Infirmary, Edinburgh; Lecturer on Surgery, Surgeons' Hall, Edinburgh.

The specimen which forms the subject of the present communication was obtained from a patient who has had a series of abortions following rapidly on each other. We were fortunate in obtaining it in a fairly good state of preservation, and as the pregnancy had not advanced beyond the third week, as judged by the condition of the embryo, it has the anatomical interest which is still attached to any human ovum of that early period, in addition to the more strictly obstetrical one, in tracing, if possible, the cause of the abortion and presumably of those which preceded and followed it.

The patient is a woman of 28 years of age, who has been married for eight years. Her obstetrical history is as follows:—

1*st Pregnancy.*—Went to full time, and a healthy boy was born in September 1902, and is still alive.

2*nd Pregnancy.*—Also went to full time, a boy being born September 1904, who only lived for nine days. Cause of death unknown.

3rd Pregnancy.—Abortion at 4½ months—September 1905. She bled continuously for six weeks prior to the abortion.

4th Pregnancy.—Abortion at 2½ months—March 1906. Bled for three weeks before the ovum was expelled.

5th Pregnancy.—Abortion probably about 2½ months—September 1906. Was bleeding the whole time and did not know she was pregnant.

6th Pregnancy.—Abortion at 2½ months—April 1907. Also preceded by hæmorrhage.

7th Pregnancy.—In December 1907, the patient had gone beyond her usual menstrual time by ten days and then began to bleed slightly. On the supposition that she was pregnant, she was instructed to keep carefully anything that came away, and next day she brought to us a piece of tissue—a complete decidual cast of the uterus, on one wall of which was visible, as a small pea-like elevation, the ovum. That ovum is the one we are about to demonstrate.

8th Pregnancy.—Abortion at 4th month—October 1908. Two weeks' hæmorrhage preceded the abortion.

9th Pregnancy.—Six weeks' abortion, April 1909, preceded by hæmorrhage.

It will thus be seen that this woman has had two full-time children followed by seven abortions, varying in time from a few weeks up to four and a half months. In the history of these abortions there is a singular uniformity as regards the occurrence of hæmorrhage, which preceded them all for a considerable time; and in her second pregnancy, which went to full time, there is an unusual history of continuous hæmorrhage and occasional floodings from the third month onwards, but none at the time of labour. Such a history points to some abnormal condition of the decidua, and, when taken in conjunction with the histological findings in it and in the resting uterine mucosa, is very significant.

The patient was seen by us for the first time after the

second abortion, and during the fifth and sixth pregnancies she was treated with potassium iodide, 10 grs. thrice daily. As that failed to prevent the abortions, the uterus was curetted in May 1907. In the seventh pregnancy she had taken potassium iodide for two days before the passage of the ovum. In the eighth she had potassium iodide and perchloride of mercury from the sixth week up to the time of the abortion at fourth month, and in the ninth pregnancy had taken the same drugs for three weeks before the abortion occurred. The mercury was given on the supposition that syphilis might be the cause of the abortions; for although there is no direct evidence of syphilis, it cannot absolutely be excluded, and the vascular changes about to be described might be regarded as of syphilitic origin.

Menstruation for the past three years has been excessive.

Naked-eye Appearances of Specimen.—The uterine decidual cast is a piece of membrane triangular in shape, measuring 3·9 cm. along the base and 4·5 cm. along each wall. Its external surface is shaggy in appearance, while on opening the sac the internal surface presents a more or less smooth surface, slightly pitted and thrown into smooth elevations (Figs. 1 and 2). Towards the apex of the cast, corresponding to the position of the os internum, is a small pea-like elevation, smooth on the surface and surrounded by a ridge of the mucosa rather bigger than the other ridges present. This pea-like body represents the ovum covered with decidua, and measures 0·8 cm. in diameter.

Microscopic Examination.—The specimen was hardened in formalin and embedded in paraffin, and a series of 1800 serial sections were made through the ovum and the adjacent parts of the decidua. In the sectioning we were fortunate in cutting the embryo almost transversely and the result has been that the sections show the relations of the different parts of the embryo and its membranes with almost diagrammatic clearness

(Fig. 3). It is not intended in the present communication to enter into a detailed description of the embryology, which must be reserved for another paper, but to confine ourselves to a consideration of the appearances met with in the decidua.

