Chart showing cause of death of 17,792 men (modified from the Medico-Actuarial Tables).

The figures in the left-hand column refer to the age at entry, those on the right to the ratio of deaths per 10,000 at risk.

TABLE IV.—Medico-Actuarial Mortality Investigation¹⁰
Graduated Percentages—Actual Deaths of Expected Deaths According
to the Number of Pounds Variation from the Average Weight

Age at Entry	Variation from Average Weight in Pounds													
	-35 to -45	-25 to -30	-15 to -20	-10	-5	Average	+5	+10	+15 to +20	+25 to +30	+35 to +45	+50 to +60	+65 to +75	
20-24	135	127	115.5	107	105.5	104	102	99	97	102	104	110	125	
25-29	122	116	108.5	102	101	100	99	97.5	96.5	104	108	116	132	
30-34	112.5	108	102.5	98	97.5	97	96.5	96	97	109	118.5	131	149	
35-39	105	101	97.5	94.5	95	95	96	96.5	101	112.5	133	151	172	
40-44	99	95.5	93	91.5	93	94	96.5	97	108	115	141	157	181	
45-49	93.5	91	89.5	89.5	91.5	93.5	97.5	100	112	116.5	139	155	178	
50-53	88.5	88	87	88.5	90.5	94.5	99	102	112.5	116.5	132	150.5	172	
54-56	86	86	86	88	90.5	95.5	99.5	102.5	112	116	122	142	162	
57-59	86	86	86	88	90.5	95.5	99.5	102	111.5	114.5	117.5	134	153	
60-62	86	86	86	88	90	95	98.5	101	110.5	112.5	114	130	148	

The point of lowest mortality for age at entry 20-34 lies in the group 15 to 20 pounds above average weight, and for age at entry 35-49 in the group 5 to 10 pounds under the average weight. For age 50 and over the lowest mortality is in the underweight group.

EFFECT OF OBESITY ON CAUSE OF DEATH

The chart has been constructed from figures given in the Medico-Actuarial Mortality Investigation.¹⁰ The ratio of deaths per 10,000 at risk has been recorded for certain diseases; in each case the ratio has been ascertained for three age groups at entry (that is, at the initial medical examination), and comparison has been made of the standard weights with those 50 lb. or more overweight, and with those 25 lb. or more underweight. The overweight group shows an improvement in mortality only in pulmonary tuberculosis.

CHOLECYSTITIS, CHOLELITHIASIS, AND OBESITY

The association of these conditions with obesity is a commonplace, and I do not propose to put forward any statistical evidence.

CONCLUSIONS

1. There is an increase in the average weight of certain sections of the community.
2. Overweight after the age of 35 years increases the general mortality.
3. The cause of obesity is usually increased carbohydrate diet.
4. Treatment is simple and dietetic.
5. Obesity and hyperpiesia are associated.
6. Diabetes is probably a penalty of obesity in the majority of cases.
7. Degenerative disease of a fatal nature in the heart, arteries, kidneys, and liver are two and a quarter times

commoner in the obese than in the standard weights, and three and three-fifths times commoner than in the underweights.

8. Chronic cholecystitis and gall-stones are much more frequent in the obese.

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THE SYMPTOMATIC END-RESULTS OF OPERATIONS FOR CHOLECYSTITIS

A REVIEW OF 153 CASES

BY

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In recent years there has been a tendency to emphasize the radiographic and biochemical evidence of cholecystitis at the expense of the clinical history. That the clinical history is of vital importance, and must be used in conjunction with Graham's test if the best results are to be obtained, is expressed by R. L. Sanders in reviewing the end-results of 500 cases of cholecystectomy, when he says: "Most of the surgeon's disappointments in the end-results are related to cases in which there are cholecystographic evidence and surgical indications for operation, but not a good clinical history."

In this connexion I considered it might be of value to attempt to estimate the prospects of complete or partial cure of the symptoms, particularly in some of the pathological subdivisions of the disease. Especial attention was directed to cases where cholecystitis was present without stones.

