considered to be suffering from general paralysis of the insane. There is no record at this time of the existence of choreiform movements.

Progress.—Shortly after his admission definite choreic movements became manifest. They rapidly developed into constant, generalized, jerky movements of the head, neck, and limbs, which were invariably accentuated when the patient was addressed. Examination of the cerebro-spinal fluid was negative for syphilis, and the diagnosis, being altered to Huntington's chorea, was confirmed when a brother was admitted in June, 1918, obviously suffering from this disorder. Thenceforth a progressive dementia supervened. The patient became slovenly and defective in his habits, very amnesic, always irritable, occasionally hostile, and more and more restless and resistive to attention. He became increasingly feeble, and died on January 7th, 1925, the choreic movements persisting until the end.

Post-mortem Examination.

(a) **Macroscopic.**—**Brain:** Dura mater normal. Marked thickening of the pia-arachnoid, with a few scattered milk-white patches. Excess of subarachnoid and ventricular fluid. Local flattening and atrophy in frontal and fronto-parietal areas. No macroscopic lesion of basal ganglia. Cerebellar consistency soft in general. **Thorax:** Thyroid fibrotic. Old adhesions of right pleura. Some old fibrosis of right lung. Heart normal. **Abdomen:** Gall bladder full of small faceted stones. Nothing else abnormal.

(b) **Microscopic.**—Nothing abnormal was noted in the microscopic appearance of the suprarenal glands or liver. Sections were taken from the medulla, pons, cerebellum, and mid-brain; also from the caudate and lentiform nuclei, thalami, and precentral gyrus. These were stained with haematoxylin and eosin by Nissl's method, and by Levaditi's silver nitrate. The following were the changes seen:

(1) **Leptomenigitis.**—This consisted more in thickening of the pia-arachnoid than in increased vascularity.

(2) **Small Round-celled Infiltration in the Perivascular Lymphatics.**—This was not seen in the medulla, pons, or cerebellum, but became noticeable in the mid-brain, being more marked towards the margins of the transverse section. The infiltration was more definite in the lentiform nucleus, thalamus, and precentral gyrus, and was seen most clearly in the caudate nucleus. Not the larger vessels, but the capillary vessels were affected, and of these less than half showed the infiltration. The cells were frequently arranged in a single line beside the vessel. Occasionally there were groups of cells in the Virchow-Robin spaces, but the condition could hardly be said to amount to the "cuffing" of acute encephalitis.

(3) **Infiltration of Small Round Cells in the Pericellular Lymphatics.**—One or two small cells in the pericellular space were not taken as abnormal. Here and there, however, were found nerve cells round which were clumped three, four, or more small cells. In most sections these were only to be found by searching carefully; they were most plentiful in the precentral gyrus.

(4) **Dilatation of Vessels.**—Increased vascularity, with dilated and congested vessels, was only seen in one group of sections taken of the thalamus. Here the first glance gave the impression of encephalitis, and indeed one small haemorrhage was found, but there were only a few round cells in the lymphatics.

(5) **Cell Degeneration.**—The cells in most sections appeared healthy, including those of the substantia nigra. In the lentiform nucleus and the precentral gyrus were cells in all stages of degeneration, but the great majority of the cells seemed healthy. The degeneration was quite irregular in distribution.

Summary of Pathological Findings.

(a) In the cerebellum, pons, and medulla: no change except leptomenigitis.

(b) In the mid-brain, caudate and lentiform nuclei, thalamus, and precentral gyrus: infiltration of small round cells, most marked in the caudate nucleus.

(c) In the thalamus: increased vascularity in addition.

(d) In the lentiform nucleus and precentral gyrus: some degeneration of nerve cells.

CASE II.

G. G., a man of no occupation, aged 43, was admitted to hospital on January 17th, 1918.

Previous History.—The patient had not been previously under care and treatment, but he was stated to have spent "three parts of his life in the workhouse," where he used to be employed in the bootmaker's shop. During the last two months he had been restless and violent in his conduct, and had assaulted various people without provocation. He had been habitually insulting to members of the opposite sex, degraded in his habits, and "lay about in the fields rough at night."

