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BACILLARY DYSENTERY  
COLITIS AND ENTERITIS

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JOSEPH FELSEN

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# Bacillary Dysentery

## Colitis and Enteritis

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Pan-American Dysentery Registry*



ILLUSTRATED

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W. B. SAUNDERS COMPANY  
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*Dedicated to the memory of  
my noble and devoted wife*

**TED**

*who made this work possible*

## *Foreword*

Infections with the dysentery bacilli have been among the commonest causes of disability and death since time immemorial. They have weakened armies, swept through civilian communities, been responsible for high infant mortality, and even caused epidemics among hospital personnel. Their prevention has often been neglected because of the difficulty of controlling the sources and vehicles of transmission.

In recent years, however, considerable advance has been made in understanding and treating these infections. Classification of strains of *Shigella* has been improved, new culture media and techniques of isolating strains have been introduced, subclinical and mild infections have been better recognized, and effective chemotherapeutic agents have been discovered.

Chronic intestinal infections with the dysentery bacilli have long been recognized, but the association of these infections with certain other intestinal conditions, notably chronic ulcerative colitis and regional ileitis, are still under debate. It is generally conceded that some cases of these conditions have a bacillary dysentery background, but the relative importance of such a background can be determined only by the most thorough clinical and laboratory study, and by following cases of bacillary dysentery over a period of years to detect chronic manifestations.

Dr. Felsen has devoted many years to the study and control of *Shigella* infections. He has dealt with epidemics and has followed cases into their late manifestations. He has produced a motion picture which is widely used for educational purposes. He has established the "International Dysentery Registry" as a means of promoting coordinated study and preventive activity. He now presents the first comprehensive monograph on the subject to be published in the United States. It records his own studies and points of view as well as the work of other authorities, and makes available for the first time the correlated investigations of the

pathologist and the clinician in bacillary dysentery, enteritis and colitis. This work should not only contribute significantly to better diagnosis, treatment, and prevention, but should also provoke discussion and research which will settle some of the unsolved problems of *Shigella* infections.

HENRY E. MELENEY

## *Preface*

In presenting the subject of bacillary dysentery, the author wishes to acknowledge a debt of gratitude to the many eminent investigators, both living and dead, who have devoted themselves to a study of this disease. To the pioneers who laid the groundwork for the better understanding of bacillary dysentery, this humble tribute could hardly be adequate. For, truly, we have but climbed upon the shoulders of those who preceded us. To the clinicians, laboratory workers and public health officials who have collaborated in the studies of the International and Pan-American Dysentery Registry since 1933, the author expresses his sincere appreciation.

No attempt to cover the vast subject of bacillary dysentery can be free of imperfections. The author has deliberately risked criticism by being repetitious occasionally when the importance or relevancy of the data warranted it.

In the light of the major advances of the past fifteen years, a correlated study of the historical, epidemiological, clinical, pathological, bacteriological, serological and therapeutic aspects of bacillary dysentery now appears justified. It is hoped this effort will fill a long recognized gap in our knowledge of the disease.\*

Special acknowledgement is made of the invaluable advice and criticism of Dr. Stuart Mudd, University of Pennsylvania. The author also wishes to express his sincere thanks to Dr. A. A. Weech, University of Cincinnati, and to Dr. Henry Meleney, New York University College of Medicine, for their critical reviews of the manuscript and to Dr. William Wolarsky for his valuable assistance as hospital epidemiologist.

NEW YORK CITY  
*July, 1945*

JOSEPH FELSEN

\* The Dysentery Teaching Set (Science 100:86, July 28, 1944), which has been used at many Universities and in Army and Navy hospitals, is now available as Medichrome films from Clay-Adams Co., Inc., 44 East 23rd Street, New York, N.Y.

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# *Acute Bacillary Dysentery*

## HISTORICAL ASPECTS

The history of bacillary dysentery is intimately associated with the development of civilization. As long as people lived in widely separated, small groups, often as travelling nomads, infectious dysenteric disorders were probably rare. Life was simple and determined chiefly by the availability of food. Primitive man, largely a product of his environment, had few social contacts and these were chiefly familial. As the struggle for existence grew, life became more complex. Aside from the necessity for protecting his family against predatory animals, man was soon forced also to safeguard them from his aggressive fellow men. It was rational for him to join others for this common purpose. At any rate, we find that the establishment and growth of cities was largely a measure of self-protection. While union and numbers meant strength, it also involved new problems. One of these concerned the hygiene and sanitation of these newly founded and relatively populous communities. The difficulty was often accentuated by the sudden influx of refugees fleeing from marauders or military aggressors. Thus, in a sense, bacillary dysentery from its very beginning was intimately bound up with military campaigns.

**Bacillary Dysentery as a Disease of Wars, Ancient and Modern.**—The hygienic and sanitary factors responsible for the transmission of this disease are particularly operative among military forces under conditions of active combat service. Together with typhus, cholera, bubonic plague, influenza, malaria, smallpox and typhoid, bacillary dysentery has always been a major military problem. From 'Thucydides' account of the Peloponnesian War in 431 B. C. to the present Second World War, no major military campaign has been free of its ravages. Herodotus, in his description of the third expedition of Xerxes I against the Greeks in 480 B. C., attributed his defeat to dysentery and plague which destroyed his army.

Mercer (1936) records the prevailing epidemic diseases in various military campaigns as tabulated in Table 1.

