THE EFFECTS OF VAPORISATION AS SHOWN
BY A UTERUS REMOVED BY VAGINAL
HYSTERECTOMY 14 DAYS AFTER THE
OPERATION OF CURETTING AND STEAM-
ING HAD BEEN PERFORMED.

By G. F. BLACKER, M.D., F.R.C.S., F.R.C.P., *Obstetric Physician,
University College Hospital and Great Northern Central Hospital;
Teacher of Practical Midwifery, University College, London.*

THE specimen, a uterus removed by vaginal hysterectomy, 14 days after the operation of curetting and steaming had been performed, illustrates very well the effect of super-heated steam upon the mucous membrane and muscular tissue. The history of the case is shortly as follows:—

Miss H., aged 47, came to me on September 10th, 1902, complaining of increased loss at the monthly periods and a slight amount of inter-menstrual hæmorrhage. This condition had been present for three to four months, and during this time the patient had been unwell every three weeks, the flow lasting a variable time from three to ten days, and as many as four dozen diapers being used at each period. Between the periods a slight show of blood occurred from time to time. There was, however, no continuous vaginal discharge either of mucus, pus or blood, and the inter-menstrual loss had not been more than slight in amount. For the past two months some pain had been present, mainly in the lower part of the abdomen. This pain, which never entirely ceased, was felt chiefly during the first two days of the period, and again severely two days after the cessation of the periods.

The general health had remained good; the appetite was fair; there had been no appreciable loss of flesh and the bowels acted regularly.

On vaginal examination the neck of the uterus was found to be healthy, the body a little enlarged, regular in outline, freely movable, and the appendages apparently normal. No polypus could be detected and the cervical canal was not unduly patulous. Exploration of the interior of the uterus was recommended, and if found necessary the performance of curettage. The patient was unwilling to consent to this at that time, and she was accordingly ordered a mixture of ergot and hydrastis canadensis. I did not see her again until the 4th

1.—Sagittal Section of Uterus.

II.—Section of Scraping from Uterus. Showing numerous tubular glands and masses of cells of malignant nature.

III.—Section from upper part of uterine cavity. Shows layer of feebly staining structureless tissue infiltrated with leucocytes, containing a few spaces without epithelial lining, the remains of glands, and remains of mucous membrane.

IV.—Section through middle part of wall of uterine cavity. Shows entire destruction of whole of mucous membrane and of superficial layers of muscular tissue. Large vessels can be seen almost at the free edge of the section.

V.—Section through upper part of wall of cervical canal and lower part of cavity of uterus. Shows destruction of mucous membrane and an entire absence of glands and lining epithelium.

December, when she returned and told me that the last period had been very profuse indeed, the medicine taken having had no appreciable effect in lessening the amount lost. The inter-menstrual discharge of blood continued slight in amount, but was still as frequent as before, and the pain had become more marked and had spread to the right side of the abdomen.

On December 10th, the cervix was dilated with Hegar's dilators sufficiently to admit the finger, and the interior of the uterus explored. Nothing abnormal could be detected. The whole surface of the mucous membrane was carefully curetted and then steamed with super-heated steam, for 90 seconds. The temperature of the steam in the boiler was 120° C. when the steaming was commenced, and 110° C. at the end of the 90 seconds. The after progress of the case was uneventful. About the end of the first week there was a good deal of thin, blood-stained, watery discharge and some small sloughs came away.

The scrapings which were very small in amount were sent to the Clinical Research Association, and the section was examined by Mr. Targett, Mr. T. W. P. Lawrence and myself. The report sent to us, signed by Mr. Targett, was as follows :—"There is very little tissue in these curettings, and it consists of large glandular tubules like those of the cervical canal. In addition to the regular columnar epithelium there are many solid masses of cells which are undoubtedly malignant. They appear to take origin from the lining of the glandular tubules as in carcinoma." Although neither Mr. Lawrence nor I were so certain of the malignant character of these masses of cells, yet in view of the doubtful nature of the case, and the fact that both the patient's father and mother had died of carcinoma, I decided to remove the uterus. The operation of vaginal hysterectomy was performed on December 24th; the patient made a good recovery, and is at present, April 15th, very well.

The description of the removed uterus is as follows :—

Its length from the external os to the fundus is 9·3 c.m., its breadth 5·6 c.m. and its antero-posterior measurement 3·8 c.m. Externally it presents a normal appearance.

