one an irregular rhythm persisted in spite of partial thyroidectomy, but normal rhythm returned after 154 grains of quinidine, and has persisted for two years. Thus of the 11 cases of permanent auricular fibrillation operated on, normal rhythm was restored and remained permanent in 6, whereas in 5 the irregularity persisted; thus restoration of the normal rhythm occurred in 55 per cent.

Out of the 356 cases investigated the total mortality was 20. Of this number one patient, who had exophthalmic goitre complicated by auricular fibrillation and severe myocardial damage, died without any operation being performed. All the remaining deaths occurred after operation. Of these, 17 occurred in exophthalmic goitre cases and 3 in toxic goitres. Three of the exophthalmic goitre deaths were those of patients with auricular fibrillation; of these, one occurred after partial thyroidectomy, a second after lobectomy, and a third after ligation of the right superior thyroid artery only.

Partial thyroidectomy with removal of three-quarters to seven-eighths of the gland was the usual procedure, unless there was a definite contraindication, when a primary ligation of one or more of the thyroid vessels was followed three or four months later by partial thyroidectomy. Only one death ensued after simple ligation—namely, the case with auricular fibrillation already mentioned.

The following table (Table II) shows a comparison of the absolute and percentage mortality after operation between cases of Graves's disease, with and without auricular fibrillation.

TABLE II.

Condition.	Total Cases.	Absolute Mortality.	Percentage Mortality.
Exophthalmic goitre without A.F. ...	293	13	4.4
Toxic goitre without A.F. ...	33	3	9.1
Exophthalmic goitre with A.F. ...	19	3	15.8
Toxic goitre with A.F. ...	7	0	0
Total cases of Graves's disease without A.F.	326	16	4.9
Total cases of Graves's disease with A.F.	26	3	11.5

Although the numbers are small the post-operative mortality is increased by the presence of auricular fibrillation in these cases. The percentage is more than doubled. Another fact brought out by the above table is that the presence of auricular fibrillation in exophthalmic goitre is of much more serious import than in toxic goitre. This is not surprising if one considers the view expressed in an earlier part of this paper—namely, that auricular fibrillation is a natural sequel of prolonged thyrotoxicosis, such as occurs in patients with toxic goitres, whereas its occurrence in exophthalmic goitre, in which the symptoms are usually of a few months' duration only, points to a severe grade of poisoning. On the other hand the mortality of exophthalmic cases without auricular fibrillation is less than half that of toxic goitres without auricular fibrillation.

The presence of auricular fibrillation in Graves's disease must be considered a distinctly unfavourable complication as regards the operative risk. It is associated, as a rule, with cardiac enlargement, a rapid pulse rate, and signs of congestive failure. The effect of the excessive thyroid secretion, as shown by the raised basal metabolic rate, is aggravated by an added impairment of cardiac function due to the congestive failure. It is essential, therefore, that the thyrotoxicosis should be reduced, and the ventricular rate controlled, before operative procedure is contemplated. At the Royal Free Hospital Lugol's solution in increasing doses up to 30 minims daily and digitalis tincture in doses of 10 to 20 minims three times daily are given, until the optimum state of the patient is reached, and the nature and extent of the operation is dependent on the degree of improvement attained. Digitalis is well borne by these patients, and they can take larger doses than patients suffering from other types of auricular fibrillation without intolerance. I have never found any untoward effect from digitalis medication.

Conclusions.

1. Auricular fibrillation occurs rather more frequently in toxic than in exophthalmic goitres.
2. Its presence in exophthalmic goitres is more serious than in toxic goitres, as shown by the increased post-operative mortality.
3. Auricular fibrillation is not of itself a contraindication to operative treatment, although it is an added risk.
4. The need for thorough pre-operative medical treatment is intensified by the presence of auricular fibrillation.
5. Primary ligation deserves careful consideration as a means of treating severe cases. In most cases, when one or more of the thyroid vessels have been tied, the improvement in the general and cardiac condition of the patient has allowed the major operation to be performed without undue risk.

