

### Expertise Lost: An Early Case of Technology Assessment

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**EXPERTISE LOST**  
**An Early Case of Technology Assessment**  
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**Bernward Joerges**

In his beautiful book on the *Eisenbahnreise*, Wolfgang Schivelbusch mentions the expertise of a *Königlich Bayrisches Obermedizinalkollegium* on the health hazards of railway travel.<sup>1</sup> This expertise has played a certain role in the history of the railway and of technology more general. In this Note, I want to place it squarely in the yet-to-be-written history of technology assessment (TA).

The Royal Bavarian medical expert report on the railways has been reproduced in various collections of historical sources<sup>2</sup> and medical history books too.<sup>3</sup> The first historian to refer to it, in the context of ridiculing southern German particularism, was none other than the great Prussian scholar Heinrich von Treitschke<sup>4</sup>.

What did this early impact assessment claim and what was its impact?

### **Delirium Furiosum**

The study's central claim, sometime around 1835, was that the railway is dangerous for your health and should be forbidden.

"Locomotion with the help of any kind of steam engines should, in the interest of public health, be prohibited. The rapid movements cannot fail to produce in the passengers mental unrest, i.e. 'delirium furiosum'. Even conceded that travellers voluntarily undergo this danger, the state must at least protect the onlookers, since the view of a locomotive, which races along in full speed, suffices to elicit this terrible sickness. It is therefore paramount that on both sides of the rails a fence is raised of at least six feet height."<sup>5</sup>

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1 Wolfgang Schivelbusch, *Geschichte der Eisenbahnreise* (München: Hanser, 1977), 198.

2 See, for example, Werner Pöls (Hg.) *Deutsche Sozialgeschichte 1815-1970*, Bd. 1 (München: C. H. Beck, 1979); Wilhelm Treue and Karl H. Manegold, *Quellen zur Geschichte der industriellen Revolution* (Göttingen: Muster-Schmidt, 1966); F. K. A. Schulze, *Die ersten Deutschen Eisenbahnen Nürnberg-Fürth und Leipzig-Dresden* (Leipzig: Voigtländers Quellenbücher Bd. I, 1st edn 1912, 2nd edn 1917).

3 For example, see G. Koch and H. Hoffmann, 'Geschichte der Verkehrsmedizin für den Verkehr mit Landfahrzeugen von den Anfängen bis zum Ende des 2. Weltkriegs', *Zentralblatt für Verkehrsmedizin*, Vol. 15 (1969), 129-59, 193-225.

4 Heinrich von Treitschke, 'Unsere Aussichten', *Preussische Jahrbücher*, Vol. 44 (1889), 559-760; here. 582ff.

5 Quoted from R. P. Sieferle, *Fortschrittsfeinde? Opposition gegen Technik und Industrie von der Romantik bis zur Gegenwart* (München: C. H. Beck, 1984), 88, who quotes after Pöls, op. cit. note 2, 371, who cites

The *Obermedizinalkollegium* took, in other words, a deeply sceptical view and advised whoever asked for their counsel to stop the infernal innovation of railways in the best interest of the public. A principled stand. But a kind of 'consenting adults' principle was allowed for too. In order to resolve the certain tension between the principles, the expertise suggests measures to protect the then majority of passive onlookers by fencing in, and thus 'blackboxing' the inevitable. And that is indeed what happened if not always with fences six feet high, then by other insurmountable measures. What did not happen was the predicted 'delirium furiosum' from the early Trains à Grande Vitesse (TGVs), although of course a great number of sicknesses whose outbreak happened to coincide with travelling the railway were attributed to this technology.<sup>6</sup>

So far so good. One might say that nothing much has changed in TA's rhetoric since the early days. But there is more to it, in terms of understanding the art, science, and politics of TA to this day, and beyond.

