

the classical theories are not alone in the field ; there is now another which harmonises with the rest of modern physics and chemistry. In 1913, Hardy initiated a molecular, chemical theory, and in 1917, Langmuir gave it definite shape. The molecules are in the forefront of the picture, and the macroscopic phenomena are explained in terms of the fields of force of these molecules ; moreover, these fields of force are shown to be identical with those which give rise to chemical reactions of all kinds.

All recent developments have shown the great unifying power of this theory ; not only has it been the basis for the accumulation of a great deal of knowledge of the two-dimensional state of matter occurring in surface films, but it has shown that the formulæ of organic chemistry really represent the shapes of the molecules, and it has made clear the relations between capillarity, organic chemistry, and crystallography. Beside this living, powerful theory, the classical 'continuum' theory of Laplace seems little more than a mathematical game. Though we need to keep and use the thermodynamics and the calculations of the manifold effects of surface tension—the tendency of liquids to diminish to minimum area—unless the pendulum of physical theory makes an altogether unexpected swing back to continuity instead of discontinuity as the basis, the non-molecular Laplacian theory cannot contribute much to the advancement and unification of knowledge.

These are criticisms of the classical theory, not of its presentation in this book: That could scarcely be bettered ; and it is well to have the work of the last century so ably put together. The only danger is lest possibly the reader should feel that the important theories of capillarity are somewhat apart from the rest of physics, and the mathematician inclined for constructive research should fail to realise that the molecular theory of capillarity is in existence, and needs his aid very urgently.

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### Commercial Seed Production.

*Seed Production and Marketing.* By Prof. Joseph F. Cox and George E. Starr. (The Wiley Farm Series.) Pp. xviii+450. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1927.) 20s. net.

OF cultural books on gardening and farming there are plenty, and the enthusiast is well provided for, whether his hobby be the growing of vegetables, sweet peas, roses, or choice flowers from seed. But the art of raising new and im-

proved varieties of plants, and the successful production of commercial seed, are subjects upon which comparatively little literature has ever been published, and the vast majority of those who grow or handle flowers or vegetables have little, if any, idea of how the different types and varieties originated, or how seeds of them are produced true to type.

The commercial production of choice strains of seeds is a highly technical business, often dabbled in by amateurs, to their own cost, and understood in its various branches by really few seed-growing experts. It is true that many gardeners or farmers have at some time had experience in the saving of seed of one or more subjects, but to be able to produce good seeds, true to type and of high germination, of the many thousands of varieties listed in seedsmen's catalogues, is a real achievement, and requires long years of careful study and observation. Consequently, any book which will give the garden-loving public even a small idea of how all this work is done, is sure to be welcomed, and read with very great interest.

The new book just issued by Prof. Cox and Mr. Stair is without doubt the best and most complete work on this subject which has been published, and every chapter shows a good acquaintance with the different methods adopted. In the raising of new plants, the modern method of 'single line' selection is described in conjunction with the older one of 'mass' selection, and the effects which are obtained by cross pollination between different varieties give the general reader some idea of the great care necessary in isolating seed crops of different subjects. In every branch of Nature there is a tendency towards degeneration, and an excellent illustration shows how skilled men have to walk carefully over seed crops to detect and remove every plant which shows any variation from the true and improved type. The practical seed grower will find many hints and much information which will be of value to him in the planting, 'rogueing,' harvesting, threshing, and cleaning of the seed, whilst there are many articles and tables of value to the seed merchant.

The book is well written and well printed, and although it is undoubtedly of greater value in America, because many of the subjects described, such as maize, cotton seed, soy beans, cow peas, squashes, peppers, tobacco, lettuces, okra, etc., cannot be seeded commercially in Great Britain, yet it is well worth a place on the bookshelf of anyone interested in the subject on this side of the water.

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