On making a sagittal section of the whole uterus the cavity is seen to present two distinct portions, an upper part 1·8 c.m. in length, which maintains its usual shape, and a lower part 6·2 c.m. in length in which the normal appearance has been entirely lost.

In the upper part of the uterine cavity the internal surface is smooth, and for the inner 3 m.m. of a reddish-grey appearance. There is no trace of mucous membrane to be seen on naked eye examination

In the lower part of the uterine cavity over an area measuring 6.2 c.m. by 1.1 c.m. there has been an extensive destruction of the tissues including not only the mucous membrane but also part of the muscular coat of the wall of the uterus. The surface is rough and granular in appearance, and has some fibrin adhering to it in places, but there is no evidence of new growth. The destruction of the tissues where it is most marked has extended to a depth of about 5 m.m. from the inner surface of the uterus. This area of destruction includes not only the lower part of the body of the uterus, but also the upper part of the cervical canal. The external os, except in so far as it has been damaged by the dilatation, is normal.

On microscopical examination the following appearances were seen:—

Section through the mucous membrane and uterine wall at the upper part of the cavity (at α in Fig. 1). The free surface of the section is here composed of a layer of tissue which appears to be structureless and does not stain with hæmatoxylin, it is infiltrated with a large number of leucocytes, and there are a few spaces in it devoid of any lining of epithelium which appear to represent the remains of the uterine glands. There is no trace of any epithelium upon the free surface. This layer of tissue appears to be the remains of the mucous membrane in a condition of necrosis. The muscular tissue beneath it stains somewhat imperfectly in its superficial part, but the deeper layers present a normal appearance.

Section through uterine wall about the middle of the uterus (at β , Fig. 1). Entire destruction of the mucous membrane and of the superficial part of the muscular tissue has occurred. The free surface of the section presents a more or less ragged edge and is composed of muscular and fibrous tissue. For a considerable depth from the surface the tissues are infiltrated with leucocytes, stain badly with hæmatoxylin, and present appearances indicating the presence of necrotic changes. Large vessels can be seen to be present almost at the free edges of the section. The deeper layers of muscle present a normal appearance.

Section through the upper part of the cervical canal (at γ , Fig. 1). This section presents appearances practically identical with those seen in section No. 1, viz., a complete destruction of the mucous membrane, and an entire absence of glands and lining epithelium.

From the naked-eye appearance and the examination of the microscopical specimens, it is evident that not only the whole of the mucous membrane of the body of the uterus and of the cervical canal has been destroyed by the action of the steam, but that a considerable

part of the muscular tissue has also been destroyed in that part of the cavity of the uterus occupied by the intra-uterine cannula. In order to avoid any risk of perforating the fundus of the uterus the end of the cannula is not introduced up to the fundus, and the large cavity present in the specimen extending up to a point 1·8 c.m. from the upper limit of the body of the uterus, no doubt represents the part of the uterus exposed to the cauterising effect of the hot intra-uterine metal tube, and the extensive destruction of tissue is due not only to the action of the steam, but also to the heat of the tube. The specimen illustrates the fact that by the use of super-heated steam it is possible to produce complete necrosis of the uterine mucous membrane, and that where the action of the steam is continued for so long a period as 90 seconds, the destructive action of the heated metal tube must also be taken into account. By the use of this method, therefore, complete destruction of the uterine mucous membrane can be obtained almost with certainty. From the entire absence of any remains of the glandular or lining epithelium in the specimen, it is evident that no regeneration of a perfect mucous membrane could have taken place.

The further examination of the uterus entirely fails to show any evidence of the presence of a carcinomatous growth. It is, however, possible that the destroyed tissues may have been the seat of early carcinomatous degeneration.

In a paper upon "Vaporisation of the Uterus," published by me in the *Journal of Obstetrics and Gynaecology*, vol. i., p. 494, the results produced upon the uterine tissues are discussed in detail, and it is shown that all degrees of change may be met with, varying from slight destruction of portions of the superficial layers of the lining epithelium to complete destruction of the whole of the mucous membrane and of the superficial layers of the muscular tissues.

In cases where the entire mucous membrane has been destroyed, its place is usually taken by a layer of connective tissue containing no glands and covered by a single layer of cubical epithelium.