Family History.—One brother died at Brentwood Mental Hospital. One brother was living at Severalls Mental Hospital. The mother was insane. The father "does not suffer from any disease of a choreiform nature, but has malignant disease of the oesophagus."

Condition on Admission.—Mentally he was confused in thought, and could give little account of himself. He was restless, excited, and resistive to attention. He had delusions of a persecutory nature regarding women, stating that females followed him about and received money for ill-treating him. He had a marked inferiority complex. Physically he was fairly nourished, and the heart, lungs, and alimentary system betrayed little abnormality. The knee-jerks were exaggerated, and he showed definite and constant choreic movements of the muscles of the limbs and face. The gait was very unsteady. The pupils were equal and normal in reaction to light and accommodation. Articulation was much impaired, and he was defective in his habits.

Progress.—The patient showed a rapidly advancing mental deterioration. He was always irritable and hostile in his attitude

to his environment. His speech soon became so affected that his remarks were altogether unintelligible. Constant and violent choreic movements of the head and neck and limbs persisted, resulting frequently in bruises and abrasions, in spite of elaborate padding of his immediate environment and the adoption of all possible precautions against injury. He became gradually enfeebled, and died on December 26th, 1921.

Post-mortem Examination.

Brain.—Skull-cap thickened. Generalized congestion of the superficial cerebral blood vessels. Oedematous condition of the pia-arachnoid. Excess of ventricular and subarachnoid fluid. Local atrophy of frontal and fronto-parietal areas. Generalized cerebral softening. Brain stem and cerebellum soft in consistency.

Thorax.—Old adhesions at apices of both lungs and congestion at bases. A few small patches of atheroma in the aorta. Heart showed nothing abnormal.

Abdomen.—The gall bladder was distended, and contained two gall stones.

A microscopic examination was not performed at the time of the patient's death.

The following points appear to be of interest in connexion with the cases described.

1. The existence of a family history of insanity transmitted through the mother, three sons becoming insane, and two of these developing Huntington's chorea.

2. The difference in the early history of the two brothers subsequently affected with chorea. One (G. G.) had never been capable of regular employment; the other (W. G.) had a long record of army service prior to and during the first half of the war.

3. The younger brother (W. G.) had a history of syphilis contracted abroad during military service in 1906, and was diagnosed on admission as a case of general paralysis of the insane.

4. The same brother exhibited no choreic movements at the time of his admission; whereas G. G. showed unmistakable evidence of chorea from the first.

5. Regarding the difference in the age factor, the younger brother, who had led an active life, developed the disease at 34, while the older, who had spent the major part of his existence under institutional control, exhibited no symptoms until he was 43.

6. As regards the morbid anatomy, both cases exhibited thickening of the pia-arachnoid, local atrophy in the frontal and fronto-parietal areas, generalized cerebral and cerebellar softening, and a pronounced increase of cerebro-spinal fluid with dilatation of the ventricles.

7. In relation to the case (W. G.) in which it was possible to carry out a detailed examination under the microscope, the pathological changes consisted of chronic leptomenigitis, small round-celled infiltration of the perivascular lymphatics, particularly definite in the caudate nucleus, increased vascularity in the thalamus, but without any definite focus of acute encephalitis. There was also some degeneration of pyramidal cells, especially in the precentral gyrus.

The rarity of Huntington's chorea has prompted us to record the facts at our disposal relating to the two brothers who suffered, and ultimately died, from this disorder at this institution.

In conclusion, we wish to express our indebtedness to Dr. R. C. Turnbull, medical superintendent of Severalls Mental Hospital, for permission to publish this account.

THE INFLUENCE OF THE VERMIFORM APPENDIX ON GYNAECOLOGICAL SURGERY.*

BY

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THE figures upon which this paper is based are taken from a series of abdominal sections performed in the gynaecological department of the Bristol Royal Infirmary. They have not been selected in any way, and include every laparotomy done in the department during a period of twelve months. The total number is 300, and I am indebted to the late Professor W. C. Swayne for permission to use cases upon which he had operated, and

* Based on a paper read before the Bristol Medico-Chirurgical Society.

which amount to a little over one-quarter of the total. In almost all of his cases I was present at the operations and able to examine the material removed.