In Fig. 3 the relation of the different parts will be seen. The chorionic membrane with its villi is everywhere surrounded by decidua, the capsularis being relatively thin. The decidua basalis and vera are shaggy on their under aspect, as the result of separation from the underlying uterine wall. In both these areas the distinction between the compact and spongy layers is evident, and separation has taken place through the latter. In the immediate neighbourhood of the ovum the decidual reaction is more marked than in the more remote parts of the decidua vera, but even in the former situation the decidual cells fail to form the dense cellular layer usually met with, the cells being separated from each other by intercellular substance, granular in appearance, and by smaller round cells. In the decidua vera and in the deeper spongy layer of the basalis the cells are only slightly enlarged, and are in places widely separated from each other (Fig. 5). The most striking changes, however, are in the vessels of the decidua. In the spongy layer all the vessels show thickening of their coats, and in some this has proceeded to such an extent as to cause obliteration of the lumen. A low-power view of the spongy layer of the decidua basalis shows the change in these vessels very well (Figs. 6 and 7). It will there be seen that all the vessels have markedly thickened walls, and on examination under a high power (Fig. 8) the thickening is found to be due partly to a deposit of fibrous tissue round the lumen and partly to a proliferation of the endothelial coat. In Fig. 5 is shown a vessel which has become completely thrombosed, and a necrosis of the tissue of the decidual lobule supplied by it has occurred.

In association with these vascular changes in the decidua, it is interesting to consider the histology of the mucosa of this

patient's uterus, removed by the curette during a resting period. This curetting was performed seven months prior to the expulsion of the present ovum. The specimen shows a certain amount of glandular proliferation and dilatation, but the striking feature of the sections is the presence of a great deal of blood extravasation in the stroma and the thickening of the vessels. Figs. 9 and 10 show the low- and high-power views respectively of some of these vessels, and it will be noted that there is, compared with the normal vessels of the endometrium, a marked degree of thickening in their coats, especially in the outer. The appearances in the vessels are, in fact, the same in character, although not so marked in degree, as those in the deeper layers of the decidua.

Relation of the Vascular Changes to the Occurrence of Abortion.—These vessel changes are undoubtedly of great pathological importance, and are in themselves sufficient to account for the repeated abortions. The cause of the thickening it is not possible to absolutely determine, but the possibilities may be limited to two: 1*st*, that it is due to syphilis; 2*nd*, that it is a sclerosis similar in character to that occurring later in life, due either to premature senility or to some local toxic absorption. Of these two the first seems the more likely in this case, but nothing more definite can be said.

In looking for a cause for the abortions, we have these definite facts in this case to go on, viz.: that the separation has occurred through the spongy layer of the decidua, and that this line of cleavage is throughout the greater part clean cut; that at certain areas the tips of the interglandular bridges which have been torn through consist of necrotic tissue (Fig. 5), and further, in all cases it can be observed that the blood-vessels supplying these necrotic bridges show a marked pathological change. In some, actual thrombosis is present, in others their lumen is narrowed by an active proliferation of the endothelial lining, and fibrous tissue cells surround the walls.

Round these vessels and in the areas supplied by them there is an excess of extravasated blood.

These appearances, the presence of which cannot be gainsaid, are such as would be considered the manifestation of a physiological process if observed in a full-time placenta, but present at this early stage must be regarded as pathological.

The explanation we would offer as accounting for the separation in this case is that it has resulted mainly from necrosis of certain of the interglandular bridges, owing to the interference with the blood-supply to them caused by the vascular changes, with, in addition, the mechanical effect of the extravasated blood. We are thus led to the conclusion that in this particular case the abortion is due to decidual disease affecting the vessels, and is not to be accounted for by the previous death of the ovum.

The pathological importance of the vessel changes met with in the endometrium has of late years been recognised, and we would submit that, as in this case, other cases of repeated abortion may be accounted for by such vascular degeneration.

Description of Figures.

