It seems clear from the history of Case 2 that attacks occur in which operation is not required, and that prompts one to wonder how many patients who are admitted with acute obstruction after partial gastrectomy and who settle on conservative treatment are actually obstructed by a bolus. One should look out for this syndrome in order to advise such patients to be careful about mastication of food.

It must be emphasized that in most cases the bolus can be milked on into the caecum. The story of Case 4 illustrates the added risk involved in doing an enterotomy at operation, and the wound infection in Case 6 was probably due to the enterotomy. Davies and Lewis (1959) stress this aspect of treatment.

An endeavour is now made at St. James' Hospital to impress upon every patient who has a partial gastrectomy the importance of chewing food well, though this was not always the case. This should be a universal piece of advice, to be given to every patient who has a partial gastrectomy.

Summary

Nine cases of food bolus occurring after partial gastrectomy are described. A brief discussion of the condition and its treatment is added. It is noted how common the condition is becoming, and prevention of its cause is stressed.

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BRUCELLOSIS—AN ISLAND EPIDEMIOLOGICAL STUDY

BY

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Human brucellosis was first diagnosed among the resident population of the Isle of Wight in 1930. Sporadic cases were subsequently reported in 1933, 1945, 1950, and 1958 (Dalrymple-Champneys, 1959).

Brucellosis was also known to have occurred among dairy cattle on the island. *Br. abortus* was recovered from 10 out of 58 aborted calves examined between 1954 and 1958. Between April, 1957, and October, 1959, *Br. abortus* was found in the milk produced by 25 dairy herds, comprising about 400 head of cattle.

The winter population of the Isle of Wight is about 93,500 (Registrar-General's estimate for 1959), but the yearly influx of visitors raises the resident population in August to nearly 180,000.

Plan of Investigation

The present paper describes the results of investigations made between December, 1958, and December, 1959, in an attempt to assess the extent of human and animal brucella infection on the island.

1. A search was made for cases of active human infection. Family and hospital doctors were asked to notify suspected cases to the county medical officer of health, who reviewed the evidence and suggested further investigations where necessary.

2. Brucellin skin-tests and agglutination tests were used to assess the extent of infection among adults and children.

*Dr. Brodigan died on January 15, 1961.

†In receipt of a grant by the Colston Research Fund, University of Bristol.

Skin-testing was done with a Heaf multiple-puncture gun, using a preparation of brucellin specially made available by the Standards Laboratory of the Public Health Laboratory Service at one thousand times the strength supplied routinely for intradermal skin-testing (Wallis, 1959). Results were read after 72 hours, and were scored in terms of the number of indurated papules developing in that time. A further reading on the 10th day could be made in only a few instances. Skin reactions were regarded as positive when two or more papules were noted after 72 hours. Agglutination tests were made with the agglutination suspension of *Br. abortus* issued by the Standards Laboratory of the Public Health Laboratory Service, in plastic agglutination plates with 0.5% phenol in 0.9% saline as diluent. The tests were kept overnight in a 36° C. incubator, then stood for 24 hours at 5° C., and finally left at room temperature for half an hour before reading. The end-point taken was the highest serum dilution showing a clear pattern of sediment on standing, with agglutinates visible to the naked eye after stirring. Skin tests, and in many instances agglutination tests, were done on a number of adults whose occupations involved contact with live cattle or their carcasses. A number of adults and children drinking milk from infected herds were similarly investigated.

3. Skin-testing was used to examine a group of primary-school children and a number of patients in a psychiatric hospital. Agglutination tests were done on some of these patients.

4. Agglutination tests were done on a number of sera from blood donors, and also on blood specimens taken from expectant mothers in the course of routine antenatal care.

5. A series of tonsils removed in the course of elective tonsillectomy were examined by culture and by guinea-pig inoculation for the presence of *Br. abortus*.

6. Milk produced on the island was examined for evidence of brucella infection. Churn samples were taken from most of the herds whose milk was sent to two pasteurizing plants. These were examined first by the milk ring test. Samples that were positive by the ring test were re-examined by a whey-agglutination technique. Milk positive by this test was then inoculated into guinea-pigs. Similar techniques were applied to bulk samples of milk sold raw and to individual cow samples from a number of herds (McDiarmid, 1961).

Results

1. *Cases of Active Human Brucellosis*.—Four of the 19 patients investigated were thought to be examples of active infection on the basis of history, serology, blood picture, or response to treatment with streptomycin and tetracycline. The essential data on the four cases are presented in Table I. A fifth patient gave a history of an acute episode in 1941.