Table 1.—Prevailing Epidemic Diseases in Nine Major Military Campaigns

Campaign	Year	Diseases
1. Persians' invasion of Greece (Xerxes).....	480 B. C.	Plague, dysentery
2. Siege of Bagdad by Saracens.....	1439	Dysentery
3. Siege of Metz by Charles V.....	1552	Dysentery, scurvy, typhus
4. Frederick William II against army of French Revolution.....	1792	Dysentery
5. Napoleon's Russian campaign.....	1812	Typhus, typhoid, dysentery, pneumonia
6. Russo-Turkish War....	1828	Plague, typhus, typhoid, dysentery, cholera
7. Mexican War.....	1846	Typhoid, dysentery, smallpox, malaria
8. Crimean War.....	1853	Cholera, typhus, typhoid, dysentery, malaria
9. Civil War.....	1861	Scurvy, typhoid, dysentery, malaria, smallpox, pneumonia

To these we may add (Zinsser, 1936) the campaign of Frederick II at Brindisi. Edward I and Henry V of England probably died of bacillary dysentery during military maneuvers, 75 per cent of the army of Henry V succumbing to the same disease.

Some idea as to the extent of the ravages of dysentery may be gleaned from the figures compiled by Vincent, Surgeon General of the French Army, and Muratet (1917) as well as those of Councell (1941). Vincent and Muratet quote Pringle who described an epidemic of bacillary dysentery involving one half of the British troops at Dettingen in 1743. Similar epidemics occurred in the War of Polish Succession, the Austrian War and the Seven Years' War. Dysentery was also widespread among the armies of Crusaders in the thirteenth century and during the Thirty Years' War. The following data (Table 2) represent the combined figures of Vincent and Muratet and Councell.

In the Mexican War (1846) 10,986 of a total of 100,000 troops died of typhoid, dysentery, smallpox, malaria and tropical diseases.<sup>1</sup>

Table 2.—Morbidity and Mortality Due to Dysentery in Six Major Wars

Year	War	Cases	Deaths	Remarks
1828	Russo-Turkish	34,198	9,543	Morbidity 57.75 per 1000; mortality 16.11 per 1000.
1853	Crimean	9,000	1,478	May-Sept. 1855.
1861	Civil	238,812	4,804	White troops only.
1870	Franco-German*	38,652	2,380	German army.
1894	Sino-Japanese*	155,140	38,094	
1899	South African*	38,108	1,342	

\* Lancet 2: 636 (Sept. 5) 1914.

During the Civil War (1861) there were 1,739,135 recorded cases of acute and chronic diarrhea with 44,558 deaths among the Federal soldiers (both white and colored). Dysentery was said to have been even more prevalent among the Confederate troops. In the military prisons, the incidence was extremely high and at Andersonville there were 16,772 cases of diarrhea and dysentery with 4,529 deaths. The difficulty of evaluating these statistical data (see discrepancies in Table 2) lies in the probable inaccuracies of diagnosis and poor terminology. It appears quite likely that some salmonella, typhoid and other infectious diarrheas may have been included. In the Medical and Surgical History of the War of the Rebellion (1879), it is stated that acute and chronic diarrheas were responsible for more sickness and deaths during the Civil War than any other disease. Among the Northern white troops the annual admission rate was 876 per thousand and the death rate 10.37 per thousand.

In the Sino-Japanese War (1894), there were 12,052 cases of bacillary dysentery among 200,000 soldiers (Vincent and Muratet, 1917).

<sup>1</sup> Editorial J. A. M. A. 113: 1230, Sept. 23, 1939.



In the Spanish-American War (1898), the incidence of dysentery among the American soldiers was 500 per thousand but the mortality rate was only 0.5 per cent, an unusually low figure, when compared with the average mortality rate for Flexner infections in the United States of about 2.5 per cent.

During the South African War (1899), there were 38,108 cases of dysentery among the British forces with 1,342 deaths. Of 30,000 British troops who fought in the Crimea, 7883 contracted dysentery and of these 2,143 died (Hurst and Knott, 1936).

It may be of interest to note the ratios of disease mortality rate to battle mortality rate among United States troops (Council, 1941). For the Mexican War it was 7:1, 10,986 dying of typhoid, dysentery, smallpox and tropical diseases, while only 1,549 died of gunshot wounds. In the Civil War, the ratio was 2:1, more than 200,000 of the Union Army dying from disease and 112,000 from battle wounds. In the Spanish-American War the ratio was 13:1, 4795 succumbing to disease and 379 in battle. During the World War the ratio was about equal (1.1:1) 58,119 deaths resulting from disease and 50,385 from wounds in the American Army (Mercer, 1936). The Germans, in the Franco-Prussian War of 1870, and both sides in the Russo-Japanese War of 1904, revealed for the first time an incidence of wounded higher than that of disability from infectious disease. Waldman (1934) reports the ratio of disease to battle deaths as 1:10 in the German army during the World War.

The withdrawal of the British forces from San Juan, Puerto Rico in 1598 after suffering a loss of 40 per cent from bacillary dysentery, largely determined the future history of the country which remained under Spanish domination. Dr. Layfield, who participated in the expedition, described the typical clinical picture as diarrhea with bloody mucus and fever, as many as sixty to one hundred evacuations occurring daily. Of 1,000 men landed in San Juan, 400 succumbed to it and as many more were affected. Mandry (1935) in his account of the history of bacillary dysentery in Puerto Rico cites other interesting facts. Thus, Lasierra (1931) states that bloody diarrhea was common among the Indians prior to the arrival of Columbus. Brau (1908), quoting Herrera, notes that Indians from Dominica often con-