Fig. 1. Outer aspect of decidual cast, unopened, as expelled from uterus. (Natural size.)

Fig. 2. Decidual cast laid open, showing inner surface thrown into folds and at lower pole a rounded swelling, the ovum. (Natural size.)

Fig. 3. Section through the ovum and decidua. The chorionic vesicle is everywhere surrounded by decidua. Inside it the embryo is seen cut in transverse section, with the amnion covering the dorsal aspect and with the yolk sac springing from its ventral aspect. (×7.)

Fig. 4. Higher power view of embryo, amnion and yolk as sac, seen in Fig. 3. In the embryo, note the normal canal, muscle plates, dorsal aorta, Wolffian ducts, neck of yolk sac with gut in transverse section, extreme vascularity of yolk sac, and the great vascularity of the mesoderm connecting the embryo to the

FIG. 1.

FIG. 2.

[*To face page* 64.

FIG. 3.

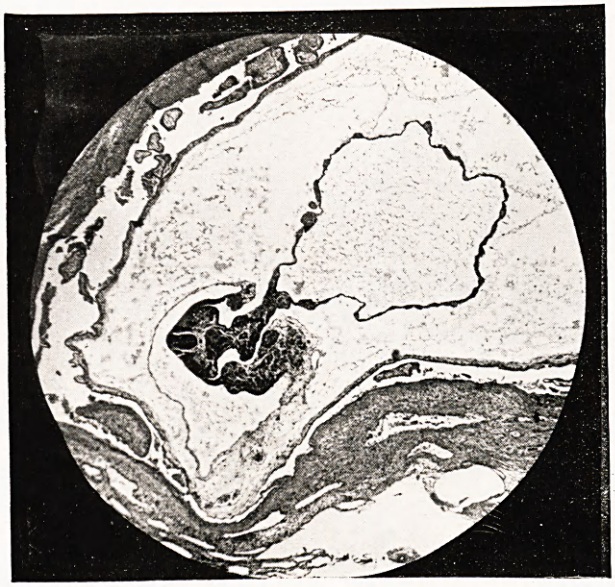

FIG. 4.

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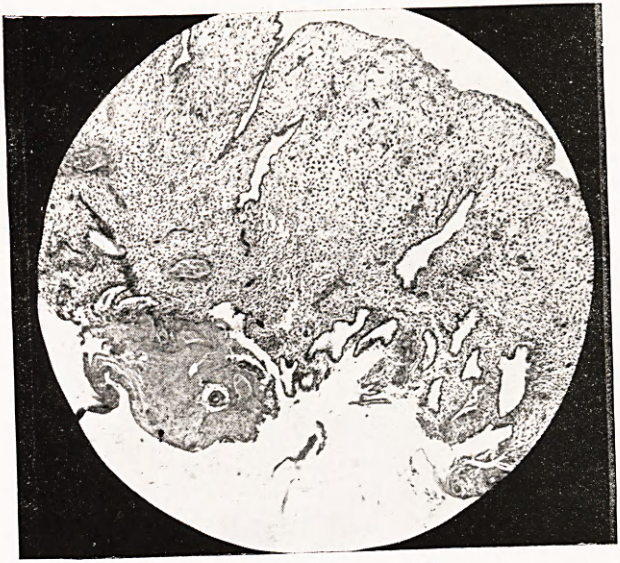

FIG. 5.

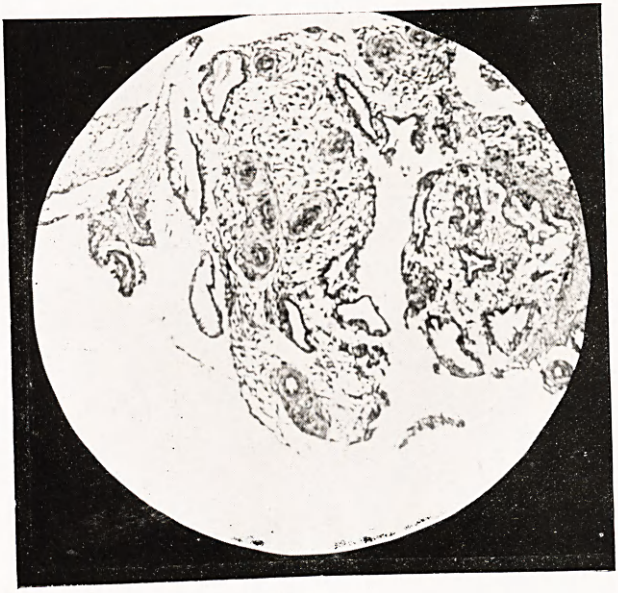

FIG. 6.

