

the homology of the muscles of the body wall, and the retrograde nature of the appendix vermiformis. These, however, are all contentious matters, which the author purposely has left undiscussed, preferring evidently to state the older view until the truth of the newer has been more firmly established.

A. K.

THE PRINCIPLES AND PRACTICE OF FOOD PRESERVING

Les Industries de la Conservation des Aliments. By X. Rocques. Pp. xi+506. (Paris: Gauthier-Villars, 1906.) Price 12 francs.

M. ROCQUES'S aim in writing the present work has been to explain, for the benefit of manufacturers and others, the scientific principles upon which the preservation of foodstuffs is based.

At first sight it is somewhat curious that in dealing with the problems of food-preservation no large measure of success should have been met with until comparatively recent times. To retain the fruits of the earth against periods of scarcity must always have been a desirable object. Hence such operations as the garnering of grain and the drying and salting of flesh were practised ages ago; but afterwards there was a gap of many centuries—one might almost say from prehistoric times until yesterday—during which no considerable advance was made in devising means of preventing the progress of decay. It was a question of the infinitely little. Against club or sword of human despoilers a man might match club or sword in defence of his store of foodstuffs, but he was very nearly powerless against the microscopic agents of putrefactive change.

Nevertheless, in a groping, tentative sort of way, some steps were beginning to be made during the eighteenth century. On the theoretical side Van Helmont, Boyle, Becher, Pringle, Macbride, Black, and others studied the allied questions of fermentation and putrefaction, whilst Lavoisier gave the first touches of quantitative exactitude to such inquiries by his experiments upon the alcoholic fermentation of sugar. On the practical side Gaefer and Eisen tested the possibility of preserving vegetables and fruits by desiccation. Then in the early part of last century came Appert, who practised what is essentially the process of sterilisation employed at the present day on an immense scale in the preservation of every sort of comestible. But it was only with the victory of Pasteur in his famous controversy with Liebig that the true nature of fermentative and putrefactive change became clear. It was the micro-organism, and not the air (*per se*), nor spontaneous generation, nor chemical instability, that was responsible for the decay of organic tissues. Henceforward the steps became firm. It is now the aim of all preservative processes to prevent the development of the micro-organism, whether by exclusion of its presence, or by its destruction, or by the inhibition of its growth. Hence it is that either heat or cold may be used for the required purpose: canned peaches are edible because the putrefactive organisms had been destroyed by heating; ice-embedded mastodons, ages after their death, have furnished well-preserved carcasses because

the development of micro-organisms has been inhibited by cold.

After touching upon these and other points in an interesting historical sketch, the author deals, shortly but comprehensively, with the phenomena and products of putrefactive change in alimentary substances. He passes then to the consideration of the practical processes employed in preventing these changes. Preservation by means of heat is first described. To give an idea of the general plan of the book we will outline this section. First comes a sketch of the development of the industry, with notes of localities, products, and some statistics of production—not very recent, by the bye—then the general technique is described, including the manufacture of tins and bottles, and the different methods of closing and sterilising these vessels after they are filled. Afterwards the various classes of foods—vegetables, fruits, meat, fish, and milk—are dealt with in detail, the quantity of material, preliminary treatment, and time of sterilisation being given where necessary for each individual article. Numerous illustrations of machinery and operations elucidate the text.

This thorough and practical style of treatment is continued in the remaining sections of the book, dealing respectively with preservation by means of cold, by desiccation, and by the use of antiseptics. M. Rocques laments the fact that France has lagged behind other countries in the use of cold storage, which in the opinion of M. Muntz is the method having the greatest future. In connection with this an interesting parallel may be noted. Just as Lister's antiseptic surgery has been largely replaced by aseptic processes, so in the case of foodstuffs sterilisation by heat is being to a considerable extent obviated by the practical asepsis of refrigeration.

We can cordially endorse the closing words of M. Brouardel's preface: M. Rocques has written a good book and done a good deed at the same time, since in all probability the health of his fellow-men will benefit from using the information he summarises and applying the principles he explains.

C. SIMMONDS.

THE THEORY OF PLANT BREEDING.

Le Transformisme appliqué à l'Agriculture. By Prof. J. Costantin. Pp. 300. (Paris: Alcan, 1906.) Price 6 francs.

BY "transformism" Prof. Costantin understands the passage from one species to another or the creation of new species—Lamarckianism or Darwinism in contradistinction to the older theories of men like Jordan concerning the absolute fixity of species. The book in the main deals with plants, and consists of a general discussion of the meaning of a species and of such phenomena as garden varieties, bud sports, and graft hybrids, the effects of climate and soil on type, together with a summary of the work of de Vries on mutations and of Nilsson and the Svalöf station on the improvement of cereals. It is a difficult and complex country, and as so much of the progress of agriculture must depend on the creation of improved varieties, the importance of a survey of the known