SPANG'S LIGHTNING PROTECTION.

A practical treatise on lightning-protection. By Henry W. Spang. New York, *Van Nostrand*, 1883. 63 p. 8°.

This is a new and enlarged edition of the author's treatise on lightning-protection, published in 1877. The book contains altogether too many good things to be bad, and too many bad things to be entirely good. There is a wholesale condemnation of all systems and methods other than those described, which is a little perplexing, until one discovers, and in fact the author confesses, that it is issued with a view of effecting a general introduction of a *patented* system of lightning-conductors. The business air which pervades the whole is thus clearly explained.

The author frequently pronounces against the 'lightning-rod men and scientists,' attributing the blunders of the former to the mistakes of the latter. A brief examination of his book will suffice to fully acquit him of the charge of belonging to the latter class; and it must be confessed, that the many excellent rules which he has emphasized oblige us to rank him considerably above the general average of the former. The general principles of lightning-protection, as presented, are in the main correct; and, as general principles, they deserve a wide dissemination. The particular system urged as the only efficient one is more complicated, and, even if it were not patented, more expensive than is necessary. Some novel statements are made, concerning what lightning 'will do' under certain circumstances, in the same paragraph in which the author bemoans the ignorance shown by scientific men on the subject of lightning-protection.

The author does not seem to be aware of the existence of what is doubtless the most complete and authoritative treatise on the subject yet published, — the elaborate 'Report of the lightning-rod conference,' edited by G. J. Symons, F.R.S. This conference was made up of delegates from the London meteorological society, the Royal institute of British architects, the London society of telegraph engineers and electricians, the London physical society, and two co-opted members, Profs. W. E. Ayrton and D. E. Hughes.

The examination of the various problems presented was exhaustive, and the code of rules for the erection of lightning-conductors published in the report is simple and easily understood. The proper construction of an efficient lightning-conductor is, after all, a matter of no great difficulty, and of comparatively little expense. The inauguration of a proper system of testing conductors would certainly reveal some astonishing facts in regard to the efficiency of rods as generally erected, elaborate and expensive as they often are. The wide circulation of the rules adopted by this conference would undoubtedly be the means of bringing about a much-needed reform in this direction.

COHN'S 'DIE PFLANZE.'

Die pflanze: Vorträge aus dem gebiete der botanik. Von Dr. Ferdinand Cohn, professor an der Universität zu Breslau. Breslau, *Kern*, 1882. 8 + 512 p. 4°.

This elaborately gotten up book of over five hundred pages comes to us as a contribution to general literature, and does not address itself to the scientific botanist, except as he is interested in a popular presentation of botanical facts and problems with which he is supposed to be more or less familiar. Dr. Cohn believes it to be the duty of those versed in any branch of science to produce a literature which shall invite a large circle of readers to an interested acquaintance with their chosen science. "Nor are they to recoil from this task," says he, "because of the difficulties which present themselves for satisfactory solution, or because popular writings on natural science have been undervalued by many." Actuated by his conviction, Dr. Cohn has collected the addresses which he delivered at various places in Germany between the years 1852 and 1881, and, while retaining their original form, has remodelled them sufficiently to bring them up to date and compact them into a shapely whole.

In the preface the author sets forth a difficulty which besets the popular lecturer on scientific topics, — one which doubtless every one who has tried this style of address has fully realized, — namely, the meagre knowledge and hazy comprehension with which the majority of hearers listen to his words, necessitating so long a dwelling on the elementary facts of the topic that little time is left for the consideration of the more recondite and interesting points.

If we may be allowed to judge, Dr. Cohn has overcome this difficulty to a large degree in a very happy manner. He devotes the first lecture, entitled 'Botanical problems,' to a brief history of the development of botany, and an explanation of some of the elementary principles of the science, thus paving the way for subsequent discussion of more special matters. Some idea of the variety of the topics treated may be gained from the titles of the sixteen lectures, which are as follows: 'Botanical problems,' 'Goethe as a botanist,' 'The cell state,'

'Light and life,' 'The plant calendar,' 'From pole to equator,' 'From sea-level to eternal snow,' 'What the forest tells of itself,' 'Grapes and wine,' 'The rose,' 'Insectivorous plants,' 'Botanical studies on the sea-shore,' 'The world in a water-drop,' 'Bacteria,' 'Invisible enemies in the air,' 'Gardens in ancient and modern times.'

