lost; in contrast to these figures, Ryder in his series had no blood loss of 600 c.c. In our series we had but four.

In conclusion, we are of the opinion that in the vast majority of cases, the method as outlined is safe and valuable in minimizing blood loss. We agree with Ryder that the uterus must be observed just as carefully as when pituitrin is not given. The only drawback to the method in our small series of 100 cases, is the possibility of irregular or hour-glass contraction of the uterus which occurred in one of our series and which has occurred to the authors in several cases outside of this series where pituitrin was given. We recognize the fact, however, that this complication occurs independently of the use of pituitrin, and time only will prove and further investigation will be necessary to show whether this complication is directly attributable to the method or not.

We believe that earlier removal of the placenta would probably have reduced the blood loss in some of our cases.

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50 WEST FORTY-EIGHTH STREET.

(For discussion, see p. 205.)

REPORT OF THREE CASES OF A RARE OVARIAN ANOMALY

BY JAMES C. JANNEY, M.D., BOSTON, MASS.

CASLER¹ recently reported an interesting case which showed, among other things, the occurrence of uterine tissue in the ovary. Norris,² in the discussion of this paper, reported a similar case from his practice. At the time Casler's article appeared, I had in preparation the report of such a case and since that time have found two others, all of which I am here reporting together.

Ovarian anomalies of any sort are of sufficiently rare occurrence to be interesting. A search of the literature on the subject will show that they are not frequent, but the standard works yield a goodly array of different conditions which sometimes occur. These anomalies are of four sorts: (A) Anomalies of number; (B) Anomalies of development; (C) Anomalies of position; (D) Miscellaneous.

There are three variations of number: (1) Absence of one or both ovaries; (2) Accessory ovaries; (3) Supernumerary ovaries: all rare conditions. Accessory ovaries occur more frequently than the other variations and are usually situated very close to the "normal" ovary, sometimes being separated only by a cleft which looks like an ex-

extremely developed lobulation. The supernumerary ovary is of extreme rarity. Dudley³ states that it has been authenticated in only one case, that reported by Winkle in Albutt and Playfair's "System of Gynecology." Absence of the ovary is usually associated with absence of the tube and uterine cornu of the same side. Absence of both ovaries has been reported, but is said to occur only in nonviable fetuses.

Anomalies of development may affect either the ovary as a whole, or may appear in isolated areas as embryonic rests. Those which affect the ovary as a whole are rudimentary conditions, congenital hypertrophy and presenile atrophy. The cases of rudimentary ovaries seem to be closely related to those which show absence of the ovary, for they too usually show underdevelopment of the follicle apparatus of the ovary and also the infantile type of uterus and tubes. This condition varies in degree and it seems likely that the cases of dysmenorrhea, irregularity, retroposition, and ante flexion with conical cervix are associated with ovaries which are underdeveloped, at least functionally. Congenital hypertrophy of the ovary is often reported as an anomaly, but some authorities (Dudley) incline to the belief that it represents, rather, the results of early inflammatory or vascular changes. Presenile atrophy of the ovary is not infrequently encountered in women of the third and fourth decades and is characterized by a sclerosis of the cortex and a marked diminution in the number of follicles. Such a condition would be normal in a woman who is close to the menopause, but not in a woman at the age of 35. It is little understood and may conceivably be either another grade of the underdeveloped ovary, or a state brought about by unknown factors in later life, possibly endocrine derangements.

The embryonic rests are the rete ovarii, egg tubes of Pflüger, either solid or tubular, remains of the Wolffian body or ducts, and possibly teratomata. These structures, with the exception of the last, are all of microscopic proportions and of little practical importance. Whether teratomata should be properly classed as embryonic rests and included among ovarian anomalies does not come within the scope of this paper, but if they be so included, they form the only group in the category which is of clinical importance and are sufficiently well known to need no further mention here.

The anomalies of position are as rare as those of number. Hernia of the ovary is described, as is the undescended ovary. Lateral and posterior descensus are also described, but here again there is a question whether these conditions ever occur except secondary to malpositions elsewhere in the genital tract.

