

stomata of the remaining leaves. The same thing is true of the discussion (p. 81) on the transpiration of flowers as compared with leaves, where the reader is left in ignorance of how far the facts are explicable by reference to the stomata.

But it is not merely in relation to isolated problems that we feel the want of more information with regard to the stomata. We should expect to find a full general discussion of their importance in regard to transpiration. This would have included a reference to Horace Brown's work on the static diffusion of gas through these openings, and a consideration of the question how far evaporation can be checked by the closure of the stomata. Again, we should have liked a discussion of the trustworthiness and general value of the microscopic measurements of the stomata in living plants. Burgerstein gives an interesting account of the methods depending on the yield of water-vapour, such as Stahl's cobalt test, &c., by which it can be roughly determined that the stomata are "widely open" or "nearly shut." But if we are to distinguish the stomatal factor from other factors in experiments on transpiration, numerical statements as to the condition of the stomata are wanted, and the question whether such data are available might well have been discussed. With regard to method, Burgerstein seems to us a little hard on the various "potometer" methods, by which a general idea of the transpiration curve is obtained by measuring the intake of water. He is justified in saying that these methods do not estimate transpiration but absorption; but we think he undervalues the fact that, with cut branches and for not too extended periods of time, the intake so closely corresponds to transpiration that the method cannot be neglected, and is certainly of great value for purposes of demonstration.

Though we have criticised "Die Transpiration der Pflanzen," we are far from meaning to condemn it; we have, indeed, read it with interest and profit. Anyone intending to make a study of the subject cannot do better than read it with care. He will thus be made aware of many pitfalls, and will have a guide to the chief points which need fresh investigation.

F. D.

OUR BOOK SHELF.

House, Garden, and Field; a Collection of Short Nature Studies. By L. C. Miall. Pp. x+316; illustrated. (London: E. Arnold, 1904.) Price 6s.

THIS admirable little work appears to be by far the best aid to the proper teaching of nature-study that has hitherto come under our notice, the author having very wisely refrained from furnishing the teacher with a manual which would do away with all necessity for original study and observation on his part, and enable him to read the various lessons to his pupils without effort or thought. The object of the writer is, indeed, as much to educate the teacher as to enable the latter to teach his pupils. For example, in the article on bananas, Prof. Miall, when he asks the reason for the peculiar shape of that popular fruit, under the guise of leaving the reply to the pupil is really testing the powers of observation and reasoning possessed by the teacher himself.

As the author observes in his introduction, teachers

NO. 1829, VOL. 71]

seem to expect a series of ready-made lessons on a variety of nature subjects, basing their demand on the ground that they have no time (or is it that they have no inclination?) to make the necessary studies for themselves. If this course were adopted, it would lead to two evils. First, all the observations (if they could be so called) would come from the teacher and not from the pupils; and, secondly, knowledge thus acquired by the teacher could not possibly raise the delights of genuine nature-study in the minds of his scholars. Prof. Miall has therefore preferred to make an effort to instil and encourage the habit of observation and inquiry in a few teachers (who will necessarily be the best of their kind) by showing them what may be learnt by careful observation of the common natural objects to be met with among their daily surroundings, rather than by pandering to the popular clamour for cut and dried lessons—which are really not nature-study at all. How he has succeeded remains to be seen. If we may venture to predict, it will be the clever and inquiring teachers who will praise and take advantage of his efforts, and the dullards and plodders who will condemn them and say that they are unsuited to their purpose.

Although the author modestly says that he gives only a few lessons, his articles or essays are no less than fifty-four in number, and cover a very wide range of subjects, including cheese-grubs, glow-worms, water-lilies, London pride, the human face and hand, and museums and their teachings. As an example of the large amount of information Prof. Miall manages to give in a very small compass, we may refer to the exceedingly interesting account of the ancestry and evolution of insects in the chapter on the "cheese-hopper." An excellent work which should be in the hands of all teachers is our verdict.

R. L.

Ideals of Science and Faith. Essays by Various Authors, edited by the Rev. J. E. Hand. Pp. xix+333. (London: George Allen, 1904.) Price 5s. net.

"On all sides" (to quote the preface) "is a growing recognition that the ideals common to both Religion and Science are not only numerous but are indeed the very ideals for which the nobler spirits on both sides care most." Necessarily the treatment is varied, perhaps too varied, but the editor gently deprecates criticism of this feature. Prof. Patrick Geddes has room to discourse on the excellence of teaching boys to make boxes; and the theologians, under "A Presbyterian Approach," "A Church of England Approach," and the like, hardly give one a definite view of "A Christian Approach."

In the papers of the men of science and philosophers the general position is that science does not deal with the whole of life, and that it can no longer meet the claims of faith with a "certainly not." Sir Oliver Lodge defends the idea of continuous guidance on the part of the Deity, seeks to reconcile Pantheism and the belief in a personal God, and complains that religious people seem to be losing some of their faith in prayer. Prof. J. Arthur Thomson and Prof. Patrick Geddes lay stress on the altruistic side of the struggle for existence. Prof. Muirhead maintains that we must limit causation and the conservation of energy to the material world, and must look for some other conception when we come to the action of the mind itself. "We use a saw to make a fiddle; we throw it (*sic*) aside when we come to play upon it (*sic*)." The Hon. Bertrand Russell's paper—"An Ethical Approach"—is the most eloquent; much of it is Lucretius, Book iii., rewritten (could one be more complimentary?), with the difference that Mr. Russell recognises more definitely the need for religion and worship, albeit the worship of a God who is not Force but "created by our own love of the good."