TABLE I

	Case 1	Case 2	Case 3	Case 4
Clinical features:				
Sweating ..	+	+	+	+
Weakness ..	+	+	+	N
Malaise ..	+	+	+	+
Headache ..	+	+	+	+
Anorexia ..	+	+	+	+
Rigors ..	+	+	N	+
Cough ..	+	N	+	+
Depression ..	+	+	+	+
Fever ..	+	+	+	+
Neutrophil count	ND	2,000/ c.mm.	4,000/ c.mm.	2,000/ c.mm.
Skin test	+	+	+	+
Agglutination titre:				
Before skin test	20	ND	200	600
After ..	100	2,000	ND	ND
Therapeutic response*	+	+	+	+
Milk supply ..	Raw, infected	Raw, infected	Raw, infected	Raw, infected
Age ..	35	41	36	36
Sex ..	M	F	M	M
Occupation	Farmer	Housewife	Medical practitioner	Office worker

* To streptomycin and tetracycline. N = Negative. ND = Not Done.

2. *Survey of Persons Thought to be Occupationally Exposed or Known to be Taking Raw Infected Milk*.—The data from this part of the work are summarized in Table II.

TABLE II

	No. Examined	Positive Skin Test	Positive Agglutination Test (Titre 20 or More)
Veterinary surgeons ..	8	7	7
Public health dept. staff ..	4	3	1
Abattoir workers ..	13	8	4
Sausage-factory employees ..	22	5	4
Bone-meal factory employees ..	5	4	2
Persons taking infected milk	82	36	19/27

3(a) *Skin Tests on Primary-school Children*.—Skin tests were carried out on 685 children, comprising more than half the 6-year-old children in maintained schools on the island. Of the 126 who attended rural schools, 16 (12.5%) gave 2-plus skin reactions or stronger. The remaining 559 attended urban schools, and included 21 positive reactors (4%). At the time of skin-testing, inquiry was also made whether raw or heat-treated milk was drunk at home. Complete data on skin-test result and home milk supply were obtained from 565 children, and are presented in Table III.

TABLE III

Type of School	No. of Children Examined	No. Drinking Raw Milk at Home	Positive Skin Test	
			Raw Milk at Home	Heat-treated Milk at Home
Urban ..	439	160 (37%)	6 (3.8%)	13 (4.7%)
Rural ..	126	85 (67%)	14 (17%)	2 (4.9%)

3(b) *Survey of Psychiatric In-patients*.—Of the 277 patients skin-tested, 52 gave positive results. Agglutination tests were done on 132 patients, with the results shown in Table IV.

TABLE IV.—Agglutination Titres from Psychiatric Hospital In-patients

Titre ..	<20	20–	40–	80–	160–
No. of sera reacting ..	116 (86%)	16 (14%)	10 (7.6%)	4 (3%)	1

4. *Agglutination Tests on Blood Donors and Expectant Mothers*.—Sera were available from 1,287 blood donors and 108 expectant mothers attending antenatal clinics. Separate analysis of the two groups showed that agglutinin titres were distributed with similar frequencies in each. The data are therefore presented in a single table (Table V).

TABLE V.—Agglutination Titres from Blood Donors and Expectant Mothers

Titre ..	<20	20–	40–	80–	160–	320–	640–	1,280–
No. of sera reacting ..	1,155 (83%)	240 (17%)	131 (9%)	75 (5%)	34 (2%)	25 (2%)	13	5

5. *Tissue Examinations*.—Examination was made of 111 pairs of tonsils for the presence of *Br. abortus*, with uniformly negative results.

6. *Animal Brucellosis*.—At the field station of the Agricultural Research Council, Compton, 2,480 churn samples, drawn from 459 farms, were examined: 415 samples were positive to the milk ring test. Of these, 118 were positive to the whey tube-test, and 18 out of this group proved positive on biological testing. Additional investigations led to the discovery of 15 more infected herds. In all, 33 (6.3%) of the 520 registered dairy herds on the island were found to be infected. Individual samples were taken from 338 cows in 20 herds. Of these, 33 were positive on guinea-pig inoculation.

Discussion

Subclinical or inapparent infection by *Br. abortus* is much commoner than the occurrence of frank cases with an identifiable pattern of signs and symptoms. That infection has taken place may reasonably be inferred on finding agglutinins or evidence of skin sensitization, but the demonstration of either, or both, of these is not sufficient to establish the presence of active disease. Among 1,287 sera from apparently healthy blood donors, 11 gave agglutinin titres of 640 and 5 of 1,280 or more (Table V). Subjective assessment of the whole clinical picture by a clinician is still necessary before a train of symptoms in a particular patient can firmly be attributed to infection by brucella.

In this survey an attempt has been made to appraise both aspects. Agglutination tests and brucellin skin-testing were used to assess the extent of infection. Separate detailed inquiry into individual patients was made in order to discover how often infection is causing overt disease.

