Two chapters are given to the study of the 'limitations of the steam-engine,' a phrase of somewhat awkward form rhetorically, but which is familiar to all engineers interested in the subject as relating to the limits set to the efficiency of the machine by the counteracting influences of 'cylinder condensation,' — another awkward phrase, meaning condensation of steam in the steam-cylinder, — and of conduction and radiation or other forms of waste which distinguish the actual from the ideal engine. Here the author takes the hitherto unconquered bull by the horns, and gains the honor of having been the first to produce a rational formula embodying what are supposed to be the laws of this method of transmission of heat, and of loss of engine efficiency due to it. The resulting expression is somewhat complicated; but it is justified by experiment, so far as comparison has been carried by its author, and may be expected to stand until further progress is made in investigation of the actual conditions, — which are unquestionably far from being few or uninvolved, — and extended research shall have thrown more light upon a problem which is to-day the most important in the whole theory of the steam-engine.

Space does not permit the criticism in detail of this or of any other part of the book. It is rich in valuable material, and although, like the angels, not absolutely without fault, in the opinion of well-informed engineers, either in matter or in manner, deserves exceptionally high praise for its wealth of excellences.

The Ancient Cities of the New World. By Désiré Charnay. New York, Harper. 8°.

In the present volume Désiré Charnay gives the results of his long and careful explorations in Central America, which were begun in 1857. Since that time, all his energies have been directed towards the collection and preservation of the antiquities of that country. As the expenses of his expeditions were defrayed in part by the French Government, in part by an American citizen, Mr. P. Lorillard, his collections are deposited in the Trocadero in Paris, and in Washington: they are indispensable for all future studies of the culture of ancient Central America. The book under review is as well pleasant to read — describing, as it does, the travels of the author and the present state of the country — as of scientific value, giving the results of his studies, and showing in numerous splendid illustrations the ancient monuments and other kinds of relics, as well as beautiful views and characteristic groups.

It was the main object of the expedition with which the author was intrusted to collect authentic material for a thorough study of the ancient civilization of Central America: therefore his studies were almost exclusively directed to the collecting of relics, photographing of buildings and reliefs, and making casts of the inscriptions and bas-reliefs. The material he gives in this line cannot be excelled. His researches lead him to the conclusion that the American civilization at the time of the conquest was of comparatively recent origin. It is his opinion that all its branches bear the characteristics of Toltec civilization, and that, by studying the monuments, the migrations and the gradual development of Toltec art may be discovered. A map shows the author's opinion regarding the subject. He lets the prehistoric Toltecs immigrate from the north-west. From the plateau of the City of Mexico two branches emigrated, — the Gulf branch and the Pacific branch. Subdivisions of the former invaded Yucatan. He lets the two principal divisions meet in Copan, the south-eastern terminus of their migrations. "The Toltecs," he says, "migrated south, following the coasts of both oceans. They ceased to exist as a nation after the disruption of their empire; but their scattered remnants carried on the work of civilization in Central America, on the high plateaus, and in Anahuac, evidenced in the strong resemblance that the civilizations of these various regions bear to one another." The time of the erection of the largest buildings and temples he supposes to be about the twelfth century.

We cannot accept those theories of the author referring to the connection between the art of eastern Asia and Central America. A thorough and detailed comparison has never been made, and superficial similarities of monuments and customs cannot be a sufficient proof of a common origin.

Since the present volume was written, the author has accomplished a new journey to his favorite field of explorations, a preliminary report of which is being published in *Le Tour du Monde* and in the *Globus*. The recent enterprise of this devoted explorer has not been less successful than the former ones, some results of which are fortunately made accessible in the volume just published.

Living Lights. By Charles Frederick Holder. New York, Scribner. 12°.

Mr. Holder has thrown into a popular form the substance of what is known about phosphorescent animals, illuminated by occasional coruscations of imagination. Most of his readers will be surprised to learn that the power of emitting light is so widely shared by animals of all classes. Not only do fire-flies fly, glow-worms glow, and zoöphytes twinkle in the sea, but sea-anemones, alcyonarians, gorgonias, star-fishes, earth-worms, crabs, shell-fish, lizards, frogs, toads, fishes, birds, monkeys, and men must be added, according to Mr. Holder, to the number of animals capable of giving forth light. In the author's preface, he says, "In the United States there are ten thousand enrolled young naturalists, comprising the Agassiz Association. As one of a committee solicited to answer questions propounded by the young people, . . . I have often been surprised at the nature of the queries, which shows that this army of young observers includes many who are not merely collectors of curiosities, but are naturalists in the best sense. They are systematic inquirers, and working in the right direction to become scientists, should they continue. It is to these young scientists . . . that this volume is addressed." While we welcome any book that will serve to awaken in the young an earnest desire to study nature, and while this fascinating volume will certainly awaken interest, it is all the more to be regretted that the author is so fond of pyrotechnical natural history. He loves to hear the sigh of pleasurable surprise that rises from his audience as he sets off a pyrosomatic rocket, or kindles pavonian flame. This fault appears especially in the illustrations, which, for young people, should be accurate, since from them they derive their lasting impressions. Not to rely on our own judgment, we quote the author's own words, "It is evident that illustrations of the phosphorescence of marine animals must be more or less conjectural;" and again (the Italics are ours), "In Plate XXVII. [XXVI.?] an *ideal* view is given of the *possible* appearance of the light of a large heron." There is no excuse for 'conjectural illustrations' and 'ideal views of possible appearances' in a book of this nature. They are distinctly misleading and wrong, and have the obvious and inevitable effect of throwing discredit on some of the more highly-colored portions of the text, into which the phosphorescence of herons, lizards, monkeys, and men seems to have been admitted on very slender evidence. Those portions of the book which record the results of Mr. Holder's own observations are the most interesting, and perhaps the least illumined by fancy.

The Ventilation and Warming of School-Buildings. By Gilbert B. Morrison. New York, Appleton. 8°.

It seems a long leap from Rosenkranz's 'Philosophy of Education,' which opened the International Education Series, to this successor, which discusses practical schoolhouse-building. But Dr. Harris shows how catholic his conception of education is by including the two books in the same series.

Mr. Morrison truly says that no "subject has been more carefully and intelligently studied than the direct and ultimate effects of impure air on the human system, and on no subject is there more unanimity of competent opinion" (p. 18); but nevertheless the want of sufficient and definite information regarding the ventilation of schoolhouses is general. The lack of general information on this particular point is the more blameworthy, inasmuch as the effects of breathing impure air are not only pathological, but pedagogical and economic. The author instances this (p. 22).

A short chapter deals succinctly with the physical aspects of the air, and then the various tests for its examination are briefly described. The general theory of ventilation is illustrated by a simple experiment (p. 47); and then the natural and artificial methods of ventilation are discussed with more attention to detail. The remaining chapters discuss the general problems of ventilating and heating, and include descriptions of many of the expedients that are used for these purposes. The treatment of each question is abreast