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The Art of Engineering

The “Renaissance” is perhaps seen as a period where art and engineering had no discernable boundaries. “Renaissance man” moved comfortably between both disciplines, indeed would not have recognised any meaningful distinction. Leonardo Da Vinci is perhaps our paragon here, painter of the world’s great masterpiece, yet possessor of the most perspicacious engineering mind. This is world where the term “science”, and the disciplinary divisions it engenders, lies two centuries in the future, where “natural philosophy” encompasses all. If we skip forward to the “Industrial Revolution”¹ and its heartland in 18th and 19th century Britain, we can detect the opening of a great divide. The world of art and world of engineering have become separate spheres, with the latter assuming the ascendancy. After all, the text that defines the Renaissance is Giorgio Vasari’s *Lives of the Artists*. For Victorian industrial Britain the definitive text is Samuel Smiles’ *Lives of the Engineers*. The emergent 19th century divide between art and engineering, indeed between art and science and between art and industry, has been the subject of controversy for many years. Oddly enough, debate has tended to privilege the arts in Britain. Martin Weiner’s notion of an anti-industrial spirit residing in the bosom of English (sic) culture, and corroding the economic structure of “the workshop of the world”, rests upon an assertion that industry and engineering were seen as somehow inferior pursuits as viewed by British society, when compared to the arts or classics. A similarly debate-provoking intervention by C. P. Snow, posited a world of “two cultures” into 20th century Britain, where scientists and engineers, sat “below the salt”, as British economic and political power were consequently eclipsed as the century wore on.ⁱ

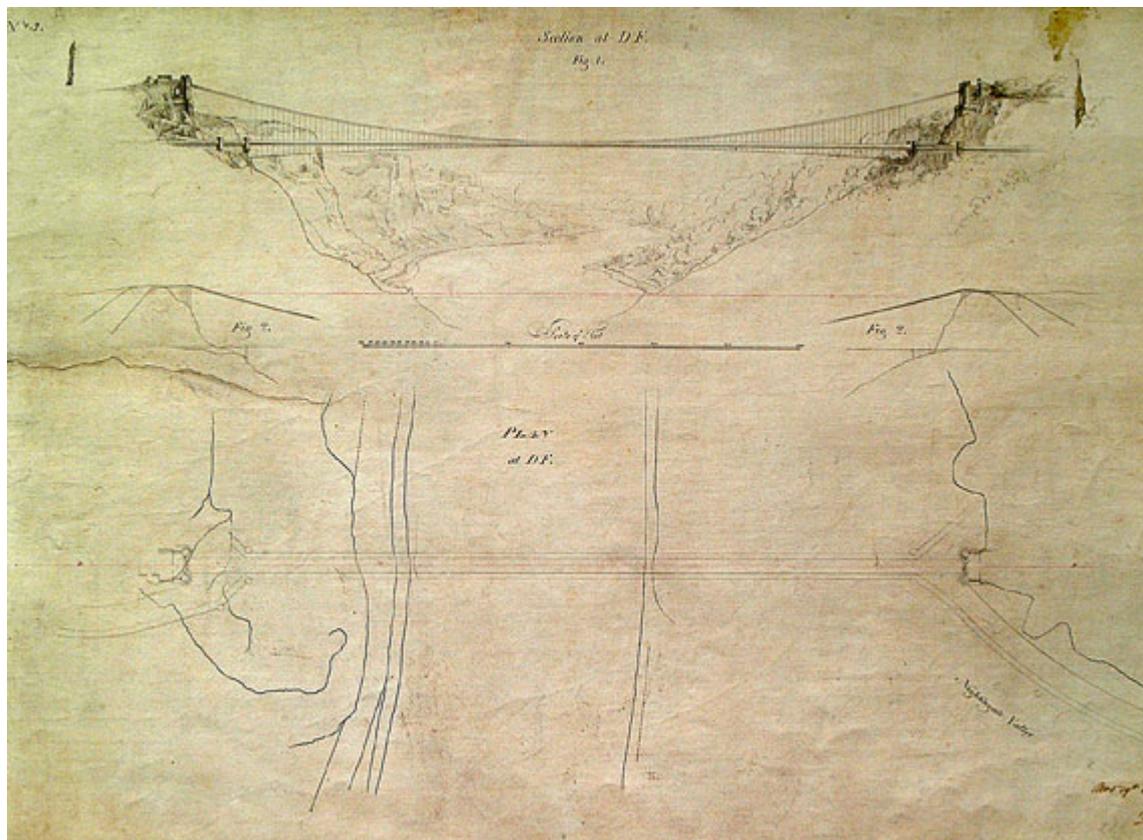
¹ I have put the terms Renaissance and Industrial Revolution in inverted commas to indicate that both are contested and controversial terms – debates continue as to the nature, location, frequency, timing, extent and impact of each of these concepts. We do not have space to outline these debates here, besides, both terms retain a general utility for our purposes.

