raising the standard of the articles made, and at the same time of improving the prosperity and health of those who are employed in making them. The volume now before us shows the application of science to the art of bread-making, and a glance at its size and contents will at once show all those who are entering into this business that there is a very large amount of scientific knowledge required to equip a man efficiently to succeed in the keen competition of the present day.

The chemistry of the subject is very fully dealt with, with valuable suggestions for practical work; and we have also a chapter on bacteriology, in which the history of our present knowledge of fermentation is clearly given up to date. Fermentation is, of course, an important process in bread-making, and a chapter on technical researches in this subject is given. The use of the microscope is also pointed out in the examination of different starches, &c. In addition to these principles, which may be said to form the groundwork of the subject, the more practical side also finds a place, such as commercial testing of wheat and flours, different methods of baking, both by machinery and otherwise; and, lastly, there are a few paragraphs on adulterations and the methods for recognising them. Numerous good illustrations are scattered throughout the book. This work will doubtless appeal to all those connected with the business of bread-making, and we imagine it will also find a place on the book-shelves of many medical and other scientific men.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Koch's Gelatine Process for the Examination of Drinking Water.

DR. EDWARD FRANKLAND, in a discourse delivered at the Royal Institution on February 21 (see NATURE, April 30), paid a just tribute to the work of the late Dr. Angus Smith, for he stated that Dr. Koch's invention was first made known and practised in England in 1882 by Dr. Angus Smith.

On the other hand, Dr. Percy Frankland has put forward a claim, in his work on "Micro-organisms in Water" (page 119), that Koch's method was introduced into this country by himself—a claim reiterated in his evidence before the Royal Commission on Metropolitan Water Supply at Question 11099 (Prof. Dewar). "I believe you tell us that you were the first person in this country who adopted the Koch method, and applied it to the London Water Supply?" "Yes, that is so."

As I was scientific assistant to the late Dr. Angus Smith, and worked with him on Dr. Koch's gelatine method, I should like to state that not only was the method applied by Dr. Angus Smith to the London Water Supply in February 1883, but also to a variety of waters from different parts of the country. The results of Dr. Angus Smith's work are to be found in the second Report of the Local Government Board R.P.P. Act, 1876.

Ellerslie, Alderley Edge, May 6. FRANK SCUDDER.

I AM much indebted to Mr. Scudder for furnishing an opportunity for calling attention to a misapprehension which appears to exist in some quarters as to the time and manner in which Dr. Koch's method of water examination by the process of gelatine-plate-culture was introduced into this country, as but for his letter I should not have thought it worth while to discuss a matter which must be sufficiently well known to all who are really conversant with the development of bacteriological inquiry in Great Britain during the past fifteen years. In the first place, I would point out that in making the statements referred to by Mr. Scudder, I did so with the full cognisance of the late Dr. Angus Smith's work as published by him in his second Report to the Local Government Board, and in an article of his which appeared in the *Sanitary Record* in 1883. In this work I was so much interested that I at once, in the same year, set about applying the method described by Dr. Angus Smith to a number of the samples of London and other waters which were being subjected to analysis in my private house at the time. These experiments yielded, however, such indefinite and unintelligible results that I entirely abandoned Dr. Smith's process, and it was not until the summer of the following year (1884) that I became really acquainted with Koch's method of plate-cultivating bacteria through the now classical demonstrations given by Mr. Watson Cheyne at the Health Exhibition. It was this method of gelatine-plate-culture which I then immediately applied to the investigation of a number of problems connected with the bacterial purification of water by filtration, precipitation, &c., both on the laboratory and on the industrial scale, and the results of which I placed in the hands of the Royal Society in May 1885, in a paper entitled "The Removal of Micro-organisms from Water." It is this paper which I believe to be the first published account in this country of the application of what is now universally understood as "Koch's gelatine-plate-process" to the examination of water, and the first to contain numerical determinations of the bacteria present in a given volume of the various waters supplied to London. In the autumn of the same year (1885) I undertook, at the request of the late Sir Francis Bolton, then Water Examiner for the Metropolis, to make for the Local Government Board regular monthly examinations by this process of the various waters, both before and after filtration, supplied by the several London Water Companies, and the results of these were regularly published in the monthly reports issued by the Local Government Board.

That I do not stand alone in viewing Dr. Angus Smith's method and that of Dr. Koch as distinct, will be apparent from the following words, extracted from Dr. Smith's above-mentioned Report to the Local Government Board:—"I do not know, even now, if I employ the method which Dr. Koch would consider the best, but the book on the subject promised by himself and his coadjutor not having appeared, I consider myself liberty to proceed with my inquiries"; and in point of fact, if any competent bacteriologist will take the trouble to read Dr. Angus Smith's report, he will see that although both processes of course involve the use of gelatine, they are in many important respects widely divergent. In the first place, the medium employed by Dr. Angus Smith contained gelatine only, and was destitute of the nutrient constituents—meat-broth and peptone; so that the appearance of colonies in his process would thus partly depend upon the chemical composition of the water, a condition of things which tends to defeat the object in view, viz. the discovery of the living as distinguished from the dead and unorganised matter in the water. Indeed Dr. Angus Smith distinctly deprecates rendering the medium more nutritive, *e.g.* by the addition of sodium phosphate and sugar, which he employed in some of his experiments. On the other hand, one of the cardinal principles of Koch's method is the use of as highly nutrient a medium as possible, so as to render the cultivation results absolutely independent of the chemical composition of the water. Again, of fundamental importance in the Koch method is the cultivation in such a thin stratum of the solid medium that all parts of it shall be practically under identical conditions and plentifully supplied with oxygen. Dr. Angus Smith, on the other hand, cultivated in test-tubes eight inches in depth, and the disadvantage of this he appears to have himself realised, as he points out that the cultures of very impure waters suffer from want of oxygen in the depth, and thus lead to erroneous results. In fact I have failed to find in Dr. Angus Smith's publications any mention whatsoever of cultivation on plates or their equivalents in any shape or form, which I hold to be the essence of the process which bears the name of Koch, and to which modern bacteriology is so profoundly indebted. Without, therefore, in any way wishing to detract from the interest attaching to Dr. Angus Smith's independent investigations on the application of gelatine to water examination, it appears to me that as he seems not to have been acquainted with what is known and described in text-books as Koch's method of water examination, he cannot obviously be said to have introduced it into this country. Indeed, I cannot personally find any more justification for the statement that Dr. Angus Smith practised Koch's method of gelatine-plate-culture in 1882, than there would be for saying that Hero drove a steam locomotive in Alexandria more than a century before the Christian era.

PERCY F. FRANKLAND.

Mason College, Birmingham, May 12.