### **In Search of an Expertise**

As early as 1920, the historian Feldhaus expressed doubts about the authenticity of the said expertise.<sup>7</sup> Since then a great number of researches were undertaken in order to locate the study in the Bavarian archives, alas to no avail.<sup>8</sup> The document was never found and the Nuremberg Archive of Transport finally decided, as reported by Sieferle<sup>9</sup> that it never existed. But can we be satisfied with that? No, we can not because this early case of TA has, if we trouble to analyze it more carefully, too much in common with other cases of vanishing evidence provided by partial or impartial experts (which cases I will refrain from naming here).

Let us begin by identifying the 'system actors' (meaning major interested parties). In this case: the TA professional, the historian of technology, and the new sociologist of technology. And let us hear what they have to say in turn.

### **The Historian**

Generations of historians, both professional and amateur, followed von Treitschke, citing his citation of the ominous source. A well-known amateur, for instance, remarked:

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Schulze, op. cit. note 2, 24, who does not give a source. All historical sources quoted here are from Sieferle, op. cit.

<sup>6</sup> See Koch & Hoffmann, op. cit. note 3, for data on such things as the 'railway-spine', the 'railway-brain', 'paralysis of the nervus facialis' from chasing a train and so on.

<sup>7</sup> Franz M. Feldhaus, *Der Laie als Erfinder. Eine soziale Skizze* (Berlin, 1920)

<sup>8</sup> See, for example, C. Nörrenberg, 'Die Sage vom delirium furiosum - eine Sage', *Jan Wellem*, Vol. 5 (1930); M. Beckh, *Deutschlands erste Eisenbahn Nürnberg-Fürth* (Nürnberg: 1935); W. K. Mück, *Deutschlands erste Eisenbahn mit Dampfkraft: Die kgl.priv. Ludwigsbahn zwischen Nürnberg und Fürth* (Fürth:, 1968); Sieferle, op. cit. note 5.

<sup>9</sup> Sieferle, op. cit. note 5, 88.

"All the anxieties of the eminent agencies of that time did not, as is well known, come true later: the travellers in the trains of the new 'steam horses' did not get vertigo, the onlookers did not become sick, and the wooden fences which were to make the new installations invisible, were abandoned - only the wooden fences blocking the foreheads of all these 'Experts' have still remained with us..."<sup>10</sup>

But many entirely respectable historians have made use of this expertise, mostly in a context of showing that early fears of technology turn out to be unwarranted once the technology comes to be mastered and culturally assimilated.

In all these cases the authority of the argument was established by quoting a historical document as quoted by preceding, presumably more authoritative historians. Truth lies in sources. And the proof of a source is its credible citation. And the strength of a proof increases with the number of allies an author can recruit into his, or her, citation cartel.<sup>11</sup>

Other historians concluded from the absence of an original source that it never existed. The logic is the same here: factual truth lies in the source. No source, no facts. And since the study does not exist, its alleged evidence can be discounted.

Of course it is not that simple. There must be other corroboration, and there was. First of all, the expertise survived in the literature in two slightly differently worded versions.<sup>12</sup> This has led to the hypothesis that the expertise might have been written in Latin and has survived in two different translations. Sieferle pursues this trail but finds that at the time medical opinions were not written in Latin anymore. He allows himself the footnote speculation, however, that 'one could presume vaguely that this 'expertise' was invented in France or so and affected to be Bavarian. Sometime in the 19th century it was then believed to be authentic and translated into German. But there are no concrete indications' (Sieferle 1984:270).

In the end, Sieferle, and presumably most historians of technology nowadays, tend to follow another source, namely the 1985 *Festschrift* in celebration of the Bavarian railway anniversary where indeed initial warnings against health risks are recalled, coming, however, not from a *Obermedizinalkollegium* but from a 'second class healer', a barber raging against the railway: 'He was of the opinion that the steam and the speed would cause illnesses: even people who did not travel but only saw the train pass by could be caught by vertigo'.<sup>13</sup> There may have been a source, but if there was, it was not reputable, and being not reputable accounts for the dubiousness of the opinion.

