

CT 5420

Public Hygiene and Epidemiology

July 2007

Dr. P. Bol, M.D., Ph.D.

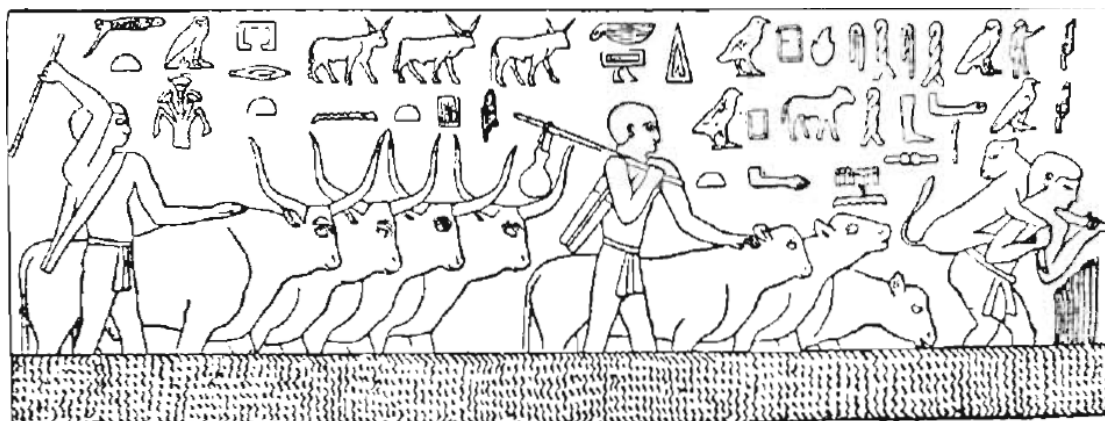
**Section Sanitary Engineering
Department of Watermanagement**



Public Hygiene and Epidemiology

CT 5420

English edition; June 2007



Dr. P. Bol, M.D., Ph.D.

Section Sanitary Engineering
Department of Water Management
Faculty of Civil Engineering



Technical University Delft, The Netherlands

Figure on cover: Herdsmen and their herd cross a river or canal. The old Egypt knew a complicated system of irrigation systems that also played a role in transportation. The later state structure even evolved out of the many small hydrologically defined units. Which forms a parallel with our Low Countries. Try to imagine which infection cycles discussed in this book can occur and persist in a situation as shown in the picture. There are more than you may think first. Take also into account the lower bar with under water life. (Source: JH Breasted: History of Egypt).

Content

	Introduction	5
	A word of thanks	6
	Some guidelines	7
	General introduction	
1	Classification of life on planet Earth	9
2	Understanding basic epidemiology	12
	A - Epidemiology	12
	B - Medical statistics	15
3	Demography	23
4	Some relevant elements from the history of medicine	31
	Pathology	
5	Terminologies for the principal causes of infections (diseases)	39
6	The killing or fixation of micro organisms	41
7	Diseases in relation to water	42
8	Gastro-enterological infectious diseases	43
9	Deficiency diseases	53
10	A number of viral disorders	58
11	Swimming water	61
12	Sexually transmitted diseases	69
13	A number of bacterial diseases	73
14	Arthropod borne infections	76
15	Diseases from protozoa and worms	82
16	Immunity	91
17	Vaccines and vaccination	93
	Social medicine	
18	Health, morbidity and mortality in the Netherlands and the world	100
	Health and the environment	
19	Some aspects of the environment	107
	Literature	110

Appendices

A1	A column: Mirror images	116
A2	Sewage and the city	117
<u>Short articles for Mappae Mundi</u>		
A3	Cities and length of lives: a wave-like pattern	126
A4	Man... a late life form	129
A5	(Neo)Malthusianism and AIDS	130
A6	Pestilence: a bug in a flea on a rat (A disease creates a landscape 1)	132
A7	The advantage of disadvantages	133
A8	Anthrax (A disease creates a landscape 2)	134
A9	The different landscapes of disease	135
A10	Diamond's hypothesis	136
A11	European expansion	138
A12	Cholera: an environmental problem	139
A13	Smallpox: will the virus reign again?	140
A14	The health aspects of modern urban water management	149
A15	Water quality, a matter of life and death	158
A16	Clear danger	164
A17	Assessing and evaluating the health impact of environmental exposures	174

Introduction

This is the text book of the college course 'Public Hygiene and Epidemiology' (CT5420) of the Section Sanitary Engineering. It is intended for students of civil engineering but also for others who are interested in sanitary engineering. Many of the students are or will be working in the field of applying technical knowledge and materials to improve human health, here and abroad.

The civil engineers are e.g. employed in the cleaning and distribution of drinking water, the collecting, transport and processing of waste and sewage water, soil sanitation, the construction of dams, water reservoirs and irrigation and drainage systems. This implies a conscious adaptation of the environment to the needs of mankind.

The operations they perform are in many cases not just beneficial to the other inhabitants of our planet. And to make things worse, man and his health can eventually be at risk because of the changed circumstances, that can have unsuspected negative consequences. This course hopes to clarify that engineers, like doctors, should not apply their technical power in an isolated way, but in good coordination with other disciplines. Only then the ability of mankind to adapt his environment can be used in a balanced way.

Delft, 5 January 2005, Dr. P. Bol, medical epidemiologist

A word of thanks

I would like to thank my predecessor Prof. Dr. J. Huisman, who taught Public Hygiene and Epidemiology till mid 1993. Not only did I make use of his course book, but he was also kind enough to review and comment on the text book that I wrote in Dutch (1997). His work has really improved the book. Historian dr. H. van Zon (State University Groningen) reviewed the historical parts critically, I thank him for that. I also thank doctor Sebastain Kalwij for a very well written appendix. Dr. A.E.M. de Hollander (RIVM), environmental epidemiologist and ecotoxicologist contributed greatly to the book. And last but not least my thanks to Kate Steenhauer and Petrina Reynolds who assisted in translating.

P. Bol