My thanks are due to my colleagues Mr. Cecil A. Joll and Mr. L. E. C. Norbury for their kindness in giving me the opportunity of collaborating with them in the treatment of their cases, and to Miss Geraldine Barry, surgical registrar, for her help in collecting certain particulars for me from the case records.

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URETHRAL CALCULI—ANCIENT AND MODERN.

BY

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DURING the last year two urinary calculi have been presented to the Pathological Museum of the University of Egypt. These calculi show so remarkable a resemblance of form, the one to the other, that I have ventured to make a few notes upon them.

The smaller stone (Fig. 1) was removed in December, 1928, by Dr. Katib, assistant surgeon to the Kasr-el-Aini

FIG. 1.

FIG. 2.

Hospital, Cairo, from the urethra of a boy 8 years of age. The history which accompanied the specimen stated that the child complained of a lump in the scrotum and perineum. No complaint was made of pain or frequency of micturition. The flow of urine was not interfered with. A slight urethral discharge was present. The stone was cut down upon and removed, and the boy made a perfect recovery. The stone itself weighed 41.5 grams, and is

seen to consist of a large lower bulbous portion, a somewhat indistinct neck, and an elongated extremity. The surface of the stone is almost smooth. In length it measures 2.75 inches, while its greatest diameter is 1.5 inches. Some particles removed from the outer surface give the chemical reaction for phosphates. When the stone was removed from the urethra it was found to be lying in a widely distended urethral canal. The large globular mass rested in the bulbar urethra, the slim end extended towards the bladder. The wall of the urethra was inflamed but showed no sign of actual ulceration.

The larger stone (Fig. 2) was presented to the museum in 1929 by Mr. Guy Brunton, who found it in the grave of a man of the early 18th Dynasty, while he was undertaking archaeological research some twenty miles south of Assiut. The stone was found in the neighbourhood of the pelvic bones. The stone, though larger in every way than that previously described, bears a very strong family likeness to it. This specimen weighs 110.5 grams, in length it is 3.75 inches, while its greatest diameter is 2.75 inches. It consists also of a bulbous lower portion, a neck, which is marked by a very evident sulcus, and an elongated extremity. The surface is rough, as if it had been lying in a septic cavity. Scrapings from the surface give the phosphatic reaction.

In comparing the two specimens so similar in shape and moulding, one might suggest that as the former is known to have occupied the urethral canal of a boy of 8, the other might well have occupied a similar position in the man of the 18th Dynasty. The sulcus, which is very evident and forms the neck of the stone obtained from the adult, is present to a lesser degree in the stone from the boy, and has probably been produced by the pressure of the anterior layer of the triangular ligament. We also know that a stone weighing 41.5 grams can be accommodated by the urethra of a boy of 8 years without causing any grave inconvenience. Could not the adult urethra accommodate a calculus of 110.5 grams? In this case, however, the roughened outer surface of the stone suggests that a considerable urethral discharge was present, due to some inflammatory disturbance about the area occupied by this calculus.

PNEUMONIA AND EMPYEMA DUE TO A NON-LACTOSE-FERMENTING BACILLUS.

BY

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THE following is an account of a case of pneumonia and empyema apparently caused by a non-lactose-fermenting coliform bacillus possessing special biochemical and agglutinative characteristics.

HISTORY OF CASE.

The patient, a man aged 21, was admitted on January 19th, 1929, as a case of "influenza." He gave a history of pain in the back and limbs, headache, sore throat, and slight cough commencing suddenly twenty-four hours previously. His temperature was 103° F., his pulse rate 98, and his respiration rate 24. No abnormality was detected on examination of the chest. He was treated with antipyretics.

On January 21st the temperature fell, and the patient felt better. Four days later he had pain in the left side of the chest and a dry cough. His temperature was 103° F., his pulse rate 88, and his respiration rate 30. Pleural friction and a small area of dullness appeared below the left scapula. Within one week the temperature had settled, and the patient's general condition was rapidly improving.