It has been pointed out that one-fifth only of the total number of cases of cholecystitis have definite attacks of biliary colic, whereas all appear to suffer with flatulent dyspepsia. What happens to these milder symptoms after operation? Post-operative adhesions between the duodenum and the liver, said to be probably the commonest cause of disappointing results in gall-bladder surgery might perpetuate those vague dyspeptic symptoms and render the result incomplete. Judged by the

cases investigated in the present series, however, this does not occur to an appreciable extent. In over 80 per cent. these symptoms of flatulent dyspepsia disappeared completely.

METHOD OF INVESTIGATION

One hundred and eighty-six cases of cholecystitis were admitted to the surgical wards of the Liverpool Royal Infirmary during the period 1925-29. Of these, thirty-three were discharged without operation, either because they were of a doubtful nature or on account of serious constitutional contraindications for operation. A further nine cases died in hospital, and to each of the remaining 144 a questionnaire was dispatched. In the vast majority microscopical evidence on section of the gall-bladder confirmed the diagnosis of cholecystitis. Replies were received from 114 cases, nearly 80 per cent. of the total, and it is largely from these replies that the end-results were estimated.

That these replies are of some value is substantiated by the following considerations:

1. A certain proportion of the cases were personally interviewed and examined.
2. In numerous instances the family doctor assisted the patient to fill in the questionnaire, and added some clinical notes of his own.
3. As the investigation is primarily directed to the symptomatic end-results, a patient of average intelligence should be in a position to make an accurate return.

In view of the above, I think we may regard these replies as reflecting, in some measure, the results of operations on the gall-bladder at this hospital.

Cases were divided into three groups: cured, relieved, and those remaining *in statu quo*. Criteria of cure included the patient's complete personal satisfaction with the operation, together with absence of abdominal pain, flatulent dyspepsia, nausea and vomiting, and subsequent attacks of jaundice. We may put this more briefly by saying that resumption of a normal working life without abdominal discomfort or dyspepsia of any sort was the standard of cure. In the "relieved" group were placed those with considerable improvement, but with occasional or slight abdominal pain and rare attacks of flatulence and "retching." In all cases included in this group the patient expressed personal satisfaction with the results of his or her operation. All the remaining cases were included in the "unimproved" group.

The results in the present series were as follows:

Cured	94 cases ; 82.4 per cent.
Relieved	12 cases ; 10.5 "
Unimproved	8 cases ; 7.01 "

For purposes of comparison the following results may be mentioned:

Davis	69.4 per cent. cures in 160 cases
Sanders	84 per cent. cures in 500 cases.
Sanders	76.4 per cent. cures in 2,222 cases (Various American surgeons).

Sanders attributes his 84 per cent. cures largely to the fact that additional operations, such as excision of a duodenal ulcer, were performed in many of his cases at the same time as the cholecystectomy. With this view I must differ emphatically, as additional operative procedures were performed in a negligible number only of the present series, yet the percentage of cures was 82.4 per cent. As an illustration of the completeness of cure may be mentioned the symptom of qualitative anorexia. Over 80 per cent. stated that they had good appetites, and were able to consume fatty foods without discomfort.

DETAILS OF RESULTS

Relieved Group.—In this group cholecystectomy was performed in ten instances and cholecystostomy in two. In one of the latter no stones were present and a subsequent cholecystectomy was necessary.

The pathology appears to have been complicated in the majority of these twelve cases by:

Stones in the common bile duct ...	2 cases
Mucocele	2 cases
Empyema	1 case
No stones present	2 cases

In another case acholuric jaundice was present, so that the residual abdominal symptoms may be attributed to this disease.

The most prominent persistent symptoms were the following:

Acid eructations	9 cases ; 75 per cent.
Flatulence	8 cases ; 66 "
Abdominal discomfort	7 cases ; 58 "
(Slight or occasional pain)	

Only two patients complained of a pain of a gripping or spasmodic nature.