Under the heading of "miscellaneous," are two conditions given by Veit,⁴ namely, bud-like projections from the albuginea of senile ovaries and extravasations of blood about the follicles. I believe that both of

these conditions are open to question as true anomalies. The former is very suggestive of fibroma of the ovary and the latter of some traumatic or infectious origin.

All of the anomalies of the ovary, then, may be said to be of academic interest only, with the exception of the teratomata and herniae of the ovary, which are of practical surgical importance, and the cases of underdevelopment, from the standpoint of endocrine therapy. It may well be that the relative infrequency of ovarian anomalies of all sorts is due in considerable degree to the concealed position of the ovary, and that if the ovary were as easily accessible as the testicle, these anomalies—some of them at least—would be of more frequent record and more importance from the viewpoint of practical therapy.

The three cases which I have to report all show the occurrence of uterine tissue in the ovary. They were found in going over a part of the pathologic collection at the Free Hospital for Women, Brookline, Mass., and occurred in a total of 4853 pathologic specimens examined. They were all discovered incidentally, the operations having been performed for other conditions which had not directed attention primarily to the ovaries.

CASE 1.—(Path. No. 2017.) Miss Mary K, aged 41, admitted to the Free Hospital for Women, February 26, 1909, with the complaint of flowing. Her family history was unimportant, as was her past history, with the exception of the menstrual

Fig. 1.—PATH. 2017, low power drawing, showing the relation of the uterine tissue to the cyst of the ovary.

condition. She had been well until the onset of the present illness, which she dates back two years.

Menstruation commenced at twelve years of age and was regular, with moderate pain the first day. Periods lasted four days, and she used seven napkins. There was no vaginal discharge between periods. Two years ago her periods lengthened

to two to three weeks every month, which condition had persisted until January (the month previous to entrance). In January she skipped her period. About four weeks previous to admission she took a long walk, then a hot bath, after which she had severe hemorrhage without pain. The flowing necessitated three to ten napkins daily. She passed some clots. This condition persisted until admission.

Physical examination was negative, except for the pelvic examination, which was made by Dr. William P. Graves. Dr. Graves' note was as follows: "Uterus ante-flexed and drawn back in pelvis; mass behind uterus, indefinite to touch and not very tender." This examination was confirmed under ether, March 4, and operation was performed at that time by Dr. Graves. The pelvic structures were all found to be involved in an inflammatory process with many adhesions. Supravaginal hysterectomy with bilateral salpingo-oophorectomy was performed, and the patient made an uneventful recovery.

Pathologic Report: "Specimen consists of uterus with ovaries and tubes attached, vermiform appendix, and a small myoma. Uterus has been amputated at the level of the internal os and opened on its anterior surface. There are adhesions about the fundus, especially on its posterior surface. Both ovaries are much enlarged and

Fig. 2.—PATH. 2017, low power, showing the uterine stroma and glands, and at the right, the blood clot within the cyst cavity.

Fig. 3.—PATH. 2017, low power, showing the uterine tissue in a cleft of the ovary of the opposite side.

cystic. Fimbriated ends of both tubes closed. On opening the uterus the walls seem to be slightly hypertrophied. The endometrium is thick, about 2 mm. in depth, but there are no intrauterine polypi or other growths. Both tubes and ovaries are densely adherent and bound into one mass. The left tube is dilated and contains clear straw-colored fluid; walls are thin, forming a true hydrosalpinx."

In summary, the microscopic findings were: Chronic interstitial endometritis with hypertrophy of the endometrium, myoma uteri, hydrosalpinx, and periovaritis with evidences of still active inflammatory process.

The interesting anomaly occurred in the ovaries, both of which were involved. In one it consisted of a piece of tissue 4 x 2 mm., which appeared to be endometrium, springing from the wall of a small cyst which measured about 7.5 mm. in its greatest diameter. The cyst contained blood clot. The section of the other ovary was torn in cutting and the relations were much distorted. The uterine tissue in this ovary was not so extensive in amount and was situated on the edge of what appeared to be either a cleft or a collapsed cyst. The finding of this tissue, of course, raised the question of some strange accident in cutting and mounting. Careful examination

showed that no such artefact had taken place and that the tissue was actually growing in and part of the ovary. (Figs. 1, 2, and 3.)