But how accurate is this depiction of a developing bi-polar world in Victorian Britain? Has anyone really looked in depth at the relationship between the lives of the artist and the lives of the engineer? Oddly, perhaps, if we look in a little more detail, we can see that these lives of art and engineering in Victorian Britain bear striking similarities and have many connections. This paper will examine some of these parallels and linkages. We are not proposing that these two worlds remain in an unchanging unity, but rather, while accepting that divergence and division feature in the worlds of art and engineering, there is nevertheless connectivity at a number of levels, professional, social and cultural, which deserves further consideration.

Firstly, let us look at the practise of both worlds. Artists of the period came almost exclusively through a process of meticulous and rigorous training, endless drafting and copying from the masters. Art was a professional career, entry into which was governed by rules of conduct and style, approved and valorised by the Royal Academy - often resented perhaps but impossible to ignore if a reputation was to be established. Patronage and approval by an elite of wealthy landowners, nouveau industrialists, and later by municipal civic authorities, was essential. In comparison the 19th century civil engineer's world, for example, looks remarkably similar. Again, a punishing regime of study and training - mathematical elements perhaps, but with draftsmanship at the core - and the Institute of Civil Engineers standing as gatekeeper and guardian of the profession from 1828 onwards. Moreover if any civil engineering design was to be commissioned it needed artistic representation. Take, for example, drawings and competition entries for the Clifton Gorge bridge by Thomas Telford and I. K. Brunel respectively. (see Plates 1. and 2. below) Drawings needed to convey the bridge, both to the engineer, and later to the "public", not as a set of engineering blueprints, but as an artwork embedded in an imagined and idealised landscape (the landscape so beloved of contemporary artists). Like artists, engineers needed to persuade patrons and commissioners of the worth of their design - patrons and commissioners again drawn from the ranks of landowners, industrialists and municipal authorities. In many ways the artist and engineer needed to be entrepreneurial in securing patronage and building a reputation, and in doing so might display many of the same characteristics. Gainsborough, Constable, Turner, Cox...all display the same qualities in this respect as the doyens of Smiles *Engineering* lives.



[Plate 1. Thomas Telford's Clifton bridge competition entry.]



[Plate 2. I. K. Brunel's Clifton suspension bridge drawings.]

Secondly, we might look for direct connections between both worlds. Did artists and engineers meet? Were they socially connected? Did they influence each other? Certainly great engineering marvels became the subject matter of many paintings. But there are more profound connections than this. Several examples point to the fact that art and engineering did not reside in separate spheres. Connections might be dynastic for example. The Knight family, one of the great ironmaster dynasties of the 18th and 19th century, included a number of important engineering innovators, but also a number of poets and artists, including Richard Payne Knight, who along with Uvedale Price and Thomas Hearn, led the *Picturesque* movement in poetry, art and architecture in Britain in the early 19th century. Benjamin Williams Leader, neglected today, but Victorian Britain's most popular landscape painter, was the son of a civil engineer of national repute, and brother to the chief engineer of the Manchester Ship Canal. Engineers also bought art, commissioned portraits and generally moved in the same social circles as the artists. We should not make the mistake of portraying artists of this period as tortured, bohemian figures inhabiting a peripheral social world, such as might have emerged at the turn of the twentieth century. They moved in polite society, where both groups could interact.²

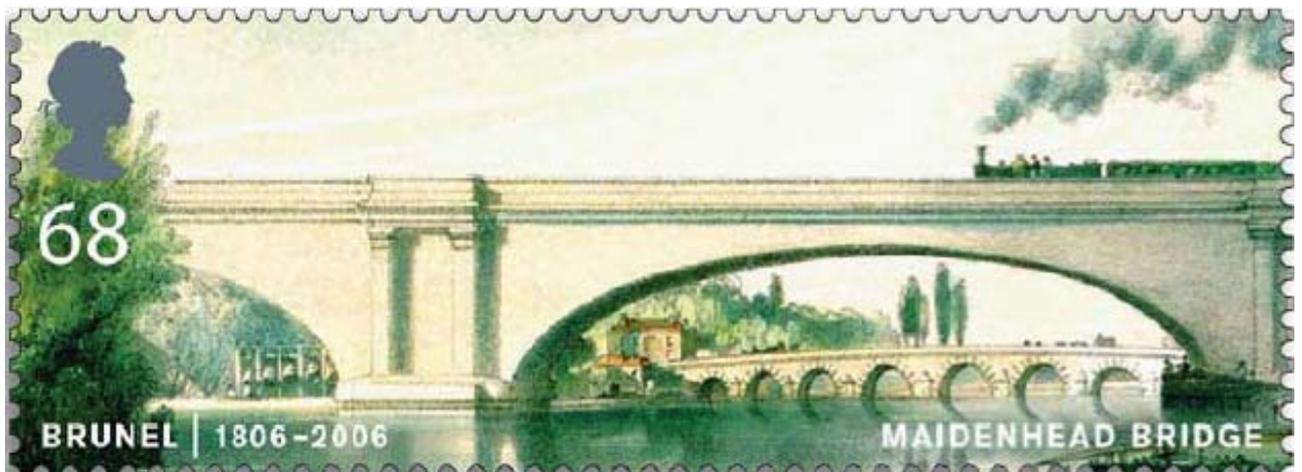
Thirdly, we might consider where both professions connected in a supportive way or a process of mutual reinforcement. As noted, engineers provided the raw material for muses on the landscape, or the industrial urban world. Often poignant landscapes, to be sure, juxtaposing the modern with the traditional worlds being “lost”, but the raw material of landscape or subject nonetheless. Timeless iconic images in this vein emerged from artists such as J. M. W. Turner or Joseph Wright of Derby, for example. 19th century engineers in turn needed visibility, to enhance their reputation. In a world increasingly driven by printed images, particularly following the development of lithography, artists could provide this visibility, this publicity. Both artist and engineer were also arguably in the business of constructing monument and memorial – reputations were needed for practical and utilitarian