Unrelieved Group.—Three of these eight patients described themselves as satisfied with their respective operations, but have been included in this group on account of residual symptoms of moderate severity. Four cholecystostomies and four cholecystectomies were performed. In two instances no stones were present. A definite history of biliary colic associated with jaundice was obtained from one patient only, but the majority complained of more or less severe abdominal pain.

Symptoms were distributed as follows:

Severe abdominal pain	50 per cent.
Mild abdominal pain	50 "
Flatulence	75 "
Acid eructations	50 "
Vomiting and nausea	75 "

Cases without Stones.—There were fifteen of these in the present series. The relatively high proportion of cases of this group figuring in the "relieved" and "unimproved" series is significant. Of these, 73.3 per cent. were cured, but this is much below the 82.4 per cent. cures of the whole series. Further, if the five cases of acute cholecystitis which occur in this group, and all of which were cured, are excluded, the percentage cured falls to the low figure of 60 per cent.

These findings closely follow the experience of Sanders, but differ from that of Boyd, in whose opinion such cases are usually cured by cholecystectomy.

Other Features.—Stones in the common bile duct occurred in fourteen cases, of which 85.7 per cent. were cured and 14.2 per cent. were relieved. Cholecystectomy was performed in ten cases, with 80 per cent. cured. Cholecystostomy was performed on four occasions, with all cases cured. These satisfactory results are borne out by a more recent series of seventeen consecutive cases of stones in the common bile duct dealt with at this hospital. This series revealed similarly satisfactory end-results, with only one post-operative death, which was due to pulmonary embolism.

Ten cases of acute cholecystitis occurred with 90 per cent. cured and 10 per cent. unimproved. In nine of them cholecystostomy, and in the other cholecystectomy, was performed. In half of these cases no stones were present, yet the percentage of cures was well above the average.

It is difficult or impossible to assess the complaint of weakness and bulging of the abdominal wound. Seventeen cases complained of either a feeling of weakness or of a bulging sensation in the abdominal wound, but not all of them could be examined.

Only two patients reported a second operation, but it seems possible that some of those who did not reply to the questionnaire would fall into the category of "subsequent operations." One patient had a cholecystectomy performed after a previous cholecystostomy had failed to relieve her symptoms, while the other had a second operation for adhesions.

Operative Mortality.—Of the 153 operations performed there were nine deaths, giving an operative mortality of 5.8 per cent. for all cases. This figure may appear somewhat high when compared with that quoted by Davis, 3.75 per cent., and 4.73 per cent. in a series of 4,032 cases by various American surgeons quoted by Sanders, but it must be remembered that the present series includes the most serious cases, and that in the United States patients suffering from cholecystitis come for treatment at a much earlier stage than they do in this country. This latter fact is emphasized by Rendle Short in the *Index to Prognosis*, and appears to be confirmed by Sanders's statement that only 40 per cent. of his 500 cases had stones, whereas 87 per cent. of the present series had the combined pathology of inflammation and stones.

Further, a series of fifty-three consecutive operations performed more recently showed an operative mortality of less than 2 per cent., which compares favourably with the best American figures.

The causes of death were as follows: paralytic ileus, 1 case; suppurative cholangitis, 2 cases; associated with acute pancreatitis, 1 case; pneumonia, 1 case; "choleæmia," 1 case; and post-operative collapse and cardiac failure, 3 cases. From a perusal of similar series, these causes appear to be the ones usually found. Cholecystectomy was performed in 117 cases, cholecystostomy in thirty-six, while in two cases removal of the mucosa only, by cautery, could be effected.

These figures reflect the modern tendency to remove the gall-bladder whenever possible. I have avoided comparison of the relative mortality of these two operations, as that of cholecystostomy, performed as it is in the more serious cases, must inevitably be the higher.

