

agency. The reading in of ideas involving purpose or forethought on the part of the plant has been so extremely general in oecological description of flowers, is so pleasing to the imagination, and proves so popular and difficult to escape from in elementary teaching, that a detailed analysis of such well-known Crucifer types as *Matthiola*, *Raphanus*, *Alyssum*, *Aubrietia*, &c., is particularly welcome.

Thus, among Crucifers generally, (1) the claws of the petals bend away from the lateral stamens as if to leave definite "entrance-slits" to the assumed nectar-containing pouches of the lateral sepals; (2) the anthers of the longer stamens are commonly twisted on their filaments so as to face round towards the adjacent lateral ones, as if with the intention of rubbing the entering proboscis of an insect; (3) the edges of the filaments are frequently extended into elaborate appendage-growths which are apparently intended to guide the proboscis of the insect-visitor exactly to the secreting surface. Such details are so obviously included under the heading of special adaptations to secure insect-pollination that the question of their actual origin demands most careful investigation.

The object of Dr. Günthart's work is to show that practically all subsidiary details of special mechanism and final adjustment may be traced back to a few fundamental tendencies in the floral construction, which, being given by phylogeny, work out on simple mechanical lines the construction details which are at first sight so purposeful. Such "active-factors" in the case of the Cruciferous flower are distinguished as:—

1. The tendency of the floral receptacle to extend in the transverse plane of the floral diagram, this factor controlling the dorsiventral insertion of the petals, the lateral apertures of the flower-tube, &c.

2. A tendency for the median sepals and adjacent parts to be "elevated" by a peculiar growth-extension in the median plane of the receptacle, which is responsible for "true" (primary) calyx-pouches and the increasing restriction of the secreting surface to lateral hollows.

3. The transverse and longitudinal extension of the ovuliferous region: the former phenomenon (*Siliculoseæ*) still further exaggerating characters induced by the original transverse construction.

4. The mutual pressures between a closed calyx and central ovary exerted on "passive" petals and stamens leading to the production of rotated anthers and marginal extensions of the filaments.

In tracing the elaborate mechanical connections of these phenomena, however, the problem of their meaning is admittedly only removed one step further back. We still remain ignorant of the reasons for the initiation of these "active" characters. Nor is there any reason to believe that continued research will ever satisfactorily solve all problems which stretch back into the distant phylogeny of the group. Still, every step cleared up is one gained, and the vague conception of intention is gradually replaced by the view that from an initial tendency, itself probably induced by some physical cause, certain mechanical results

will necessarily follow, which will in turn determine the subsequent possibilities of the evolution of the race. Further, the fundamental factors thus deduced should give the key to the systematic arrangement of the family.

#### FACT AND FANCY IN DIETETICS.

"*What Shall I Eat?*": a *Manual of Rational Feeding*. By Dr. F. X. Gouraud. With a Preface by Prof. A. Gautier. Authorised English translation by F. J. Rebman. Pp. xvi+379. (London: Rebman, Ltd.; New York: Rebman Co., n.d.) Price 6s. net.

THERE appears to be a plethora of books on diet just now, but the present volume does not reach the same standard of excellence which is noticeable in several other books on the subject recently reviewed in these columns.

Dr. Gouraud's work contains a certain amount of useful information, it is true, but it is so interwoven with speculations and contradictions that it is not likely to prove useful either to specialists or to the public at large.

The preface tells us it is intended for the business man and the educated housewife among others, but we wonder what the average man of business would make out of the following sentences:—

"Endogenetic purin is produced by the rejection of nuclein by the organism; its percentage, though variable in each individual, is a fixed quantity in each individual. Exogenetic purin of alimentary origin varies considerably according to diet, and may be reduced to zero by a regimen entirely free of all xanthic bodies."

"Beef is a powerful factor in membral hyperacidity. Its alimentary value, which depends almost wholly on the percentage of fats present in it, is rather slight. It takes only second place to butter, sugar, and rice. Its sole merit from the alimentary standpoint can only be that it supplies within a small compass a comparatively large amount of assimilable nitrogen."

"The third nutritive element in milk is the carbohydrates, i.e. lactose or milk sugar. This is a bihexose well known for its diuretic properties which makes the sugar in diabetics. Phosphorus is also abundant, and is present chiefly in the shape of physiological values well differentiated."

Quotations such as the preceding could be multiplied indefinitely. A physiologist will at once detect the gross misstatements of fact; but the man in the street, so far as he can make head or tail out of technical language, will at any rate detect the want of logic and of a knowledge of English composition. The glossary at the end of the book will not help him much, for we learn there that purins are unclean or poisonous substances, that xanthin is a yellow colouring matter, that steapsin is a diastasic ferment, that inosite is a saccharine substance, that casein is a derived albumin, that galactose is lactose, that ammonia contains hydrogen atones, &c., &c.

The translator does not in the greater number of instances know the English equivalents for French technical terms, or for the names of pathological conditions. We select only one gem for special mention; we are told that milk is curdled by the *pressure* of the

stomach. This is a very free translation of *présure*, which really means rennet. Not having seen the book in the original French, it is a little difficult to apportion the blame between Dr. Gouraud and his translator. Internal evidence leads one, however, to conclude that both are at fault.

The book is a curious and muddled medley of fact and fancy; the translation has evidently been carried out by someone unfamiliar with physiology, and deficient in his knowledge of both French and English.

