For the use of the expert or specialist the index is not a complete one, as only the more important articles in the transactions of engineering societies are included. The oldest and most influential engineering society, the Institution of Civil Engineers of Great Britain, issues annually four volumes of proceedings, but these are not included in the list of periodicals indexed. Some important special German publications, like the *Zeitschrift für Vermessungswesen,* a high authority on geodesy and precise surveying, and *Baumaterialienkunde,* the leading journal on the testing of materials, are also not included. A few special American periodicals, like *Cement* and the *Metallographist,* are likewise omitted, but it is plain that it would be a difficult task to index all the literature of all the branches of the vast field of engineering.

Any index to literature should be prepared with the definite aim of being useful to a definite class of people. This has been done in the case of the present volume, the definite class being the readers of the *Engineering Magazine,* who include men of all professions having interest in transportation, manufacturing and construction. To these the index is admirably adapted, and it would be difficult to outline a plan that would produce better results for the engineering profession in general. The volume may appear somewhat incomplete to engineers who are experts in a special line like hydraulics, but when they turn to other headings they are likely to be astonished at the number of references and the number of periodicals that have been indexed. The expert may properly object to including titles of popular articles on engineering topics from the monthly literary magazines, but beyond this he has cause only for congratulation. The work has been carefully prepared on a comprehensive plan, and it should immediately find a place in every public library as a record of progress in the science and art of engineering, and in every technical library as an indispensable aid to research.

Mansfield Merriman.

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*Insects Injurious to Staple Crops.* By E. Dwight Sanderson, B.S., Agr. New York, John Wiley & Sons. 1902.

Under the above title Professor Sanderson, entomologist of the Delaware Agricultural Experiment Station, has brought out a handbook of 295 pages, with 162 illustrations, the subject matter being disposed in 25 chapters. Besides topics of a general nature the following are discussed: 'Insects Injurious to Grains and Grasses,' 'to Wheat,' 'to Indian Corn,' 'to Stored Grain,' 'to Clover,' 'to Cotton,' 'to Tobacco,' 'to the Potato,' 'to the Sugar-beet,' and 'to the Hop-plant.' Although the author in his preface unreservedly disclaims any originality for the contents of his work, and states that, unless otherwise noted, all the facts are merely compilations of the writings of others, it is in some respects, in the writer's opinion, the most useful book covering the subject of the insect enemies to staple crops that is extant. The typography is excellent, and most of the illustrations are well produced. In its arrangement it is, in some respects, not unlike the 'Farmers' Bulletins' that have been published on entomology by the Division of Entomology of the U. S. Department of Agriculture; and the presented matter is grouped together in such manner that any one desiring information on any of the topics considered can find ready access to them.

The main incentive for the compilation of this work, as the author states, is due to the fact that our sources of information concerning injurious insects are so widely scattered throughout the circulars, bulletins and reports of the state agricultural experiment stations and of the U. S. Department of Agriculture, a few books on economic entomology and many other publications, that the farmer, provided he be not also an economic entomologist, is unable to obtain the facts which he desires concerning any given insect, unless it so happens that the species is treated in popular form in some publication from his own state. Again, most works upon American economic entomology give such meager descriptions and accounts of the life-histories of insects that the agriculturist cannot secure a clear

understanding of the subject in which he is interested.

The author might have gone farther in stating that many publications supposedly written in a popular manner—at least designed for distribution among the agricultural population—are so filled with technical terms as to render them unintelligible to the average reader. Many of the writers who publish in this manner fail to furnish summary accounts of what has been given in detail, and thus the reader is obliged to peruse many pages which have no interest to him in order to secure the object desired, which is usually an approximate knowledge of the appearance of the insect, the nature of its ravages, life-history, and, above all, the means for its reduction.

It might have been added that every year brings new pests to our shores, which in time become disseminated by flight and commerce through our country, and that this necessitates the publication of new popular works or of new editions of the old in order to consider these foreign pests and bring the works up to date.

In estimating the money value of the injury done by insects the author states that when we include that done to fruits, truck crops, domestic animals and timber, $300,000,000 is a conservative estimate of the price these apparently insignificant creatures annually cost this country.

One good feature of the author's treatment of his subjects consists in the space given to the consideration of general farm practices that may be used in combating insect pests. In the treatment of this chapter he points out that few farmers in planning the management of their land for crops for the season consider the effect which any given procedure will have upon injurious insects with which they may have to contend. Farmers too frequently fail to look far ahead, and rotation of crops when practiced is more for the sake of soil improvement than for the reduction of insect attack, and yet crop rotation is the only remedy for many species of insects when they occur in injurious numbers over large areas, *e. g.*, in fields of grain. Among other methods of tillage, clean farming, the destruction of weeds that might harbor injurious species, the burning over of fields after the crops have been made, fall plowing, drainage, the judicious use of fertilizers, the employment of trap crops, and the selection of the proper time for planting, are considered. Due attention is also given to the structure and development of insects, to beneficial insects, the value which accrues from the use of poultry as insect exterminators, and to insecticides, and the means for preparing and applying them.

Professor Sanderson's work is well fitted for the class of persons whom it is designed to reach, and it should have a large sale.

F. H. CHITTENDEN.

## *SCIENTIFIC JOURNALS AND ARTICLES.*

THE *Journal of Comparative Neurology* for March contains two papers by J. E. Johnston on 'The Brain of *Petromyzon*,' and the 'Primitive Functional Divisions of the Nervous System.' The structure and connections of the nuclei of the cranial nerves in *Petromyzon* are closely similar to those of *Acipenser* previously described by the same author. Especially noteworthy is the presence of a large post-auditory lateral line root and a lobus lineæ lateralis corresponding to that of selachians and *Acipenser*. The fasciculus communis root of the facialis and the central relations of the sensory IX. and X. nerves are recognized and described for the first time. The cerebellum is in a very primitive condition histologically, the Purkinje cells being represented by simple large cells similar to those of the acusticum. In the forebrain the illusion of a well-developed cortex is due to the crowding and telescoping of the parts by pressure from the upper lip. The nuclei and fiber tracts are shown to be strictly comparable to those of the brain of other fishes. There is no cortex. The olfactory lobe contains a large number of slightly differentiated cells which serve as the end-nucleus of the olfactory nerve. In the second paper the author defines the longitudinal zones of the spinal cord and brain and the peripheral components and end-organs related to each.