CONCLUSIONS

1. Complete cure may be expected in 82.4 per cent. Of the rest 10.5 per cent. are relieved, while 7.01 per cent. remain *in statu quo*.
2. The symptoms of flatulent dyspepsia, including qualitative anorexia, completely disappear in over 80 per cent. of cases.
3. It would appear that the absence of stones renders the prospect of cure perceptibly less. However, in cases of acute cholecystitis the absence of stones has no effect whatever on the prospect of cure.
4. The operative mortality varies between 2 and 6 per cent., depending to a large extent on the type of case dealt with. In the present series, dealing with every type of case, the mortality was 5.8 per cent.
5. The average period of convalescence before resuming full work is thirteen weeks. I have not been able to find any reference to this feature in the literature for purposes of comparison.

I wish to acknowledge my indebtedness to the surgeons and assistant surgeons of the Liverpool Royal Infirmary for permission to use their cases in this investigation, and for their help.

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A CASE OF ABORTUS FEVER IN YORKSHIRE

BY

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If, as the Americans tell us, this fever—*B. abortus* Bang—is to be "the fever of the future," it is important that cases should be recorded and the attention of practitioners called to this subject. It is unlikely that, while thousands of cases should have occurred in America during the past few years, we in this country should have been exempt, since contagious abortion in cows has been known to be of common occurrence for many years, and particularly since B. Bang in 1897 described the organism which caused the disease, and which has since borne his name. At a recent meeting of the Health Section of the League of Nations undulant fever was stated to be the most important problem facing public health workers at the present time.

The following case, which occurred in my practice last February, is interesting owing to the fact of having had this disease connected up with the source, which has not been possible, so far as I am aware, in the few previous cases recorded in England.

CASE REPORT

A master upholsterer, aged 32, living in a small Yorkshire town in the West Riding, gave the following history:

He was taken ill on January 24th, 1932, with what was diagnosed as influenza, which was prevalent in the district at that time. He complained of severe headache of a boring character, which lasted for ten days, and his temperature was 103°. At the end of the first week a blood test was made—presumably for the typhoid group—but this was negative. At the end of a fortnight the temperature was normal and remained so for a week, at the end of which time he motored, accompanied by his wife, to a seaside resort about ninety miles distant, for a week's convalescence. On arrival there, having in the meantime provided himself with a clinical thermometer, he found that his evening temperature was 102.6°, and each evening during his stay of eight days was between 102° and 103°, while the morning temperature was normal.

On his way home he visited some relatives in Sheffield, and I was called in the following morning. This was at the beginning of the fifth week of the disease (February 23rd). His temperature was normal, heart and lungs negative, liver freely palpable and somewhat tender, especially over the left lobe, spleen doubtful, some flatulent distension with discomfort over abdomen, and bowels stated to have been somewhat constipated. The tongue was clean at tip and edges, but posterior two-thirds was covered by a thick yellowish fur.

From the history I suspected having to deal with one of the typhoid group, and at once had a specimen of blood conveyed to the pathological department of Sheffield University, where it was found to be negative for *B. typhosus* and *B. paratyphosus* A, B, and C.

Two days later, on the advice of Dr. A. E. Barnes, who saw him in consultation, further samples of blood were taken. A complete set of agglutination tests was done, all of which were negative except the one against *B. abortus* Bang, which caused definite agglutination in a dilution of 1 in 25 to 1 in 250. Three days later another specimen of blood showed a positive reaction in a dilution of 1 in 25 to 1 in 500 (full titre) and a negative reaction for the typhoid group. At this stage an attempt was made to isolate the organism, but after cultivation at 37°C. this was not successful, and there was a similar result with a specimen of urine. A week later a positive reaction was found in a dilution of 1 in 25 to 1 in 1,000, while six weeks later—a month after the patient had returned to work—the blood serum agglutinated *B. abortus* Bang in a dilution of 1 in 25 to 1 in 250, the Widal reactions remaining negative.