

of the dye be added, the sky can be strongly colored without apparently changing the color of the corona in the slightest degree, a rather surprising circumstance, since both are produced by the same means. We should have now a most beautiful and perfect reproduction of the wonderful atmosphere around the sun, a corona of pure golden white light, with pearly luster and exquisite texture, the misty streamers stretching out until lost on the bluish-green background of the sky. The rifts or darker areas due to the unequal illumination are present as well as the polar streamers. The effect is heightened if the eyes are partially closed.

A photograph of one of these artificial eclipses is reproduced in Fig. 3. Much of the fine detail present in the negative is lost in the print, and still more will doubtless go in the process of reproduction. The coronal streamers extend out much farther than is indicated by the photograph. No especial pains were taken to get the polar rays just right.

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SCIENTIFIC BOOKS.

Street Pavements and Paving Materials. A Manual of City Pavements: the Methods and Materials of their Construction. For the use of Students, Engineers and City Officials. By GEORGE W. TILLSON, C.E., President Brooklyn Engineers' Club, etc. New York, John Wiley & Sons. 1900.

As might be inferred from the title, this is a very pretentious book. The design of the author appears to have been to exhaust the subject. A very careful examination of the book has convinced the reviewer that for the purpose of the reviewer the accomplishment of this design may be divided into two parts: (1) That portion of the book that comes strictly within the perview of the engineer, and (2) that portion which does not.

Before proceeding to the consideration of these parts we wish to remark certain condi-

tions that relate to the work as a whole. The author does not appear to have been impressed with the gravity and seriousness of the great work he has undertaken, but a certain atmosphere of flippancy pervades some of the most important discussions; as witness his definition of the word Bitumen on page 43.

Again, either the manuscript was very carelessly prepared, or the proofs were very carelessly read, for the grave errors that are too numerous to mention can hardly be laid to the account of the printer. For illustration turn to page 53. The sentence, "He contends that by the use of petroleum ether a large amount of asphaltene is dissolved and is consequently called asphaltene," is nonsense, as it stands; the last word should be 'petrolene.' Further on he says, "I had to admit, and do admit, that the analysis as carried out by the later methods suffices to make identity or nonentity of two samples probable or highly probable." Nonentity should be nonidentity, and highly should be highly. To point out all the errors of this description would require too much space.

That portion of the work that relates strictly to engineering problems appears to be carefully prepared, and the various problems discussed appear to be treated with intelligence and discrimination. Had Mr. Tillson, as an engineer, discussed seriously and carefully read the proofs of a work devoted to the engineering problems involved in street paving, we do not doubt that a very valuable book would have been the result. For Mr. Tillson has reaped a field of immense extent, and he has brought together an immense amount of detail from widely separated sources and has brought them into convenient form. For this his fellow members of the engineering profession, and a wider clientele of miscellaneous readers outside his profession would have doubtless given him appreciative thanks. But, as before stated, Mr. Tillson has attempted, in a very pretentious way, to exhaust his subject, and has wandered far beyond the borders of his profession of engineering, thereby committing the blunder of attempting to treat subjects learnedly of which he has no knowledge. For engineers as a class are not trained in general science. They are

trained as engineers and have a fairly generous knowledge of physics, with only a smattering of chemistry, mineralogy and geology; yet following the example of the French engineers, which I have elsewhere mentioned, they seem to have a propensity for the discussion of the origin and properties of bitumens, a discussion which involves some of the most intricate problems in the sciences above mentioned now engaging the attention of scientific men. Hence, it is not strange, that outside the engineering problems which it treats intelligently, this book should be a chaotic jumble, brought together without chronological arrangement, without order as to the natural divisions of subjects, and discussed without discrimination and without satisfactory result. These defects of judgment and purpose would have been greatly mitigated if Mr. Tillson had not committed two unpardonable offences as an author. First, he cites from authors all over the world without giving in a single instance reference to the original memoirs, by which a reader can verify or extend the passage cited. Second, he has attributed to authors cited, language that they have never used, by substituting for the author's language his own abstract or paraphrase. In illustration, see page 43, where he patches up a definition of 'bitumen' by 'transposing Professor Sadtler's words and adding some of Mr. Richardson's.' He puts this patchwork that neither Sadtler nor Richardson would recognize, in quotation marks. From whom is it quoted? Again, on page 53, he quotes from my 'Tenth Census Report.' I read the passage with amazement. I knew I had never used such language. When I turned to the report I found that Mr. Tillson had substituted his own paraphrase for the language used by myself and had enclosed it in quotation marks. Comment on such atrocious work is unnecessary.

It would require too much time and space to show in detail all the blunders that are found in the nearly 40 pages devoted to 'Asphalt.' One other must suffice. This book is infested with the ill-disguised fallacy that material from the Trinidad Pitch Lake is superior to all other for street pavements. The old threadbare story of Eighth Avenue is rehearsed, etc.

I regret the necessity of such unqualified con-

demnation of much of this book; but the character of the criticism results from the nature of the case. I think I am safe in assuming that no railroad corporation would employ a chemist to construct a skew-arched bridge.

S. F. PECKHAM.

American Education and What Shall It Be?

Preliminary Report of the Committee of the Society for the Promotion of Engineering Education; made at the New York Meeting, July 2, 3, 1900. Reprinted, with discussion, from the Annual Volume of Proceedings; H. S. JACOBY, Secretary, Ithaca, N. Y. 8vo. Pp. 74. Price, 25 cents.

One of the speakers in the discussion began with the remark that this report marks an era in its department, that it was the first document of the sort which, so far as he had observed, recognized the fact that there may be 'many educations.' While it may not be the fact that the publication of this report was the first recognition of the necessity of various educations for various sorts and conditions of men,* it is probably the first in which the fact of a variety of educations as a need of the time being recognized by authority is itself noted. The document is a reprint, from the transactions of the Society, of the report of a committee consisting of six representative educators in applied science and technical subjects, selected from representative institutions at Madison, St. Louis, Ithaca, Minneapolis, Boston and Philadelphia, who were requested to endeavor to give formal expression to the views held by them collectively on the question above quoted in the title of the paper thus prepared.

Space does not here permit of the presentation of any full abstract of the report, which is one which should be carefully read by every educator—and by our legislators even more carefully, if possible. The discussion is no less suggestive and invaluable than the report; a considerable number of well-known teachers and engineers taking part.

* 'The Mechanic Arts and Modern Educations,' an address delivered at Richmond, Va., before the Mechanics' Institute of Virginia, by R. H. Thurston, May 18, 1894, Richmond, Va. William Ellis Jones. 1894. 12mo. Pp. 23.