

from the deposit of materials brought down the fen rivers in flood-time, and have then been enclosed and drained. The area of land thus reclaimed from the sea, since the formation of the first sea banks about 1700 years ago, amounts to 63,300 acres, or an average yearly addition of $37\frac{1}{4}$ acres. Mr. Wheeler points out that the reclamations must be gradual, owing to the limited quantity of fertilising alluvium brought down by the rivers, and that the schemes which have occasionally been brought forward for enclosing large areas of the sandy foreshores of the Wash, adjoining the fens, would be financial failures on account of the barren nature of the sands before they are covered over with warp.

The subject is dealt with in seventeen chapters, followed by eight appendices; and it is illustrated by fourteen maps of the various districts, and two diagrams exhibiting the strata, levels, and rainfall of the fens. Unfortunately, no pages are given in the table of contents, which renders reference to the different chapters and illustrations a tedious search; and marginal headings in small print only partially compensate for the absence of top headings to the pages, and the entire omission of notes. A general early history of the fens is given in the first chapter, and the several drainage districts are described in turn; and special chapters are devoted to the river Witham, the river Welland, the estuary and its reclamation, Boston Harbour, and the Witham Outfall, with which the author has long been professionally connected, the geology and water-supply of the fens, and a concluding chapter on the natural history, products, climatology, and health of the district. The inhabitants of the fens have had to maintain a constant struggle with nature, first in rescuing and preserving these fertile lands from the sea, and by degrees increasing their extent by fresh enclosures; and secondly, in improving the drainage of these flat low-lying districts by straightening, enlarging, and embanking the channels of their rivers, and supplementing them by numerous straight drains, so as to prevent the inundation of the lands in times of heavy rainfall. Pumps also have been extensively introduced to remove the water from the lands, and to assist in the drainage of the district, which, owing to the small fall, cannot be wholly effected by gravitation. Sluices placed across the rivers in the neighbourhood of their outfalls, with gates to arrest the tidal flow, and thus secure the land above from any chance of an inroad of the sea, through breaches in the embankments along the river banks, have naturally, in conjunction with silting in the Wash, produced a deterioration in the depth of the outfalls, which has been detrimental to drainage as well as navigation. The straightening, however, of the outfall channels has effected some improvement; and the formation of a more direct outlet for the Witham, by cutting a new channel for the river, in 1880-84, two and a quarter miles long, through a projecting clay bank below Boston to deep water in the Wash, has effected a great amelioration in the navigable channel between Boston and the sea, and in the outflow of the drainage waters, which latter was at the same time further facilitated by an enlargement of the Grand Sluice above Boston.

The author being an engineer, has perhaps given more prominence to the engineering features of the

history of the fens than another writer might have done; but unquestionably the prosperity, and even the existence of the fens are almost wholly dependent on engineering works. The book, however, does not pretend to give detailed descriptions of the works carried out, which have been recorded by Mr. Wheeler and others in engineering publications; and the book will chiefly interest archæologists and topographers, and especially those who live in the neighbourhood of the districts described. Though Mr. Wheeler, as an old inhabitant, has given somewhat too rosy a description of the attractions of the fens on pages 2 and 486-487, where the features of the landscape are banks, drains, windmills, and occasional church towers, and keen north-east winds often prevail through the spring up to June, he shows great interest in the country he resides in, extending to minute details on a variety of topics, and has produced a volume exhibiting considerable labour and research.

OUR BOOK SHELF.

Bacteria of the Sputa and Cryptogamic Flora of the Mouth. By Filandro Vincentini, M.D. Translated by Rev. E. J. Stutter and Prof. E. Saieghi. Pp. x + 239. (London: Ballière, Tindall, and Cox, 1897.)

THIS volume is a collection of three monographs and an appendix, viz. First memoir: On the Sputa of Whooping Cough. Second memoir: Recent Bacteriological Researches on the Sputa. Third memoir: On *Leptothrix racemosa*.

Without in the least wishing to detract from the earnestness, enthusiasm and laudable industry of Dr. Vincentini, we are sorry to have to confess that this book is what, in Germany, would be called an overcome standpoint—*ein überwundener Standpunkt*. Fifteen years ago, prior to the introduction, by Koch, of exact methods of bacteriological study, this book, dealing with the purely microscopic examination as to size and shape of micro-organisms in the sputa and of the mouth, would have had some *raison d'être*; not so at the present time. Everybody knows that if you talk of a bacterial species, of pathogenic and non-pathogenic organisms, you mean not merely the size and shape of a microbe, but that you have studied its biological, chemical and cultural characters, and that you have ascertained whether or not, and under what conditions, it possesses, or is devoid of, pathogenic properties when introduced in one way or another, experimentally or otherwise, into the animal system. Of all this, Dr. Vincentini is quite innocent. To assert, as he does from purely microscopic examination, that a host of microbes—bacilli, cocci, vibrios, and spirilla, occurring in the sputa and in the fluid of the mouth—are all derived from, or are parts of, a single species "*leptothrix*," requires either tremendous courage, or is due to a want of appreciation of the enormous amount of exact work hitherto accomplished. The discussion in the appendix, by Dr. Vincentini, of the views of antiquated authors on spontaneity of origin of infectious diseases, and, further, his extraordinary derivation of the tubercle bacillus, spirillum of relapsing fever, gonococcus and pneumococcus from the indifferent leptothrix, is an anachronism of a curious and, we had hoped, extinct type. E. KLEIN.

Neudrucke von Schriften und Karten über Meteorologie und Erdmagnetismus. Nos. 7-9. Edited by Prof. Dr. G. Hellmann. (Berlin: A. Asher and Co., 1897.)

THESE reproductions in facsimile of classic papers in meteorology and terrestrial magnetism are attractive in appearance, and Prof. Hellmann's introductions and