UNDULANT FEVER IN MALTA

BY

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As a result of the report of a Royal Commission which investigated undulant fever in Malta in 1904 to 1906, both naval and military authorities forbade the use of fresh milk of any sort by the marine troops and their families. In a few months a morbidity from this cause as high as 37.6 per cent. among soldiers and 28.55 per cent. among sailors and their families disappeared altogether with the compulsory substitution of tinned for fresh milk. The occasional sporadic cases were invariably traced to the consumption of fresh milk in unauthorized inns or restaurants. Among the civil population the incidence of the disease increased till in 1934 as many as 7.25 per 1,000 of the population were infected. The public health department periodically advised that milk should be boiled, but owing to a prejudice against cooked milk, and the fear of adulteration unless the goat (the principal and often the only source) was milked on the doorstep of the householder, only a very small proportion of the inhabitants paid heed to the warning. Tinned milk, however, rose rapidly in favour among the lower classes as an infant food. Many cheap sweetened brands flooded the market, to the obvious detriment of child welfare and with a consequent increase in the infant mortality. Cases of undulant fever among the military and naval population dropped from 245 in 1905 to 12 in 1907. The figures for the civil population for the same years were 798 and 457 respectively. For the last decade, 1926 to 1935 inclusive, the returns for the civil population have been as follows:

Year	Cases Notified	Deaths
1926	586	27
1927	702	28
1928	971	42
1929	1,288	61
1930	1,471	85
1931	1,345	72
1932	1,465	82
1933	1,713	67
1934	1,909	88
1935	1,310	80
1936	873	52
1937 (January to October) 677	—	—

The highest incidence invariably occurred during the dry months of the year—that is, from May to September or October. Thus for 1937:

Months ..	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Notified cases..	36	48	66	70	93	109	146	133	114	98

Epidemiology

Undulant fever is endemic throughout the Mediterranean basin and all the countries adjoining it. Since the identification of *Brucella abortus* in 1921 and the discovery of its close relationship to *Brucella melitensis*, it may well be described as a world-wide disease. In Great Britain the infection was first reported by Sir Weldon Dalrymple-Champneys in 1929. Other reports followed from Scotland, Wales, and Ireland; recently reports have come from Russia, the infection there being traced to dung briquettes imported as fuel. In France at least fifteen Departments, chiefly in the south and south-east, are seriously affected. In the United States of America thirty-two out of the forty-eight States are infected, and the infection is progressing. Infection has been invariably traced to raw milk or to direct contact with the discharges of infected animals.

Clinical Points

Undulant fever due to *Brucella melitensis* infection is characterized by waves of fever of varying duration with intervening periods of apyrexia, often of very long dura-

tion, the total course varying from an average of six months to three years or longer. There is profuse diaphoresis, progressive anaemia, and later excruciating pains in bones, joints, and along the course of nerves, due to chronic inflammation of aponeuroses, ligaments, and nerve sheaths. The spleen is always enlarged but not usually tender. Secondary infections, especially tuberculous and staphylococcal, are common. The most usual blood picture is a leucocytosis, as many as 50 per cent. of the white cells being mononuclears. A moderate eosinophilia may also be met with. In protracted cases the haemoglobin is considerably reduced, and a profound anaemia results which is the cause of a protracted convalescence. Blood culture is positive in as many as 98 per cent. of cases, and the *Brucella melitensis* may be isolated even during apyretic intervals. The not infrequent presence of organisms in the urine of patients at once raises the problem of human carriers.

Treatment and Prophylaxis

Vaccines appear to offer the only hope of successful treatment at present, but largely owing to the profound anaemia and allergic states great care and patience have to be exercised in the selection of cases suitable for vaccine therapy. Protosil has been tried in America without success.

As to prophylaxis, the scheme in Malta for pasteurizing goats' milk and for the simultaneous control of the whole milk industry of the islands, which will result in the early disappearance of all goats and sheep from the public thoroughfares, is now well in hand, and it is hoped that the system will begin to operate early in 1938. But unless all the herds are systematically examined with a view to eliminating all infected beasts, which certainly exceed 15 per cent., the improvement must be slow. Undulant fever has been successfully stamped out in Port Said by destroying all infected goats; the same method of attack is being advocated and carried out in Sweden to deal with contagious abortion in cattle. If the destruction of a considerable proportion of the existing herds in the Maltese Islands is not feasible, at least immediate segregation should be insisted upon, and the goats so segregated on Government farms may supply the material for further study at the newly opened research station, where it is hoped to evolve a suitable goat vaccine. An emulsion of *Br. abortus* in normal saline (100,000,000 organisms per c.cm.) is used intradermally in France for the detection of infected animals, 0.7 c.cm. for cattle and 0.3 c.cm. for sheep and goats being injected into the folds of the skin around the anus. A positive reaction is indicated in from two to three days by a tense oedema which lasts for five to six days. A preventive vaccine with live, non-virulent organisms is also used for infected animals. This prevents abortion, and thus reduces the chances of human infection from this source.

While compulsory pasteurization is not at present contemplated in Malta, reliance is being placed more on the effect of healthy propaganda, with a view to educating the public to the value of a clean and safe milk. Distribution in properly sealed bottles and cartons will be from suitable centres, so that the supply will be within easy reach of the consumers all over the island.

A new edition of the pamphlet *Careers for Secondary School Girls* is now published in a more compact form as one of the series prepared by arrangement between the Incorporated Association of Headmasters and Headmistresses and the Ministry of Labour. Most of the usual careers for girls are listed, including some still in the pioneer stage. In each section there is a brief note of the qualifications required (with particular reference to the need for the school leaving certificate); the nature, length, and cost of training and the prospects, including starting salaries. The pamphlet is on sale at H.M. Stationery Office or through any bookseller, price 6d. (7d. post free).