CASE 2.—(Path. No. 4136) Mrs. B. W., age forty-eight, entered the hospital April 14, 1913, with the complaint of having had "the womb come outside" for the past four years. Family history was unimportant as was the past history, except for nocturia, two to three times every night. Menstruation had always been normal. She had passed through the menopause nine years previously and had subsequently suffered considerably from nervousness and hot flushes for two years. These were not so troublesome at time of admission. She had had five pregnancies with normal labors. The last child was stillborn. No abortions. Present illness dates from four years ago when the uterus first began to come out. This had grown steadily worse and has caused sacral backache and a dragging feeling in the lower abdomen. Physical examination was negative, except for the local examination by Dr. Graves, which showed separation of the recti muscles, atrophy of the external genitalia, cystocele, lacerated cervix and perineum, and moderate prolapse. Operation April 16, 1913, by Dr. Graves, curettage, trachelorrhaphy, anterior colporrhaphy, perineorrhaphy, supravaginal hysterectomy, and repair of diastasis recti. Recovery was uneventful.

Fig. 4.—PATH. 4136, low power, showing the uterine tissue on the surface of the ovary.

Fig. 5.—PATH. 4815, 2 inch, showing the cyst lined with endometrium.

Pathologic Report: "Specimen consists of uterus with both tubes, both ovaries, and a piece of cervical tissue. Uterus measures 5 x 6 cm.; no adhesions seen. Uterine cavity is 3 cm. long, endometrium is 1 mm. thick and covered with blood. Right tube is 5.5 cm. long, very tortuous, but shows no adhesions. Right ovary is 2.5 x 1 cm., and shows nothing remarkable. Left tube is 5 cm. long; shows nothing remarkable. Left ovary measures 2 x 3 cm., has many adhesions on it, and contains a few small cysts."

Microscopic examination shows a good deal of connective tissue in the cortex of both ovaries. In summary, it showed interval endometrium, chronic salpingitis, bilateral. Normal ovary, right; chronic periovaritis, left; chronic cervicitis.

The uterine tissue occurs in the right ovary in this case and covers an area of approximately 2 x 1 mm. It is on the surface of the ovary and is not enclosed in a cyst as in the former case. (Fig. 4.)

CASE 3.—(Path. No. 4815.) Mrs. G. C., age forty-four, entered the hospital March 28, 1914, complaining of flowing. Family history unimportant. An operation was done nine years previously at Boston City Hospital for gastric ulcer. Menstru-

action began at 17, was regular and normal until one year ago, when present illness began. She had slight yellowish discharge. Micturition two to six times in day and one to three at night; at times has dysuria. Present illness started one year ago. Since then she has had a backache and dull ache in both lower quadrants, worse during periods. The latter have become irregular, appearing at intervals of two to six weeks and lasting from six to twenty-one days. The flow was very profuse, necessitating twelve to fifteen napkins daily. Physical examination was negative with the exception of the pelvic examination which was made by Dr. Graves. This revealed uterus large and anteverted, some loss of mobility, nothing definite felt on the sides, scar in posterior vaginal wall, lacerated cervix and perineum, cervical polyp. On March 31 operation was performed by Dr. F. A. Pemberton consisting of curettage, removal of cervical polyp, perineorrhaphy, and supravaginal hysterectomy. At operation the uterus was anteverted and adhesions were found about the adnexa on both sides. The patient made a good recovery.

Pathologic Report: "Specimen consists of cervical polyp, curettings, and a uterus with two tubes and ovaries. Uterus measures 6x5 cm.; the endometrium is 3 mm. thick and smooth. There are no adhesions; tubes and ovaries look normal. On section the right ovary is found to consist of a cyst 3 cm. in diameter; no ovarian tissue was left. Left ovary is small, seems to be atrophied. Section taken of polyp, curettings uterine wall, right tube and left ovary." Histologic examination showed (in summary) interval endometrium, mucous polyp of the cervix, chronic salpingitis, bilateral, atrophy of left ovary, adenomyoma (?), retention cyst of right ovary. The microscopic note on the left ovary said: "Left ovary shows, in one place, glandular tissue surrounded by connective tissue which looks like endometrium of the uterus."