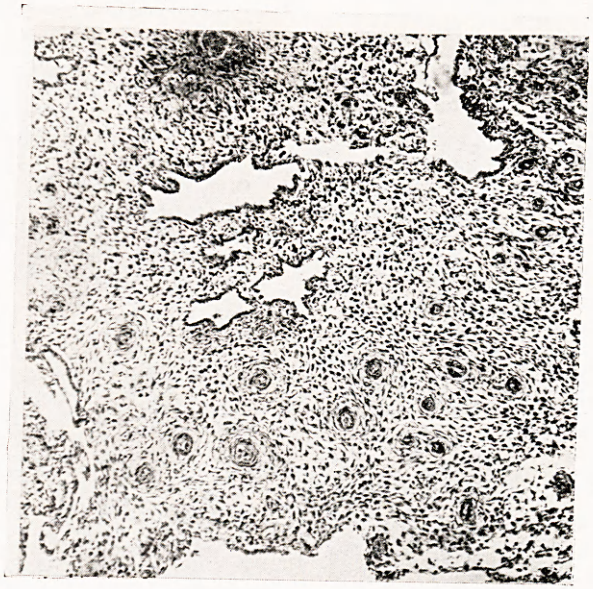

FIG. 7.

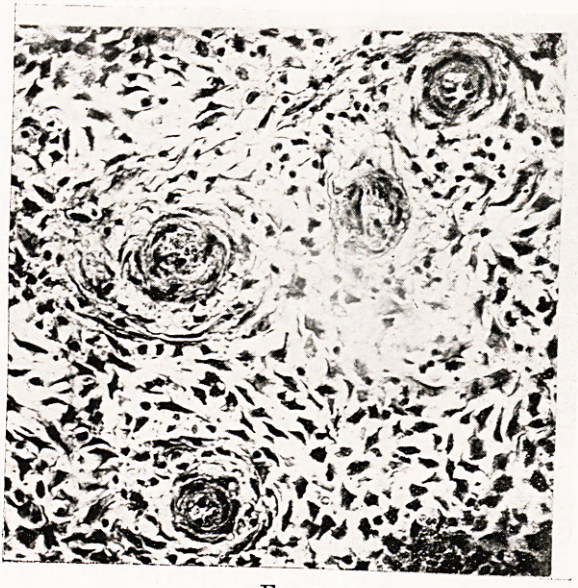

FIG. 8.

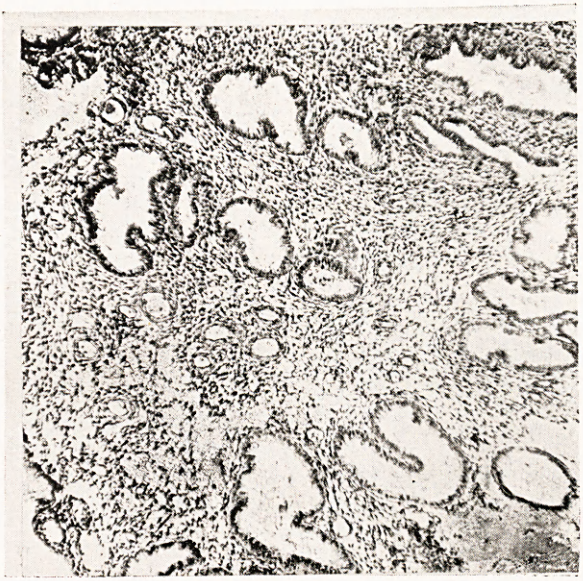

FIG. 9.