W. D. H.

#### OUR BOOK SHELF.

*Lilies.* By A. Grove. Pp. xi+116+8 coloured plates. *Apples and Pears.* By G. Bunyard. Pp. xi+116+8 coloured plates.

(Present-day Gardening Series.) (London and Edinburgh: T. C. and E. C. Jack, n.d.) Price 1s. 6d. each.

MR. GROVE'S book on lilies is one of the most welcome that have appeared in this series. Among popular flowers the genus is, perhaps, the most trying with which English gardeners have to deal, and the presence of many species in our gardens is due more to the efficiency and rapidity of ocean transit than to a proved capability of our cultivators to grow them in gardens. It is probably to the facility with which stocks can be renewed that the present unsatisfactory state of lily cultivation is largely due. The incentive to conquer the problems of keeping them alive and propagating them are, to a great extent, lacking when a new and vigorous stock can be easily obtained from the salerooms. Mr. Grove is, however, an enthusiast, and we have it on the authority of Mr. Elwes—himself the author of a classical work on the genus—that he knows more about their cultivation than anyone else living. There is no botany in the work; it is purely a gardening book cleverly and pleasantly written by a master of his subject. Mr. Elwes contributes an interesting preface.

Mr. Grove's study of lilies has been carried on unostentatiously in his garden on the Berkshire hills, and his name is comparatively unknown except to the *élite*. It is otherwise with Mr. Bunyard. As the head of one of the first fruit-tree nurseries, and an experienced author on hardy fruits, he has long filled a high place in the esteem of those occupied in the same pursuits. The present little volume is certainly one of the best that has ever appeared on the subject of apples and pears. Although concise it is comprehensive, and deals efficiently with every phase of their treatment. The author gives lists of the best sorts for various purposes and different districts, all the better because they are comparatively short. He deals with their cultivation from the propagation and planting of the trees, and the way to combat insect pests, to the storing of the fruit. The state of many orchards of this country impels one to hope that this book may be widely read.

Each of these volumes is illustrated by eight coloured plates, and makes a very creditable addition to the useful series to which it belongs.

*The Animal World.* By Prof. F. W. Gamble, F.R.S. With an Introduction by Sir Oliver Lodge, F.R.S. (Home University Library of Modern Knowledge.) Pp. 255. (London: Williams and Norgate; New York: Henry Holt and Co., n.d.) Price 1s. net.

PROF. GAMBLE'S account of the animal world is written from the point of view of function. Its chief aim is to direct attention to the adaptations of structure to the performance of movement, breathing, and

other vital functions. An introductory chapter, which contains a general survey of the structure and classification of animals, is rather condensed, and will probably be more useful to the reader who has already a little knowledge of animal life than to the beginner. The description of the movements, and of the succession and distribution of animals, provides opportunity for pointing out the great advantages possessed by birds and mammals in consequence of their warm blood. The quest for food, modes of breathing, the colours and senses of animals, societies and associations, symbiosis, the care of the young, and short accounts of the life-history of a few animals, form the subjects of successive chapters. The concluding chapter on heredity and variation might well have been a little more extended: the subject-matter is too briefly explained to be of full value to the reader for whom the book is intended.

Several of the figures are crude, especially that of *Vorticella*. The statement on p. 28 that the buds of coelenterates may remain in connection with the parent tissues "by strings of mesenchyme" requires modification. On p. 37 the spaces between the mesenteries of a sea-anemone are designated the *coelom*, and immediately below are referred to as increasing the capacity of the digestive cavity.

The book, which is written in a fresh clear style, is characterised throughout by breadth of view, and is also noteworthy for the aptness of the illustrative examples cited. The thoughtful reader, with an interest in biology, will find in this volume food for thought in abundant measure.

*Orthochromatic Filters.* Pp. 55. (Croydon: Wratten and Wainwright, Ltd., n.d.) Price 6d.

THE title of this little book does not include its contents, for there is a chapter on "contrast filters," with some very striking examples of their use. A photograph of an engineers' blue print taken through a strong red filter that needs the exposure to be increased twenty-four times with a Wratten's panchromatic plate, renders the blue as a full black, instead of the rather feeble grey given by an ordinary plate with no filter. The great improvement obtainable in the rendering of the grain of dark-coloured woods, as well as in other cases, is well illustrated. We learn that the sensitiveness to green and red of ordinary orthochromatic plates is generally from 2 to 5 per cent. of the total sensitiveness, while in a panchromatic plate this rises to as much as 18 per cent. From these and other figures of a like nature the necessary increase of exposure when using certain colour filters with various specially sensitised plates is calculated in a simple way. The chapter that will be of most interest to those who are fairly familiar with the use of colour filters and sensitised plates, deals with the optical properties of filters. It gives clear examples of the degradation of defining power of the lens by the use of a filter strained by being too tightly screwed up in its cell, and also of filters which introduce various degrees of astigmatism. Many other matters are dealt with which are of prime importance to those who use colour screens.

*Studies of Trees and Flowers.* By M. Wrigley. With descriptions by Annie L. Smith. Pp. 129+vi+129 plates. (London: Methuen and Co., Ltd., n.d.) Price 15s. net.

THE photographs that form the chief feature of this weighty volume reflect considerable credit on the skill of the author as a manipulator with the camera. Undoubtedly the most impressive are the photographs of plants *in situ*; the picture of the foxglove is good, except that it fails to show the lower portion of the