This glandular tissue in the section of the left ovary occurs in the wall of a small cyst as in the first case. It measures roughly 3x2 mm.

The more detailed histologic description of the uterine tissue in these three cases, I shall group together for the reason that the tissues are practically identical in structure. The tissue is composed of stroma and epithelial elements in about the same proportion as normal uterine mucosa. All of the cell nuclei in the stroma stain readily with hematoxylin, are regular in size and shape, and show the usual finely granular nuclear markings and a single small deeply staining nucleolus, usually eccentric. The cytoplasmic elements of the cells show a delicate reticulum, taking the acid stains. Definite mitotic figures are rare in the stroma, two only being seen. There are many irregular hyperchromatic nuclei which are apparently undergoing some change preparatory to division, but they are not characteristic mitotic figures. (Fig. 7.)

The epithelial elements are composed of columnar cells, which cover the surface fronting on the cavity of the cyst, and which line the gland spaces. The gland spaces themselves are, in places, quite irregular in size and outline, which is the main feature divergent from normal interval endometrium. These irregular glands are counterbalanced, however, by many small round glands in every way characteristic of normal uterine glands. The epithelial cells are uniform, with a good basement membrane and show no tendency to invade the deeper struc-

tures. The cell nuclei are oval and arranged near the basal end of the cells. They show numerous mitoses, as are commonly seen in the post-menstrual and interval periods of the endometrial cycle. These mitoses are very definite, showing a variety of monasters, diasters, and spindles. No ciliated epithelium was seen in the sections.

In two of the cases there were small bundles of cells on the edges of the uterine tissue which closely resembled smooth muscle. The identification of these cells could not be determined beyond question in the sections available and other sections and stains could not be made. All the sections of these cases were frozen sections and not adapted for the study of the finer cell structure. Unfortunately the gross material from the first case of the series had been destroyed so that no further sections could be made. Many sections were made of the remaining ovarian tissue of both ovaries in the last two cases but no other uterine tissue was found.

Fig. 6.—PATH. 4815, low power, showing the stroma and glands.

Fig. 7.—Semidiagrammatic drawing showing the characteristics of the uterine tissue found in all of the cases.

The differences between the three cases were very minor. In Case 2 the uterine tissue occurred on the surface of the ovary, while it was within the ovarian tissue in the other two cases. All of the cases showed minor histologic variations attributable to differences in the stage of the endometrial cycle, and congestion of the parts due to infection, prolapse, or accompanying conditions.

Besides those mentioned above, reported by Casler and Norris, I have been able to find only two other cases, one of which is extremely doubtful. In 1899 Russell⁵ reported finding aberrant portions of the müllerian duct in the ovary. This occurred in an ovary macroscopically normal, but associated with tumor of the other ovary. The ovary contained a thick-walled cyst and in three areas in the cyst wall and solid tissue of the ovary, uterine tissue was found. It showed much

the same picture that I have described, and it definitely contained smooth muscle in a relative position corresponding to the muscular coat of the uterus. The other possible case was reported by von Franqué⁶ in 1898, but in such vague terms and in such a loose way that it is impossible from his article to tell whether it actually belongs to this category or not. I believe it better to omit this case from the discussion, because we have no definite facts about it to discuss.

For comparison and contrast, then, there are three cases. Of a total of six, four occurred in ovaries that were macroscopically normal and were removed incidentally in an operation directed at some other condition. Two of them were associated with tumors in the affected ovary. The interpretation of these findings must lie between teratoma, metastasis and anomaly. Casler considers teratoma long enough to discard it as a possibility, and takes the position, with which I agree, that no teratoma confined entirely to uterine glands, stroma, and muscle has been hitherto described, and that its occurrence would be extremely improbable. The possibility of metastasis must also be considered. This would demand for a premise that an analogous tumor be present elsewhere and that it be malignant. In Casler's case the uterus had been removed some years previously for an "adenomyoma, with stroma, but no glands." Here we have the tumor, and it is conceivable that it might be malignant, in which case we could explain with ease the presence in the ovary of this uterine tissue. In Russell's case also there was a tumor, an adenocarcinoma of the other ovary, but it would be very hard to explain uterine tissue, anywhere, as metastasis from an adenocarcinoma of the ovary. In one of my cases there was a myoma showing the ordinary picture of myoma uteri, and here again it would be very hard to explain on the basis of metastasis from a smooth muscle tumor (even supposing it to be malignant) the presence in the ovary of this uterine tissue, whose chief characteristic was the glandular structure. In the case reported by Norris and in my other two cases there was no tumor at all, and it seems as if the metastasis hypothesis were entirely untenable in these cases. My own belief is that all of these cases can be most rationally explained on the basis of anomaly.

