

**THE CAMPAIGN  
AGAINST  
MICROBES**

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The campaign against microbes by Etienne Burnet & E. E. Austen

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**ETIENNE BURNET & E. E. AUSTEN**

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# THE CAMPAIGN AGAINST MICROBES

BY

ÉTIENNE BURNET, M.D.

OF THE PASTEUR INSTITUTE, HEAD OF THE VACCINATION SERVICE OF THE  
CITY OF PARIS

TRANSLATED FROM THE FRENCH

By E. E. AUSTEN, F.Z.S.



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## PREFACE.

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THE studies collected in this book have not been grouped together at random. They relate to different types of infectious disorders, and are fairly representative of the problems and methods of experimental medicine. The series might be entitled : *The objects of laboratory research at the present day, for the prosecution of the anti-microbe campaign.*

The longest chapter is devoted to cancer, a subject which is still veiled in obscurity, though familiar to all students of vital phenomena, whether medical men, histologists, bacteriologists, chemists, or specialists in hygiene. If it be true that in science "the known loses its attraction, while the unknown is ever full of charm" (Claude Bernard), this is indeed the problem that must excite the keenest interest. Everything connected with it is mysterious—the nature of the disease, its origin, and its causes ; we have scarcely begun to approach it by the experimental method. We are indeed at the starting point of the chase, and the prize is far away : imagine a study on tuberculosis written about 1875, or on rabies about 1880. Gropings such as these, such diversity of opinions and tendencies, such haphazard experiments represent science itself in travail.

Tuberculosis is the typical chronic microbic disease, an attack of which renders the organism *susceptible* instead of vaccinating it. We are well acquainted with the natural history of the tubercle bacillus, as the result of the very large number of memoirs that have appeared subsequently to the discoveries of Robert Koch. The malady itself, however, has hitherto failed to yield to any of the methods of scientific therapeutics, vaccination, and serum-therapy, which have proved so successful in the case of other diseases. At the moment of writing,

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indeed, we have to record the failure of von Behring's *bovo-vaccination*, from which great things had been expected.

In the case of sleeping sickness we are dealing with a tropical disease the peculiarities of which are of a novel character; that is to say, the protozoon that causes it, the fly by which it is propagated, and the chemical treatment that holds out a promise of cure.

Tetanus and diphtheria are types of *toxic* disease which it is possible to reproduce by means of the poison of the microbe in the absence of the microbe itself, the remedy for which has been found in the shape of antitoxic serum, and with regard to which a difficult problem still presents itself—namely, after the curative remedy to discover a prophylactic. From the scientific point of view, there is nothing of greater educational value than the story of the tetanus investigations: on the one hand, we have a series of enigmas which had to be solved one after the other; and, on the other, a succession of experiments which remain lessons and models.

The chapter on enteritis and the intestinal microbes will perhaps give some idea of the extensive researches upon the intestinal flora, in which Metchnikoff has been so ardent a pioneer. The originality of the problem lies not so much in the technique, which is that of classical microbiology, as in the immensity of the horizons that this bold spirit has revealed to us. The question at issue is the perfecting or renovation of the human species by a carefully considered system of nutrition, and by the scientific selection of the races of microbes of which we are the hosts. It is the A B C of hygiene, which should retard the approach of old age, and assure to mankind the normal cycle of life. Here, however, we cannot do more than refer the reader to the "*Études sur la nature humaine*" and the "*Essais optimistes*" of the illustrious biologist.

Although more than a hundred years have elapsed since the date of Jenner's magnificent discovery, we are still ignorant of the nature of the virus of small-pox and vaccine, and a series of infections referable to the same type has been described. The result is that there is not a chapter of more present interest than that which appears to belong solely to history.

It would have been easy to combine the two studies on cancer, which were written at an interval of a few months, as



also the two on tuberculosis. By leaving them distinct, it has been possible to show how a question may develop in the space of a year. To be present at one of those great discoveries that, like the rising sun, illuminate a domain which was dark the night before is not a matter of everyday occurrence. Besides sudden developments, there are the imperceptible advances by which the slow transformations are brought about. The change is visible from day to day only to those who follow very closely the patient labour of the investigators. From one year to another it is perceptible to the whole world. Hundreds of workers bring up their grain of sand and the edifice is built. Between the month of March, 1905, and October, 1906, there were published at least a thousand memoirs on Schaudinn's spirillum. A German author, on bringing before the scientific world a work on tuberculosis written some ten years previously, found himself confronted with eleven thousand publications which had appeared in the interval. The industry of scientists resembles that of ants.

I make no pretence to a definite philosophy, but would rather steer clear of anything of the kind. What is the use of wearying the reader and of preventing him from thinking, in his own way, what he is capable of thinking as well as I? If the simple narration of facts and experiments suggests some reflections on the experimental method, or the co-efficient of certainty or uncertainty of ideas and results, I have left these to be read between the lines. I have no more claim to be a scientific critic than to be a philosopher, remembering as I do the saying of Claude Bernard: "I do not admit the possibility of there being in science men whose speciality is criticism, as there are in letters and the arts. In each science criticism must be pronounced by the scientists themselves. . . ." My sole qualification is that I have been permitted to labour in the great scientific workshop, and to participate in the investigations that I describe, which is the only method of following them.

At the present day it is the fashion to "popularize" science. The phrase would be unpleasant, were it implied that science could become "vulgar" as well as popular, and that it is necessary to degrade or alter it in order to render it accessible. There is but one truth for everyone, and we have no right to disseminate partial truths. So far from being of an inferior

quality, an elementary book should display greater clearness, method, and precision.

Science occupies too large a place in life for us not to respond to the taste of the public, which desires to know its beauty and utility. On the other hand, there is room for a certain amount of scepticism as to how much science it is possible to communicate to minds (even the best) unfamiliar with laboratory research. What is to be done? Excessive simplification and unnecessary detail must alike be avoided. To popularize is to select. The rule is in the technical portion to pass over all that is devoid of educational value ; to explain what is essential in terms which professional scientists would not repudiate ; to present science as liberal and humane ; to aim at something higher than the immediate interest of curiosity, and to offer to those whom their occupations keep at a distance from scientific work sound ideas as to the place and power of man in Nature. To popularize science would be labour in vain if, besides its instructive value, such work did not possess the merit of contributing to the general progress by cultivating the mind.

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