Editorial | The Esthetics of Structures

By Jon A. Schmidt, P.E., SECB, NCSEA Secretary

Modern culture tends to associate esthetics primarily with visual appearance, but philosophy has traditionally sought to unify the virtues of beauty, goodness, and truth. How might someone evaluate whether a particular structure achieves these ideal ends?

As mentioned in Part 2 of my recent series of "Outside the Box" articles on *The Logic of Ingenuity* (October 2016, **www.structuremag.org/?p=10490**), Charles Sanders Peirce provided some assistance to George S. Morison with the latter's mid-1890s proposal for a span across the Hudson River. Morison's paper about it, "Suspension Bridges – A Study," appeared in *Transactions of the American Society of Civil Engineers* in December 1896 (Vol. 36, pp. 359-416, **https://books.google.com/books?id=EFJDAAAAYAAJ&pg=359**), accompanied by 66 pages of discussion. As stated on page 400, "A careful investigation of the theory of the stiffening truss has been made on entirely independent lines by Mr. Charles S. Peirce."

Peirce's own surviving materials related to this project are collected under manuscripts 1357-1360, as maintained by the Houghton Library at Harvard University and cataloged in 1967 by Richard S. Robin. An initiative called the Scalable Peirce Interpretation Network (SPIN) is now posting and, in some cases, transcribing digital images of such unpublished texts online (**http://fromthepage.com/collection/show?collection_id=16**). 1357 begins with a typescript that almost exactly duplicates pages 398-401 of Morison's paper, including the portion quoted above; it is not clear whether Morison prepared it and sent it to Peirce, who then kept it in his files, or Peirce prepared it for Morison to include in the ASCE paper.

Based on the other contents of the manuscripts, all handwritten by Peirce, his primary task was to prepare a report about the effect of live loads on the structure. There are various partial drafts, lots of detailed calculations, and other miscellaneous fragments; but unfortunately, nothing resembling a complete document. Even so, one surviving draft, which may have been intended to serve as a cover letter, is worthy of being excerpted at length for its answer to the question that I posed above:

> *When, after having agreed to calculate the effects of the loads upon your projected Hudson River bridge, I came to study the plan of it, I became more and more impressed with the honor of being concerned, even in that entirely obscure way, with such an instrument for the elevation of man. For whoever, in allowing his eye of a morning to rest a moment for refreshment on that splendid scene, should catch sight of that bridge and should reflect upon how calmly and simply it performed a great duty, conforming in every detail to the principles of good sense and of sound reason, would certainly receive a moral lesson which would have its effect upon his conduct for all that day. In the absence of reflection, modern psychology informs us that the influence of the sight might perhaps be even more efficient on the whole; for the subconscious mind – that marvellous [sic] power we call instinct, so much greater than the little self – would virtually make such calculations, without the individual being otherwise aware of it than by the sense of beauty and the elevating thoughts that would well up into his consciousness. Now when I came to reckon, as a good mathematician should, what multitudes of men were to be so influenced daily for century after century, if not for millennium after millennium, I found the integral sum of good, in proportion as the plan of the bridge was simple and scientifically adequate, to be sufficient to rouse the utmost depths of any man's earnestness. Distant ages shall rise up and extol the contrivers and the executors of such a monument, as they would have reason to curse ever more and more deeply those who should deface the landscape with a hideous, broken-backed structure that should half intend one thing and half another, perpetually acting to debase the souls of the generations whose eyes it should weary and torture. Would not the total guilt of every man who should lend a hand to such a nuisance be worth his serious consideration?*
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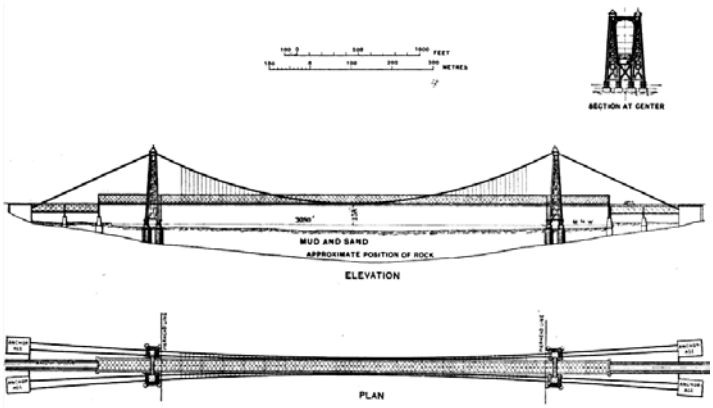
> *The nineteenth century is destined to be looked back upon as the classical age of engineering – for every art has its classical age, before it shrinks to small ambitions, and every engineer ought to hope that the century may be crowned by some great enduring type of classical simplicity. Every American must desire that such a secular memorial may be placed in New York, though he shudders at the danger of its being converted into an ineffaceable record of stupidity and bad taste.*



Peirce's eloquent words pose a worthy challenge to those of us who practice engineering some 120 years later. Do our own structures typically serve as "instruments for the elevation of man" (and woman) by "conforming in every detail to the principles of good sense and of sound reason"? How will the twenty-first century "be looked back upon" by "distant ages" with respect to "the contrivers and executors" of its monuments? Has our profession irrevocably "shrunk to small ambitions" at this point in its history, or is it not yet too late for each of us to produce "some great enduring type of classical simplicity"?▪

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