When it came to an explanation of the mechanism of this anomaly, I was entirely at a loss. Two suggestions were advanced by Drs. Bremer and Begg of the Department of Embryology of the Harvard Medical School. The former believed that this might be explained on the supposition of an accessory aberrant müllerian duct bud which was included in the ovary. Accessory tubes and ducts are not infrequently recorded and accessory ostia are often seen in embryos. Admitting for the moment that this explanation is correct, the advancing or caudal end of the duct is the portion which fuses

with the duct from the other side to form the uterus and vagina. If this portion were included in the ovary and continued to develop there, it would sufficiently explain the occurrence of endometrium. It is necessary to assume that this aberrant portion is an accessory duct for the reason that in each case there was a normally developed tube on the affected side. Dr. Begg suggested that the proximity of the "anlagen" of the ovary and tube in embryonic life was so great that there might be some critical period of embryonic development at which it would be possible for a tissue mixture to take place.

Casler does not advance a theory in explanation, but recapitulates that of Russell who argues that inasmuch as the epithelium of the tube and uterus and the germinal epithelium of the ovary are all originally derived from one embryologic ancestor, it is not too much to assume that tissue may develop structures in one place (namely,

Fig. 8.—Human embryo 1597, 19.3 mm., serial section 704, 2 inch, showing the urogenital ridge on each side and the general anatomic location of all the embryologic illustrations.

Fig. 9.—Human embryo 2044, 16.0 mm., serial section 928, right side, showing a small portion of the sex gland at the median side of the urogenital ridge and the funnel opening on the lateral side of the tubar area. The tubar and genital areas are usually separated by a cleft of considerable depth, which is absent in this section. Note the distance separating the genital from the tubar areas.

in the ovary) which its function is to develop elsewhere (in the uterus).

The only one of these theories which seems susceptible of experimental confirmation is that a tissue mixture may take place at some stage of embryonic development. With this idea in view, I have gone over the collection of human embryos at the Harvard Medical School. Of these 43 were available, ranging in size from 10 mm. to 50 mm. The others in the collection were either too young or otherwise unfit. The sex glands and ducts of the embryo are developed from the genital ridge which is on the surface of the wolffian body on either side of the midline. The genital ridge on each side is divided longitudi-

nally by a fissure which separates the genital area from the tubar area. The genital area gives rise to the sex gland, and the tubar area to the müllerian duct. The funnel arises in the tubar area as a dimple in the celomic epithelium, from which grows backward a solid cord of epithelial cells. This cord gradually becomes tubular, thus forming the müllerian duct. Its course is at first tailward, until it gets well below the crest of the ileum, then it turns sharply toward the midline where it meets its fellow from the other side, and the two then proceed tailward together to the cloaca. The anterior portion of the müllerian duct later becomes the tube while the portion which has joined (and later fused with) the duct from the other side forms the vagina, cervix, and uterus. This development of the müllerian ducts is at first the same in both the male and female. In later stages there are slight differences in the relations of the ducts in the two sexes, but these affect the portions which are associated with the

Fig. 10.—Human embryo 2155, 17.5 mm., serial section 930, left side showing the opening of the funnel on the median side of the tubar area.

Fig. 11.—Human embryo 2155, serial section 948, right side, showing the opening of the funnel on the median side of the tubar area.

bladder or cloaca, and not the portions near the genital gland. The müllerian ducts finally atrophy in the male, with the exception of a small portion of the lower end, which opens into the urethra and forms the utriculus masculinus. (Figs. 8 and 9.)

In reviewing this series of embryos I have found cases where the funnel, instead of forming on the lateral side of the tubar area, forms on the median side, and is thereby brought into a position much closer to the sex gland, a fact which is suggestive in view of the supposition advanced by Dr. Begg.