The operations can be roughly classified as follows:

Operations.	No.	Appendix Removed.	State of Appendix.		
			Acute.	Chronic.	Slight.
Hysterectomy for fibroids ...	48	10	2	6	2
Myomectomy	7	0	—	—	—
Myomectomy (during pregnancy)	5	1	—	1	—
Ovariectomy	54	3	—	2	1
Oöphorectomy	34	15	1	9	5
Hysterectomy for other causes	9	2	2	—	—
Wertheim's panhysterectomy...	8	0	—	—	—
Ectopic pregnancy	17	2	—	2	—
Adherent retroversion	31	11	1	9	1
Pyosalpinx	70	39	12	21	6
Hydrosalpinx	3	1	—	1	—
Appendicitis (2 plus pregnancy)	6	6	4	2	—
Unclassified	8	1	1	—	—
			23	53	15
Total	300	91	91		

This classification was used merely to show the type of operation performed and its association with disease of the appendix. It will be seen that the appendix was removed 91 times in 300 cases, and its condition is stated opposite each group of operation cases.

I have classified the condition of the appendix into three groups, as follows:

Acute.—Includes those cases with definite perforation or abscess formation. All cases with obvious acute inflammation.

Chronic.—Includes cases which had previously suffered from a well marked appendicular inflammation with definite adhesions, kinks, etc.

Slight.—Implies definite changes and adhesions (apart from anatomical ones) but not so well marked as to make it certain that the appendix, *per se*, was sufficiently diseased to cause the pain or other symptoms complained of.

No doubtful cases were included in this list, the appendices being sent to the pathologist for report for section in those cases where its naked-eye appearance was indefinite. Eight cases in which the appendix was removed "just because it was there" have not been included.

It will be seen that these operations fall roughly into two groups: (A) Operations done for inflammatory pelvic conditions; and (B) those in which operation was done for fibroids, ovarian conditions, and carcinoma. Group B contains 131 cases and the appendix was removed 31 times (23.6 per cent.).

The other cases were all caused by or gave rise to inflammatory reactions and can be grouped under that convenient term "pelvic peritonitis." The total was 169. In this group the appendix was removed on 60 occasions (35.5 per cent.).

I have included in Group B oöphorectomies, because it is not usual at the Bristol Royal Infirmary to remove the ovary unless it is badly adherent, prolapsed, or totally degenerated. I myself do not think that a large ovary gives any symptoms unless complicated by a pelvic peritonitis and adhesions.

In the non-inflammatory group of operations (Group A) there were two cases of special interest which occurred within a few weeks of each other. The patients were both young women under 27; both had been apparently quite healthy, including their menstrual histories. Each of them was suddenly taken ill—one with diarrhoea and vomiting after a picnic, the other with acute retention of urine.

In the first case there was a large single cervical fibroid completely filling the pelvis, which I removed by total hysterectomy, after preliminary myomectomy. The caecum contained a lump

the size of a Tangerine orange, situated at the base of the appendix; this was excised altogether with the greater part of the caecum, and was reported by the pathologist, Dr. Kay-Mouat, as "typical so-called spheroidal cell carcinoma of the appendix." She did very well for eighteen months and was then readmitted to the infirmary with a large mass in the right iliac fossa. My surgical colleague, Mr. C. F. Walters, kindly saw her with me and we both considered it to be a recurrence. He operated and removed the remains of the caecum, the ascending colon, and the greater part of the transverse colon. Very much to our surprise the pathological report stated that this was a chronic inflammatory condition and showed no evidence of malignant disease. She is at present in perfect health.

The second patient developed acute retention and was found to have a large fibroid filling up the pelvis (weighing 9 lb. on removal). This was removed by subtotal hysterectomy. On examining the caecum a growth the size of a walnut was found on the distal end of the appendix. This was removed with the greater part of the caecum, and she appears to have made a complete recovery. The pathological report stated that this was also "spheroidal cell carcinoma."

Among the other cases in Group A the appendix was found to be densely adherent—twice to an ovarian cyst and four times to a fibroid.

In the much larger and more important group of operations for conditions involving peritonitis the first question which impressed itself on me was whether the inflamed appendix was the cause or the result of the condition found at operation. I found this almost impossible to decide in the majority of cases, the history being of little use except where there had been a recent attack of puerperal sepsis or gonorrhoea. The only criteria I could adopt were (1) that infection of both tubes probably implies an ascending infection; (2) recent gonorrhoea and puerperal sepsis are of similar significance; (3) a right-sided salpingitis, associated with appendicitis, and in which the left tube appears to be normal, is probably appendicular in origin.