The incidence of the disease in this country is uncertain. Estimates have ranged from 400 cases annually (Wilson, 1932) to 1,300 (Dalrymple-Champneys, 1950). Barrett and Rickards (1953), Davies (1957), and Wallis (1959) have published evidence that cases are common in rural areas. At the end of 1959 four local authorities had acquired powers under section 147 of the Public Health Act, 1936, to make brucellosis notifiable and applications from three other authorities were under consideration (Ministry of Health, 1960). It is unlikely that notification can give much useful information unless the criteria for diagnosis can be made clearer and less subject to controversy.

During the present survey 19 patients were investigated as possible cases of active brucellosis. In four instances the evidence seemed complete enough to put the diagnosis beyond mere reasonable suspicion (Table I). Among the 16 psychiatric patients found to have agglutinin titres of 20 or more, seven were suffering from depressive illness, but there was no evidence that any were examples of the psychiatric complications described by many authors.

The results of agglutination tests and brucellin skin tests are in good agreement, and show that infection is very many times commoner than overt clinical disease. Differences in technique and in the agglutinability of suspensions make it hard to compare agglutinin titres obtained on different sera, at different times, in different laboratories. The agglutination technique used in this survey regularly gave titres at least fourfold higher than those obtained from the same sera using the standard antigen provided from the Weybridge laboratories of the Ministry of Agriculture, and using their standard technique described by Stableforth (1953). Many human sera with titres of 20 or 40 gave negative or doubtful reactions with the Weybridge suspension in two independent laboratories. A titre of 20 has been regarded as significant because—(1) titres at this level have been encountered regularly in cases of diagnosed brucellosis, and (2) patients with an agglutinin titre of 20 will respond to a skin-test dose of brucellin by a marked, transient rise in agglutinins.

Agglutination tests on 1,395 adults (Table V), showed that titres of 20 or more occurred in 17%. These figures are in marked contrast to the proportion of 70% found positive among the sera of 27 persons known to be drinking raw infected milk (Table II). A similar finding was made when investigating an outbreak of brucellosis in a Wiltshire village, traced to a heavily infected supply of raw milk. In this episode 78% of 130 sera had agglutinin titres of 20 or more.

Skin tests on adult psychiatric patients gave the same proportion of positives as did agglutination tests (52 out of 277). A different pattern was found among children (Table III). The rate was low (4–5%) for children drinking only heat-treated milk, whether in urban or rural areas. In urban schools 160 out of 439 drank raw milk at home, and these included only 6 positive reactors (3.8%). By contrast 126 children in rural schools included 85 who drank raw milk, and among these were 14 reactors (17%). It was hardly expected that one-third of the children in urban schools, and two-thirds of those in rural schools, would be found taking raw milk at home. The cause of the very high proportion of reactors among the rural children was not determined. Probably many of these still receive "accommodation" milk from a variety of small units,

less carefully kept than the large dairy herds supplying towns. The country child is also apt to be exposed to infection from animals and cattle-sheds as well as by way of the milk supply.

Cattle are the source from which infection spreads to the human population. Ross (1958) thought that since 93.2% of all milk sold to the public was heat-treated and most cases of human brucellosis occurred in rural districts, occupational contact with infected animals might be more important than milk as a mode of infection. The data in Table II support the view that contact with animals carries an enhanced risk of infection (Wilson, 1932; White, 1960). On the other hand, there is abundant evidence that milk has been the vehicle of infection in many cases (Dalrymple-Champneys, 1960), and the figure of 42% positive skin tests among persons drinking milk from infected herds is very much higher than the overall rate for the island (17–18%). Although occupational infections clearly occur, the evidence suggests that infected milk remains an important hazard.

Where the medical officer of health of a district is satisfied that a person is suffering from disease caused by the consumption of infected milk he may issue a notice in accordance with Article 20 of the Milk and Dairies Regulations, 1959, prohibiting its sale or use in the manufacture of products for human consumption unless it has been satisfactorily treated. During 1959 official notices were served throughout the whole country on only 43 occasions. Doubtless many medical officers of health follow the practice of Leicester County and District Councils (Gregory, 1956), dealing with many herds on the basis of undertakings from farmers that their milk will be sent for pasteurization.

The negative results obtained by examining tissue removed at tonsillectomy are reported here as contrasting with rare positive findings reported elsewhere (Carpenter and Boak, 1932; Poelma and Pickens, 1932).

Examination of raw milk showed that the overall rate of infection among the 520 registered herds on the island is 6.3%. This may be compared with the figure of 4.6% positive in 11,051 herd samples examined by laboratories of the Public Health Laboratory Service during 1959 (Report, 1961). The introduction of S.19 vaccine in 1944 has been very successful in achieving a dramatic fall in the incidence of contagious abortion among cattle (Stableforth *et al.*, 1960). Vaccination of calves when 6–8 months old is known to give effective protection through at least five pregnancies (McDiarmid, 1957).