The funnel, which is the earliest beginning of the müllerian duct, is developed usually on the lateral side of the tubar area and separated from the genital area by a fissure and the whole width of the tubar ridge, a distance of approximately 0.5 to 0.75 mm. In one case both

funnels opened on the median side of the tubar area. (Figs. 10 and 11.) In two other embryos one funnel opened on the median side, and in a fourth the funnel opening seemed to extend from the lateral through to the median side of the tubar area. (Fig. 14.) This unusual median position of the funnel reduces the distance between the genital

Fig. 12.—Human embryo 1913, 18.2 mm., serial section 919, left side, showing the opening of the funnel on the median side of the tubar area.

Fig. 13.—Human embryo 1597, 19.3 mm., serial section 704, left side, showing the opening of the funnel on the median side of the tubar area and its close proximity to the genital gland.

Fig. 14.—Human embryo 2042, 25.0 mm., serial section 1384, left side, showing the funnel with its tubal epithelium running through to the median surface of the tubar area.

gland and the müllerian duct very materially. In the cases which showed this variation the actual distances between the funnel and the genital gland at the nearest point were in four cases less than 0.1 mm. (about 0.0875 mm.) and in the fifth instance less than 0.2 mm. (about 0.175). It is not unreasonable to suppose that tissue mixtures between the tubal and ovarian tissue could take place in cases where the distance separating the two tissues is less than 0.1 mm.

I must note here that in the cases where this condition was present three of the embryos were too young to distinguish the sex with certainty. The genital glands were still undifferentiated. In the other two cases testes cords were present and the embryo was probably male. I do not feel that it would argue impossibility of such an explanation of uterine tissue in the ovary, had these been definitely male embryos, for there is nothing to show that such variations could not occur in the female. The most it could argue, I think, is that such an anomaly might some day be found in the testis also.

Recent experimental work in embryology has shown that certain tissues transplanted in fetal life to foreign parts of the same individual may grow and form comparatively well developed portions of their structures. Thus Lewis⁷ has shown that in frogs the otic vesicle may be transplanted from one individual to another in early embryonic life and continue to grow normally, and other investigators have performed similar experiments with comparable results. We may believe, therefore, that a stray piece of uterine tissue in the ovary, even though it be eventually completely cut off from its origin, might go on and develop to a degree such as we have found in these cases.

The table shows a comparison of the six cases from various points of view. In the first place, the uniformity of age is of interest, though probably only incidental. In Russell's case the age in years is not given, but it is stated that the patient had reached the natural menopause. The gross appearance of the ovary is also worth noting. Four of the ovaries appeared grossly normal, one slightly enlarged, and one only showed gross tumor. This is interesting in view of Casler's suggestion that we might have in this anomaly another origin for tumors of the ovary. It would hardly seem, with the rarity of the condition taken into consideration, that this could be of any great practical importance in the genesis of ovarian tumor if only one in six of the cases show tumor at all. With regard to the rarity of the condition, the incidence of three cases in a series of 4853 is very high frequency for a condition that had been only once definitely described before August, 1920. I believe that it would prove more common if more searching microscopic examination of the ovaries was made in all cases, and the occurrence in most cases would probably take the form of small areas of uterine tissue in the walls of cysts. If this supposition be true, it would be an argument against Casler's idea, for many instances of this condition showing gross tumor formation cannot have been missed. It would logically mean, then, that the undiscovered cases would contain a much higher proportion of cases of harmless (if you will) uterine tissue in the ovary than of cases that have reached

any clinical significance, and that the true ratio of important to unimportant should be, not 1 to 5, but rather 1 to 50 or 1 to 100.

The matter of neoplasm occurring in connection with this condition has been already partially treated. Three cases showed no tumor of any kind in the genital tract. One case had had the uterus and adnexa, except the ovary in question, previously removed because of a diffuse uterine tumor. One case had adenocarcinoma of the opposite ovary, for which the operation was performed. A third had myoma uteri.