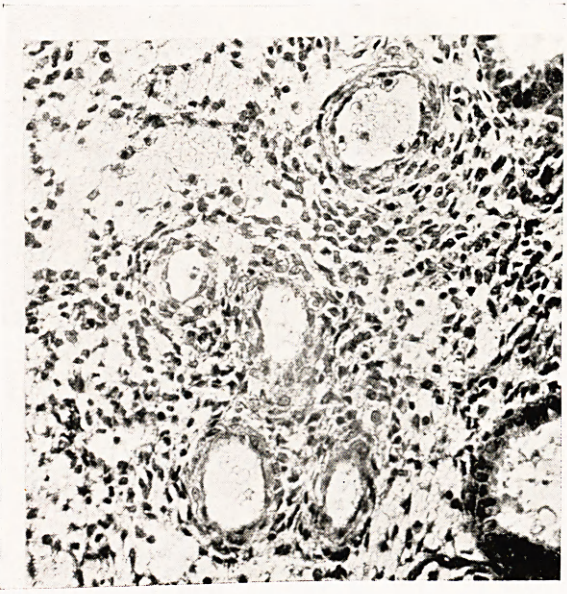

FIG. 10.

mesoderm of the chorionic vessels—the primitive belly stalk. (×20.)

FIG. 5. Decidua vera. Note the division into compact and spongy layers, and the feeble decidual reaction. In the spongy layers is a necrosed lobule with a thrombosed vessel in the middle.

FIG. 6. Part of spongy layer of decidua showing great thickening of the vessels.

FIG. 7. Spongy layer of decidua, showing thickened vessels.

FIG. 8. High-power view of vessels seen in Fig. 7. Note that the thickening is partly due to the presence of fibrous tissue round the vessels, and partly to an endothelial proliferation.

FIG. 9. Mucosa of uterus, removed seven months prior to the abortion, showing blood extravasation in stroma and thickened vessels. The glands are dilated.

FIG. 10. High-power view of Fig. 9. Note the blood extravasation and the vessels with thickened walls due to fibrous tissue growth round the lumina.

Dr Barbour welcomed Mr Wade again to the Obstetrical Society. He spoke of the enormous amount of work which must lie behind the production of such a paper as this one. There were countless points of interest in the paper which could not be reached in the discussion. He described the lantern slides as almost diagrammatic in their clearness.

Mr Wade said that the case had a pathological interest, and also was interesting from the developmental point of view. They did not claim to have shown anything new. There is a good deal of luck connected with the cutting of sections, and they had been singularly fortunate in theirs.

Dr Ballantyne expressed himself as much interested in some of the sections as showing the relationships of the different parts of the embryo. He asked if it was correct to state that embryos are first of S shape and later take a C shape, which seems to have been the shape of the embryo in this case.

He congratulated the authors on having produced a series

of photographs, in our own midst, such as we see sometimes in American publications, but which almost appear to be beyond our own reach.

Dr James Young criticised some points in the paper. With regard to the condition of the vessels, he said that he would expect to find thickening of the vessels of the decidua. This is nearly always found. He has found it sometimes very marked in cases where there was no history of hæmorrhage. Is this condition necessarily the cause of hæmorrhage? He was doubtful as to there being fibrous tissue in the walls of the vessels. This thickening is frequently seen in the endometrium in the resting stage, and he finds that the thickened vessels are capable of opening up as well as others, and have an epithelium which appears to be normal. If fibrous tissue were present, it would certainly constitute a very rare condition. He asked if there was a pronounced decidual reaction round these vessels. Was there any excessive hæmorrhage at the menstrual periods?

The President thanked the authors for a lucid, exhaustive, instructive, and able paper. He was sure that others must feel, as he did, that they knew much more about embryology since they came to that meeting.

Dr Watson, in reply, said that he had no doubt that in the cases where there was a marked thickening of the vessels, it was a fibrous thickening. One knows that in the decidua under normal conditions there is thickening, but he had never seen a decidua which showed so much thickening as this one. Perhaps Dr Young's cases had been cases of abortion. His patient had had marked menorrhagia for the last three or four years. The decidual reaction, all over, was distinctly feeble.