On February 3rd he developed pain in the right side of the chest and frequent dry cough. His temperature was 102° F., his pulse rate 94, and his respiration rate 40. The patient felt and looked very ill. Pleural friction was present on the right side. Dullness of the right base developed, and slowly increased during the next few weeks. A temperature of the swinging type persisted.

On February 23rd a needle was introduced into the right pleural cavity and 35 ounces of fluid were aspirated. On four more occasions pus was aspirated, and finally the patient was sent to the surgical side for rib resection and drainage of the pleural cavity. Uninterrupted recovery followed. During the whole illness there were no signs of intestinal disturbance.

BACTERIOLOGICAL EXAMINATION.

Three specimens of pus aspirated from the pleural cavity on different dates were examined, and a Gram-negative bacillus was isolated on each occasion, giving the same biochemical and agglutination reactions.

Morphology and Fermentation Reactions.

A profuse growth on agar was obtained in twelve hours of colonies having the typical appearance of the coliform group and consisting of highly motile Gram-negative bacilli about 4 μ long and 0.5 μ broad, showing the following reactions when observed over a period of thirty days.

Glucose, mannite, maltose, sorbite, and galactose: formation of acid and gas.

Lactose, saccharose, dulcitol, salicin, inulin, adonite, and raffinose: no change.

Litmus milk: slight acid and curdling by fourth day; alkaline from eighth day onwards.

Lead acetate: no blackening.

Gelatin: not liquefied in six weeks.

Indole reaction: negative.

The organism therefore differed biochemically from the salmonella group only in its failure to attack dulcitol. Most members of the salmonella group produce acid and gas in inositol, but some, like this organism, do not. Blood culture yielded no growth. This was taken when the temperature had fallen, too late to be of much value.

Agglutination Tests.

A Widal test yielded the following results:

Patient's serum + *B. paratyphosus* A = no agglutination.

Patient's serum + *B. typhosus* = agglutination up to 1 in 15.

Patient's serum + *B. paratyphosus* B = agglutination up to 1 in 120.

Patient's serum + unknown organism = agglutination up to 1 in 3,200.

The organism was then typed against stock antisera for *B. typhosus* B, *Paratyphosus* A, and Gaertner's bacillus, but no agglutination was obtained. The results of typing against antisera for *B. paratyphosus* B and *B. aertrycke* (Glasgow) were as follows.

Emulsion of Organism.	Dilutions of <i>B. paratyphosus</i> B Antiserum.						
	100	200	400	800	1,600	3,200	6,400
<i>B. paratyphosus</i> B ...	+++	+++	+++	+++	+++	+++	+++
Unknown organism ...	+	+	±	±	-	-	-
<i>B. aertrycke</i> (Glasgow) ...	++	+	+	+	±	-	-

Emulsion of Organism.	Dilutions of <i>B. aertrycke</i> (Glasgow) Antiserum.							
	400	800	1,600	3,200	6,400	12,800	25,600	51,200
<i>B. aertrycke</i> (Glasgow) ...	+++	+++	+++	+++	+++	+++	+++	+++
<i>B. paratyphosus</i> B ...	++	+	±	±	-	-	-	-
Unknown organism ...	+	±	±	±	±	±	-	-

+++ quite clear, complete sedimentation.

++ not quite clear, almost complete sedimentation.

+ not clear, definite sedimentation.

± and ± slight degree of sedimentation.

A vaccine was made containing 500 million of the unknown organism per c.cm. and injected intravenously into

Emulsion of Organism.	Dilutions of Antiserum to unknown Organism.						
	160	320	640	960	1,280	2,560	5,120
<i>B. typhosus</i> ...	-	-	-	-	-	-	-
<i>B. paratyphosus</i> A ...	-	-	-	-	-	-	-
<i>B. suispestifer</i> (Lister Institute)	+	+	-	-	-	-	-
<i>B. aertrycke</i> (Smethwick) ...	++	++	+	-	-	-	-
<i>B. paratyphosus</i> B ...	++	++	+	+	-	-	-
<i>B. aertrycke</i> (Beveridge) ...	+++	++	++	+	+	-	-
Unknown organism ...	+++	+++	+++	+++	+++	+++	++