There were 16 cases in Group B in which I feel fairly certain that the appendix was the original cause of the condition. In 8 of these the appendix and tube were continuous, with the fimbriae of the tube enveloping the end of the appendix, and in 2 there was pus and a faecal concretion actually in the lumen of the tube itself.

Since this series of cases was completed I have operated upon 5 cases from whom the appendix had been previously removed for acute appendicitis and who had had a normal gynaecological history up to the onset of the acute attack of appendicitis, but since that time had suffered from dysmenorrhoea, etc. In all these cases there was extensive chronic pelvic peritonitis with involvement of the right tube and ovary.

Operations for Pyosalpinx.—It will be seen that 39 out of the 70 cases showed definite appendicular disease (that is, 55.7 per cent.), and that in 12 cases it was acutely inflamed. It seems likely that in at least half the cases of pyosalpinx the appendix will be more or less acutely infected, and will probably need surgical intervention sooner or later, if, indeed, it is not the primary cause of the condition.

Adherent Retroversion.—These cases I have classed together, the great majority of them being treated by Gilliam's operation on the round ligaments. In all these cases there was more or less old peritonitis with adhesions in Douglas's pouch and matting of the tubes and ovaries. Here again the appendix was found to be affected in 31 per cent. of the cases, but, as might be expected, it was of the chronic type, except in one case, where I think a recent attack had supervened on an old chronic condition.

Oöphorectomy.—Here a similar condition prevails, 44 per cent. of the cases showing affection of the appendix; in these cases I am inclined to think that the appendix was usually the causal agent, and that the pain and malaise were due to the chronic appendicitis, and not to the enlargement of the ovary, although in all cases in which the ovary was removed there was considerable destruction of the ovarian tissue, consequent on prolonged inflammation and adhesions.

Ectopic Pregnancy.—Two very interesting cases were met with. (1) A case of tubo-abdominal pregnancy with a large gestation sac in Douglas's pouch, containing twin four-months embryos, the caecum forming the outer boundary of the sac, the appendix being densely incorporated in its wall, and much thickened and reddened. It

was removed with the sac and the patient did well. (2) The other patient had a large right-sided tubal gestation with a very long appendix lying across and adherent to it; the appendix was gangrenous and a large concretion was just bursting through its tip. The gestation sac was full of thin, foul-smelling fluid; no embryo was found, but there was an abundance of necrosing chorionic tissue.

Hysterectomy for other Causes.—Most of the cases were for acute puerperal peritonitis; here the appendix was four times removed, twice being acutely inflamed. In both cases I feel certain that it was the cause of infection.

Appendicitis.—There were two cases, in the series, of appendicular abscesses complicating pregnancy at the seventh and eighth month. Four were found when operating for "cystic ovary." The ovaries were left, and the patients' symptoms have been cured completely by the removal of the appendix.

Deaths.

I have not found any reason to think that the removal of the appendix in any of these cases has been prejudicial to recovery or convalescence. There have been eleven deaths among the 300 cases—as follows:

Fibroids ...	2
1 from cardiac failure—aortic regurgitation.	
1 from pulmonary embolism.	
Ovarian ...	1
Malignant.	
Other hysterectomies ...	4
3 from puerperal peritonitis	
1 from criminal abortion, with perforated uterus and gas gangrene.	
Wertheim's hysterectomy ...	1
From shock.	
Pyosalpinx ...	2
1 from shock.	
1 from peritonitis.	
Myomectomy and pregnancy ...	1
Miscarriage and pulmonary embolism nine days after operation.	

In only one of these cases was the appendix removed; the patient had pyosalpinx, and died of peritonitis from which the gonococcus was recovered, so that I do not think that the mortality rate has been in any way affected by the removal of the appendix.

Among the oöphorectomies two cases became infected in the abdominal incision, and possibly the appendicectomy was the cause of this occurring; otherwise the removal of the appendix seems to have caused no risk to the patient and has only occupied a few minutes. In 23 cases out of the 300 the appendix was acutely inflamed and would have required removal in any case.