The question of functional activity of the uterine tissue is interesting also, in that three of the cases showed undoubted signs of menstrual activity of that portion of the endometrium which lay in the ovary. Casler's case after panhysterectomy continued to menstruate for part of a day every month. After removal of the ovary in question, it was found that there was dark blood in the cyst cavity into which these uterine glands emptied. Norris' case also showed blood in the cavity of the cyst, as did one of mine. Russell made no note in his report of any findings suggestive in this respect. Closely associated with the question of functional activity is that of correspondence of this tissue with the uterine mucosa itself in the stage of the menstrual cycle. Here again Russell does not note this fact. Casler cannot note it, for the uterus was removed four years previously in his case. Norris has remarked on the correspondence of the two tissues in his case, and in all of mine there was correspondence between the two. Case 1 showed in the uterus a marked hypertrophic condition which was not reproduced in the uterine tissue in the ovary. This hypertrophy was, no doubt, largely attributable to inflammation and congestion of the pelvic organs which caused more derangement of the circulation in the uterus than in the ovary. The mitotic figures and other finer evidence of the stage of the menstrual cycle, however, showed a condition in each case conformable with the interval stage. In Case 2 the patient had passed the menopause, and the endometrium showed a moderate senile atrophy which was present, but not so marked, in the tissue found in the ovary. In the third case the endometrium showed an early atrophic condition, which was not incompatible with the history of flowing (in the presence of the cervical polyp). The uterine tissue in the ovary in this case showed distinct atrophy.

The location of the uterine tissue is of some importance in relation to the theories advanced in explanation. In four instances the tissue was found within the ovarian substance, and so far as was demonstrated it had no connection with the surface of the ovary or the germinal epithelium. In Russell's case the tissue was both on the surface and within the ovary and in one of my cases was wholly upon the surface. In Case 1, here reported, there is possibility that the

TABLE I

CASE	GROSS APPEARANCE	AGE	NEOPLASM	FUNCTIONAL ACTIVITY OF OVARIAN ENDOMETRIUM	CYCLE CORRESPONDENCE	LOCATION OF UTERINE TISSUE	COMMUNICATION WITH SURFACE
1.	Normal	41	Small sub-peritoneal myoma uteri	Yes	Yes	Cyst within ovary ? surface opp. side.	None found
2.	Normal	48	No	?	Yes	Surface	
3.	Normal	44	No	No	Yes	Cyst within ovary	None found
Russell's	Normal	"Natural Menopause"	Adenocarcinoma other ovary	Not stated	?	Cyst and surface	
Casler's	Pathological	43	Uterus prev. removed for neoplasm, also ovary in question.	Probably	Uterus previously removed	Cyst within ovary	Not noted
Norris'	Slightly enlarged	29	No	Yes	Yes	Cyst within ovary	Not noted

tissue may have occurred in a cleft, in one of the ovaries. The two cases where the tissue is on the surface seem to favor the hypothesis advanced by Russell that they arose from anomalies of growth of the germinal epithelium. In the other four cases there was no apparent connection with the germinal epithelium, and in these cases it seemed more probable that Bremer's or Begg's suggestion is correct.

In conclusion then, we are dealing with a series of cases of a rare and interesting condition whose origin, we must admit, is not satisfactorily explained. All of the theories advanced are theoretically possible and for any of them concrete proof will be next to impossible. Embryology may be suggestive but hardly conclusive, for the reason that suggestive appearances in an embryo can never be proved to be the early stages of a condition found in adults unless all of the steps can be demonstrated, which seems unlikely in a condition of this rarity. Only if we are favored, like Mark Twain, to the extent of seeing St. Peter's skull at the age of seventeen and again in another museum at the time of his death, can we hope to bring forth actual proof by the aid of embryology.

With regard to the practical importance of the condition, I think we can agree that it is interesting academically, but as yet of unknown clinical significance.

NOTE: Since the preparation of this paper, several cases of the same sort have been reported by Sampson in a paper read before the American Gynecological Society, which appeared in *Archives of Surgery*, October, 1921. The discovery of endometrium in the wall in a large proportion of the so-called "hemorrhagic cysts of the ovary" would seem to bear out the opinion expressed in this paper that the condition under discussion is not of such rare occurrence as the scarcity of reported cases would suggest.

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205 BEACON STREET.