

kale and other crops. There are no special features here; similar systems can be found elsewhere.

The difference from ordinary farming is that Mr. Sykes uses no fertilizers and no chemical agents for plant or animal protection. By withholding fertilizers he claims that his crops are entirely free from disease and produce seed free from adherent fungus spores, so that no seed dressing is ever required; that his animals likewise suffer neither disease nor sterility; and further, that his cereals have a health-giving quality lacking in ordinary farm produce. He recognizes that the basis of his crop production is the nitrogen of the air as in ordinary farming, but he maintains that the plant nutrient produced by microbiological fixation has far greater value than that produced by catalytic fixation; the end-product is nitrate, but in one case the nitrate is natural and associated with the vital principle, and in the other it is artificial and devitalized.

Unfortunately, the evidence for the claim is entirely subjective. Mr. Sykes claims to be able to detect by taste the difference between humus-grown crops and those produced in the usual way. An experiment on the farm scale has been set up; it will be convincing only if both design and execution conform to modern standards. In these days of hormones, trace elements and isotopes, no responsible scientific worker would pretend that the full story of plant nutrition is yet known; but standards of experimental technique have advanced greatly in recent years, thanks largely to the Rothamsted workers, and experiments can be designed in such a way that the validity of the results can be tested. Only when satisfactory evidence can be adduced are the theories of the author's group likely to be accepted. E. JOHN RUSSELL

LEEUWENHOEK

Antoni van Leeuwenhoek

Zijn Leven en zijn Werken. Door Dr. A. Schierbeek. Deel 1. Pp. 278+18 plates. 10 f. Deel 2. Pp. 281-526+10 plates. 12 f.

(Lochem: 'De Tijdstroom', 1950-51.)

THE literature that has rapidly grown up around Leeuwenhoek since the publication of Dobell's classic work in 1932 would suggest the preparation of a general treatise devoted to his scientific researches as a whole. Dobell's study, admirable as it is, covers only a small fraction of the work of the celebrated Hollander. Out of a projected total of twenty volumes of the "Opera Omnia" the Leeuwenhoek Commission of Amsterdam has so far produced only three volumes since 1939, and the War has well-nigh shelved this sumptuous and costly enterprise. If, however, as we all hope, it can be completed on the scale of the detailed magnificence of the early volumes, we shall have a monument to Leeuwenhoek worthy of the man and of the Dutch nation. The recently instituted Leeuwenhoek lecture by the Royal Society is not intended to deal with Leeuwenhoek's own work, but rather with *modern* developments in microbiology—a branch of science in which Leeuwenhoek's discoveries have earned for him the title of 'Father'.

Dr. A. Schierbeek's book, therefore, comes at a time when an inclusive and critical examination of Leeuwenhoek's researches based on a thorough knowledge of all the original letters in Dutch, and also on the labours of modern commentators, might reasonably

have been expected. It is true that such an author would find his own knowledge of biology severely tested, and, moreover, several minor researches of his own would be necessary before a final judgment could be reached on those points which always emerge during the progress of such a work. Dr. Schierbeek's professional duties are sufficiently exacting to tax both energy and endurance, and he is to be congratulated on the production of a learned work which must have entailed considerable literary and objective research. Its wide scope and complexity is indicated by the following translation of the chapter and sectional headings, outlining Leeuwenhoek's personality and researches, into which the text is divided. Vol. I. (1) Life and works. The first forty years. As a citizen, an usher in the council chamber, a wine gauger, surveyor, and an amateur scientific worker. His mentality and psychological type. (2) His microscopes and research methods. (3) His attitude towards inorganic Nature and concern with mathematics, physics, chemistry and geology. (4) As the father of microbiology. On free-living and parasitic unicellular animals, rotifers, phytoflagellates, soil micro-organisms, seaweeds, mildew, bacteria and yeast. (5) On the study of the lower animals, such as stinging animals (Coelenterates), sponges, molluscs, worms, spiders, and the higher Crustacea. (6) As an entomologist. On the anatomy of advantageous instincts, compound eye, galls and gall insects, clothes [body] louse, flea, grain weevil and its treatment, aphid, parthenogenesis and ichneumon parasites. The first volume closes with a genealogical table of the Leeuwenhoek family.

Vol. 2. (7) On the investigation of the vertebrate animals. (8) Discovery of the spermatozoa and views on generation. (9) As an histologist. On the structure of muscle, blood corpuscles and blood vessels, digestion and microscopic structure of gut, bone, teeth, skin, sweat glands, hair, nails, structure of nerves, brain and spinal cord, lens of eye, tongue, saliva, nasal mucus, phlegm, ear, kidney, bile production, milk, fat, ciliated epithelium, chromatophores, and nuclei. (10) Medical observations. (11) On botany. Structure of wood, structure of monocotyledons, tyloses, vessels, vacuolated tissue, raphides, starch, movements of sap, fruit and seed, growth of meristem in wheat ear, laticiferous vessels, stinging hairs, hairs of Labiatae, and plants used in medicine. (12) As ecologist. (13) Summary and appendixes. The published letters and bibliography of Dutch and Latin editions. The relevant literature.

Dr. Schierbeek surveys this comprehensive and bewildering field with the confidence of an enthusiast steeped in his subject, and, as a Dutchman, better able to unravel Leeuwenhoek's many puzzling and involved passages, often made less intelligible by his use of obsolete colloquialisms. I regret the mistake of publishing so important a work in a language unfamiliar to the larger foreign public attracted by the subject. Perhaps Dr. Schierbeek will now prepare an English translation, for which a publisher could readily be found in Britain, if not in Holland. In framing the idiom of the Dutch text of his work, I fear that Dr. Schierbeek has not always borne in mind that the affairs and work of Leeuwenhoek interest a widening non-Batavian circle.

[Since the above notice was written, Dr. Schierbeek has been approached by an American publisher with an offer for the publication of an English translation of his memoir.] F. J. COLE