A sophisticated way out: the rhetoric of truth/source/quote is preserved effacing the source, making it into a non-source. The non-source's factual claims can safely be put aside, not so much because

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<sup>10</sup> Adolf Hitler, *Mein Kampf* (München: 1st edn 1925), 233.

<sup>11</sup> For the politics of scientific truth see especially Latour, for example, Bruno Latour, 'The Politics of Explanation', in Steve Woolgar (ed.), *Knowledge and Reflexivity* (London: 1988), 155-77 and idem, *Les Microbes, Paix et Guerre* (Paris 1984).

<sup>12</sup> The second version is quoted in Treue and Manegold, op. cit. note 2, 84, for example, who quote W. Strauß, *Einst und jetzt auf Stephenson's Spur* (Hannover, 1925).

<sup>13</sup> Hagen, *Die erste Deutsche Eisenbahn mit Dampfbetrieb zwischen Nürnberg und Fürth. Ein Beitrag zur Kulturgeschichte des 19. Jahrhunderts* (Nürnberg: 1986).

retrospectively they turned out to be so much non-sense (that too) but because they never were properly conceived and documented, and published.

### **The TA Expert**

In the historical disciplines, the custom for every historian is then to quote other, preferably more highly reputed ones, and that is that. And that is why the story could gather credibility over the decades by a string of citations into which very potent members of the profession were recruited and thus contributed to the strength of the case. The matter was blackboxed and could be referred to like the date of the year - until it became untenable when some young Turk historian cracked open the box.

For the professional TA man (rarely a woman) things are a great deal trickier. He takes his clue from Hitler who, affirming the existence of the expertise and making sly use of established historical truth, proceeds to deride the experts. Sneering at expert competence and, yes, the dignity of impartial knowledge is a favourite strategy of those in power whenever expert advice is not welcome or an experts' private political stance is considered the wrong one.

For any seasoned TA professional it is more than obvious that the alleged expertise never existed as such; but that it was a fabrication, faked by some party who was out to ruin the still young and vulnerable business of TA. The pretentious, pseudo-medical style ('delirium furiosum', put between quotation marks at that), the crude 'have your cake and eat it too' style of political advice, the call for enormous public expenditures and other features of the concoction all too obviously betray the intention to jeopardise TA's claim to play a role in the exploitation of technical achievements.

It cannot be denied that with few exceptions the historical profession has lent support to all this, not only by authenticating the fake from one decade to the next but by insidiously deriding the injection of competent know-how other than that coming under the concept of 'learning from history', a notion that notoriously must fail in the face of technical innovation and social progress.<sup>14</sup>

TA is not about analogies to historical precedents established by 20/20 hindsight, as practised by historians. TA is responsibly prospective, or rather prospectively responsible. Since its beginnings, TA has developed a set of techniques for enabling decision-makers to base their choices on sound empirical analysis and prognosis, paired with accumulated, if tacit, professional expertise and hands-on know-how.<sup>15</sup> If TA experts are sometimes said to be the means by which expert reports generate more expert reports, this must be seen as yet another move to discredit TA's contribution to the oiling of the common wheel, to coin a socio-technical metaphor. Had it not been for attacks on the profession's integrity as already exemplified by the fake railway expertise of 1835, TA would not be compelled to resort to extensive, sometimes, it cannot be denied, over-extensive reporting. It is important to understand that TA's most accomplished practitioners prefer to communicate by way of privileged

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<sup>14</sup> This is of course a professional deformation not restricted to historians of technology. See, for example, R. Neustadt and E. May, *Thinking in Time: the Uses of History for Decision Makers* (1993).

<sup>15</sup> For variants of TA rhetoric see for instance contributions in Meinolf Dierkes, Thomas Petermann and Volker von Thienen (eds.), *Technik und Parlament* (Berlin: edition sigma, 1986).

counsel rather than published report. How else could factual accuracy, social responsibility and a client's interests be balanced?