² It is often noted that industrialists have a penchant for aristocratic living, once their fortune is made. Artists are no different. Far from dying a young romantic death, many are marked with success which includes all the trappings of wealth, including chateaux, country houses and grand city houses. See for example the chosen domiciles of Rodin, Picasso and Hirst.

contemporary purposes, but also for posterity - to cement a place in history. A single example might illuminate this multilayered process. In the 1830s Brunel built one of the great engineering triumphs of the age, the Great Western Railway. Regarded by many as the most complex and ambitious project of the era-defining railway system, the GWR incorporated many engineering challenges and innovative technologies. In bridging the Thames at Maidenhead, for example, Brunel constructed the widest and flattest single span brick arch in the world. Practical, yet at the limit of engineering possibility, the bridge became one of many of Brunel's world beating civil engineering "marvels". For Brunel the showman, the entrepreneur, the consummate Victorian engineer, the style of the bridge, its elegance and its visibility – its celebrity – were equally as important as its functionality. The artist was needed to enhance or promulgate this celebrity. Many contemporary lithographs portrayed the bridge. It has since been memorialised in many ways, including memorial plaques celebrating European Architectural Heritage (see Plate 3) and the issuing of a bi-centennial stamp in 2006, itself using a contemporary lithograph (see Plate 4.). The greatest memorial to the bridge, however, is provided by Turner, who immortalised it in his 1844 painting, *Rain Steam and Speed*. (see Plate 5) Turner was in many ways Brunel's counterpart. Both at the heart of the establishment, yet simultaneously pushing boundaries. Conventionally unconventional. *Rain Steam and Speed*, like so many of Turner's paintings, excites controversy in the interpretation.ⁱⁱ Does it portray a headlong rush towards a gloomy and uncertain industrial future? Or is it simply the product of an individual interpretation of the scene through Turner's refracting imagination? Debate continues, nevertheless Brunel and Turner are inextricably bound up in the same process – constructing and memorialising the changing face of 19th century Britain.



[Plate 3. Memorial plaque, European Architectural Heritage Year]



[Plate 4. 2006 Commemorative 68p Stamp]



[Plate 5. Turner *Rain Steam and Speed*, 1844]

Against the background of the Weiner or Snow divergent cultures debates, these, albeit tentative suggestions of a connectivity between art and engineering seem out of place. So perhaps we need to further re-examine these debates and their inherent notions of a stark bipolarity.ⁱⁱⁱ That art and engineering continue to offer, or need, mutual support or inspiration, can be found in many examples. Formalised programmes such as the Bell Labs *Experiments in Art and Technology* (EAT) initiative in the 1960s, have been attempted. The work of Daniel Libeskind, or Zaha Hadid are contemporary examples of engineering and architecture which have their origins in strong artistic tendencies.

To conclude, and by way of illustrating this deep connectivity between art and engineering, we might consider two seemingly disparate artefacts. Michelangelo's David is acknowledged as the paragon of the renaissance sculptors' art. Beautiful in itself perhaps, the sculpture is also important in terms of the radical nature of its execution, method, and composition. But it also has embedded within it an important politics – it stands for precocious Florentine republican power standing against the Goliath of Rome. David was unveiled in 1504. In 2004

the Millau viaduct in France was unveiled. Norman Foster's bridge in the sky is surely a radically different artefact to Michelangelo's masterpiece. Well, perhaps. But if we view them both as political objects, for example, the distinctions of half a millennium begin to fade. The politics of the viaduct, the motives and processes behind its commission, its revolutionary and sculptural form, all begin to construct a cultural bridge across 500 years of history. Just as David stood for Florentine defiance and pride, Millau stands for a technocratic and modern France, maybe even a France standing against US technological and political imperialism. Also, each is the product of the imaginative process, where creativity meets commission. A process which shares a great many common features, across the divide of disciplines and the divide of history.



[Plate 6. Michelangelo, David.]



[Plate 7. Millau Viaduct.]

ⁱ M. Weiner, *English Culture and the Decline of the Industrial Spirit 1850 – 1980*, Penguin 1985, C. P. Snow, *The Two Cultures*, Cambridge University Press, 1993.

ⁱⁱ Ian Carter, "Rain Steam and What?", *Oxford Art Journal*, Vol 20, No.2, 1997.

ⁱⁱⁱ For a discussion of the two cultures debate, including the historiographical unease in discussing cultures when referring to economy see B. Collins and K. Robbins, *British Culture and Economic Decline*, Weidenfeld and Nicholson, 1990.