The lectures are written in an entertaining style, and vary in interest as little as the inequality of the subjects will allow. The two on 'Light and life' and 'The cell state' are especially happy, particularly the latter in an apt comparison of a plant to a state.

The design of the book is laudable, and its execution admirable. We commend both as models to our American biologists and physicists, who owe it to the American public to provide better opportunities for a general acquaintance with scientific problems and methods.

REPORT ON SORGHUM-SUGAR.

Investigation of the scientific and economic relations of the sorghum-sugar industry; being a report made in response to a request from the Hon. George B. Loring, U. S. commissioner of agriculture, by a committee of the National academy of sciences, November, 1882. Washington, *Government*, 1883. 152 p. 8°.

A PROBLEM, which, if not the most important, is certainly the most prominent, agricultural problem of the day, is that of the profitable production of sugar from sorghum. The experiments made during the last few years at the U. S. department of agriculture and elsewhere have attracted general attention, both on account of the interesting scientific questions involved, and still more because they promise to create a new branch of agricultural industry, and to greatly enlarge our domestic supply of sugar.

The report of the committee of the National academy on this subject must prove very valuable to all interested in the promotion of this infant industry, because it contains a very full summary, prepared by thoroughly competent and impartial persons, of all that has been accomplished in this direction up to the date of the report, and thus collects in one publication information previously scattered through numerous state and other reports. That the work has been well done is sufficiently guaranteed by the names of the committee. They were Prof. William H. Brewer, Ph. D., of the Sheffield scientific school; Prof. Charles F. Chandler, Ph.D., of Columbia college; Prof. S. W. Johnson, M. A., of the Sheffield scientific school; Prof. B. Silliman, M.A., M.D., of Yale college; Prof. J. Lawrence Smith, M.D., late of the University of Louisville; and also, not of the academy, Gideon E. Moore, Ph.D., of New York. Prof. C. A. Goessmann, of the Massachusetts agricultural college, was also a member of, and acted with, the committee until Sept. 15, 1882, when he resigned.

The committee begins its report with several pages of citations from earlier (chiefly American) investigations upon sorghum as a sugar producing plant, showing the conflicting opinions upon almost every essential point of the subject entertained by the authorities quoted. On such points as the kind of sugar present in the juice, the best varieties of sorghum, the proper time for harvesting and working, etc., diametrically opposite opinions, each by reputable authorities, are quoted.

This was the state of the question, when, in 1878, the U. S. department of agriculture, by its chemist, Dr. Peter Collier, began its well-known investigations, which went far to decide many of the points just spoken of. This work the committee does not review in detail, but contents itself with a favorable criticism of the analytical methods employed, and with pointing out the material value of the results and the need of further investigation.

At the time when this report was prepared, the successful work of the department of agriculture consisted chiefly of chemical examinations of sorghum-juice, attempts to produce sugar from it on a manufacturing scale having proved partial failures: the committee therefore closes its report with brief accounts of the results of practical attempts to make sugar from sorghum. Among these are noted two failures, and seventeen cases of more or less pronounced success, several on a manufacturing scale.

In an appendix are collected divers interesting papers bearing upon the subject of the report. Some of them present fuller details of experiments referred to in the report, and some contain accounts of later successes in sugar-production. This portion of the report concludes with a 'Bibliography of sorghum,' which cannot fail to be of great value to investigators in this field.

It is evident from the facts collected in this report, and from the experience since gained, that, with skill in working, sugar can be successfully made from sorghum. It is also equally evident, that, without that skill and the proper appliances, failure is more probable than success. Sirup can easily be made from sorghum on a domestic scale, but not sugar.