On the Isle of Wight, as a result of talks by the county medical officer to farmers and personal letters from the Divisional Veterinary Officer, the number of calf vaccinations rose to 1,441 in the second half of 1959. The figures for comparable periods for 1957 and 1958 were respectively 980 and 856.

Vaccination of calves does not wholly prevent the production of infected milk. Vaccinated herds with little evidence of uterine infection may yet have much udder infection (Kerr *et al.*, 1958; Kerr and Rankin, 1959). Of the 33 infected herds on the island, 26 were among the 310 herds participating in the calf vaccination scheme, but it is not known what proportion of calves were vaccinated in each herd. It is also likely that repeated examinations would have uncovered infection in several more herds.

Summary and Conclusions

The incidence of brucella infection and active disease in the Isle of Wight was assessed by a survey during the 12 months December, 1958, to December, 1959.

Four cases of clinically active disease were encountered.

Agglutination tests and skin tests indicate infection in about 17% of the adult population.

Of 685 children, 5% gave positive skin tests. Raw milk was drunk at home by 37% of children attending urban schools, and by 67% of children attending rural schools. The incidence of positive skin tests was highest (17%) among a group of 85 children who attended rural schools and drank raw milk at home.

On the basis of single examinations 33 out of 520 registered dairy herds on the island were found to be producing milk infected by *Br. abortus*.

Data were also obtained on the incidence of agglutinins and skin sensitivity among adults occupationally exposed to infection by contact with animals, as well as among others known to be drinking raw milk from infected herds.

It is concluded that infection is widespread among the dairy herds on the island. Consumption of infected milk is associated with a high rate of infection among adults and children. Much of this infection is sub-clinical, but cases of overt disease are occurring.

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DIFFICULTIES IN WEANING IN STERIOD TREATMENT OF ASTHMA

BY

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There is general agreement that adrenocorticosteroids are useful in treating an acute attack of asthma (M.R.C., 1956b), but a good deal of discussion has arisen about their effectiveness as a long-term measure (M.R.C., 1956a). In spite of the M.R.C.'s unenthusiastic report on this long-term use, most subsequent workers have not agreed, and this opposing view is well summarized by Phear *et al.* (1960).

In practice, the usual difficulty is not to decide whether to give long-term steroid therapy to a particular patient, but how to wean a patient from treatment once symptoms are under control. It is this difficulty in weaning that is the main deterrent to giving steroids to asthmatics. Information with regard to the possibility or probability of weaning the patient suggests this is usually difficult. Thus Walton (1956), who studied 153 patients for up to five years, concluded that it "is rare that patients can stop using them [steroids] once they have started." Sheldon *et al.* (1955), who studied 51 patients for periods of up to six months, noted that relapse of symptoms was "the usual experience when the drug was withdrawn."

In the M.R.C. 1956a trial 22 of the 36 patients (61%) were still taking steroids 6 to 22 months after the trial ended; only 7 (19%) were reported to be well and off steroid treatment. Bickerman *et al.* (1954) treated 163 patients with short courses of steroids (average about 8 days, range 3 to 21 days) and noted relapse in the majority shortly after stopping treatment. Twenty-two patients were free of symptoms for more than two months, but only one had a remission lasting more than 12 months. Brockbank *et al.* (1957) treated 29 patients for up to three and a half years and reported 8 (27.6%) as being well and off steroids. Irwin and Burrage (1958) studied 68 patients for up to seven years and found that all except 3 (5%) still required steroids. Arnoldsson (1958), who also presents a very extensive review of the literature, gives details of 161 patients, of whom only two were successfully weaned. Livingstone (1958), in a general review, says "they are difficult, if not impossible to withdraw." Williams (1959) reported 202 patients, some of whom had been followed since 1951: 121 (60%) needed continuous treatment, 43 (21%) had intermittent treatment, and 38 (19%) had only a single course of treatment. Phear *et al.* (1960) treated 50 patients for three to six months, and only 6 (12%) remained well and off steroids. Of the 701 patients described, sufficient details are given about 538 to say that 463 (86%) of them were still taking steroids at the end of the period of observation. There were 21 deaths (3%).

None of the above authors set out specifically to study the problem of weaning from steroids, and it is felt that a more detailed analysis with this in mind is justified. Accordingly, a retrospective survey has been made of all patients with asthma attending the asthma clinic at University College Hospital who have had treatment with steroids. Answers have been sought to the following questions: (1) When asthma is treated with steroids is the treatment likely to be permanent? (2) Which type of patient, if any, is likely to be weaned?

President KENNEDY has announced that he is establishing a panel of medical and other experts to plan a programme of research into the causes, cures, and means of preventing mental retardation. He said in a statement that there were 5,000,000 mentally retarded people in the United States and that the number is expected to rise to 6,000,000 by 1970. (*New York Times*, October 16.)