I have found it very difficult to obtain any definite information as to the position of the appendix in health, but it appears that most of the authorities consider that the appendix may be below the brim of the pelvis in about 50 per cent. of cases, and also that in a large number of cases there is a definite anastomosis between the branches of the ovarian and appendicular arteries.

Conclusions.

1. The appendix is very likely to be affected by pelvic inflammations and may be the cause of salpingo-oöphoritis and its consequences more frequently than is expected.

2. The appendix should be suspected and examined in all cases of pelvic peritonitis, and it should be removed if it is in any way diseased, to prevent further trouble at a later date.

3. Even when the operation is performed for a condition which is not inflammatory the appendix should be examined; 20 per cent. of my series show definite disease of this organ, and 2 of the 31 appendices removed were reported as malignant.

4. Acute pyosalpinx is frequently complicated by acute appendicitis and vice versa.

5. "Oöphoritis" as a disease, and apart from pelvic peritonitis, should not be diagnosed. If at operation the ovaries are found to be merely enlarged and not adherent, then the appendix is most likely to be the cause of the

patient's pelvic pain. In corroboration of this, the number of oöphorectomies performed at the Royal Infirmary has fallen to a quarter of the number which were done before the war, and the results as to the cure of chronic pain have very greatly improved.

6. I would advance with great diffidence that it is just as well to remove a pelvic appendix whenever found, even if it appears quite healthy to the eye.

In conclusion, I wish to express my gratitude to Drs. Kay-Mouat, Fraser, and Todd for cutting numerous sections of appendices and tubes in the pathological department of the Royal Infirmary.

THE RADICAL TREATMENT OF TRIGEMINAL NEURALGIA

AS EXHIBITED IN SEVENTEEN CONSECUTIVE CASES.

BY

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SOME ANATOMICAL CONSIDERATIONS.

The fifth cranial nerve is a fairly typical dorsal nerve. What is the corresponding ventral nerve, and, still more important, what is its portion in the sympathetic chain? There are at least four ganglia, sympathetic in structure, connected with this nerve—namely, Meckel's, Arnold's, the ciliary, and the submaxillary. They receive their efferent fibres from the third and seventh cranial nerves, which must therefore be regarded as the ventral element, while their afferent fibres are supplied indirectly from the superior cervical ganglion. It is of importance to note that the cell stations of the sympathetic nerves are within these ganglia, and not in the ganglion of the dorsal root (the Gasserian ganglion) or the cord.

PATHOLOGY.

Our present knowledge of the pathology of tic-douloureux is both unsatisfactory and unreliable. Degenerative changes of a doubtful kind and a round-celled infiltration have both been described as occurring in the Gasserian ganglion. Pressure on the ganglion by tumours can, according to some observers, give rise to a "true" tic (a very doubtful proposition). In sections of the ganglion removed at operation I have not been able to confirm any of these findings, not even in the minutest degree. My own most constant finding is a hypertrophic obliteration of the arteries of the ganglion itself due to hypertrophy of the circular muscular coat. It is not a condition of endarteritis. The change is identical with that seen in the arteries of the feet in that particular type of Raynaud's disease associated with intense pain of an unbearable kind in which patients readily submit to amputation in order to obtain relief. Similar changes were seen in the arteries of men who suffered with trench feet and the accompanying erythromelalgia.

This is the only change I have been able to find in the Gasserian ganglia of patients suffering from true tic, and it is of important significance. It suggests arterio-spasm, arterial cramp, a condition allied to angina which might suitably be called "arterial angina." It is an angioneurosis, brought about by some sympathetic unbalance.

If this be correct, afferent painful impulses from the arteries will travel by way of the ganglia mentioned, passing thence via the posterior nerve roots to the brain. This view is strengthened by the fact that removal of Meckel's ganglion gives complete relief in instances of tic affecting the middle division of the trigeminal. Interesting in this connexion are certain methods of treatment, hitherto empiric, such as removal of the superior cervical ganglion, ligature of the carotid arteries, which in this connexion is similar to removing the superior cervical ganglion, the exhibition of iodides and belladonna, and the use of amyl nitrite for relieving the spasm when at its worst.