### **The New Sociologist of Technology<sup>16</sup>**

Enters the sociologist of the new school. She (or he) requires us, first of all, to proceed symmetrically.<sup>17</sup> This means two things: to assume the same likelihood for health hazards as for the health benefits of railway travel<sup>18</sup>; and to assume equal likelihood for the existence of the expertise and for its non-existence.

A word for the non-initiated must be added here. The new sociologist of technology cultivates mostly post-modern sensibilities. This means that she generally celebrates 'aporia' - ambiguity, anarchy, contradiction, difference, discontinuity, discord, disparity, indeterminacy, irony, paradox, perversity, obscurity, opacity, in a word: chaos.<sup>19</sup> The new sociologist will therefore seek out the odds, the chance aspects, the manifold contingencies and, even more to the point, coincidences of the case.

It is important to note, however, that many new sociologists do not strictly adhere to the symmetry principle or, as we may now call it, the principle of double coincidence. They often privilege that horn of a dilemma which tends to be effaced by mainstream science and politics. For the present case that means to pay special attention to the possibilities that indeed railway travel may cause brain damage or other pests and that a genuine expertise did indeed exist.

Methodologically the new sociologist of technology is a hermeneut. A hermeneut proceeds on the assumption that '*Wo Rauch ist, ist auch Feuer*' (where there is smoke there is fire too). In other words, the basic hermeneutic suspicion<sup>20</sup> leads us to assume that an original technology assessment of the risks of railway travel did once exist and that the fake (if one can, as a new sociologist, apply the concept of 'fakes' at all) lies in its attribution by modern historians to a figaro style quack. I would even go further here: the fact that the expertise could not be found until today proves (if one can use the concept of 'proof' as a new sociologist) that it really existed (to the extent that the concept of 'reality' is useful here).

The question arises why the expertise was suppressed. Here the new sociologist starts talking with the TA expert. She is much taken with the latter's hunch that the expertise must not have been in the interest of those who paid for it and that for this reason it never was properly archived. By the

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<sup>16</sup> See also Bernward Joerges, 'Romancing the Machine', *International Studies of Management & Organization*, Vol. 19, No. 4 (1990), 24-50.

<sup>17</sup> For a general notion of symmetry in science and technology research see the relevant contributions in Andrew Pickering (ed.) *Science as Practice and Culture* (Chicago, IL: The University of Chicago Press, 1993).

<sup>18</sup> Why not, indeed, a 'railway cure' for the victims of other forms of locomotion.

<sup>19</sup> I have taken this by no means exhaustive list (and alphabetised it myself) from Gertrude Himmelfarb's courageous attack on post-modern history 'Telling it as you like it' in *Times Literary Supplement* No. 4672 (1992), 15.

<sup>20</sup> For a theoretical treatment see Umberto Eco, *The Limits of Interpretation* (Bloomington, IN:, 1990), but also, for a more narrative exposition, idem, *Foucault's Pendulum*.

same token, the search should, according to this interpretation, be reopened, focusing on old table drawers and the like.

It is entirely possible, however, knowing certain academic practises that have survived to this day in Bavaria, that the expertise has indeed been discovered by some doctoral student in the history of technology but was effaced for the second time, as it were, under the pressure of a Doktorvater who above all wanted to preserve the reputation of his discipline. In which case the chase might as well be called off because the expertise will probably have ended up in the shredder of some Bavarian archive.

As to the issue of health risks, the new sociologist for once can rub shoulders with the men from TA. It is hard to dispute, and a matter of historical record, that railway travel has caused tremendous anxiety and damage in terms of health and lives.<sup>21</sup> True, early calls to 'reduce risk (*Wagniß*)' in railways 'under all life circumstances to a minimum' in a Europe where 'general security' reigns<sup>22</sup> have in the long run led to noteworthy improvements and deriskification of that particular technology. But this could not have happened without the antecedent health threat and, by the same token, early (and probably relatively cheap) TA studies. So right from the beginning, TA was less about the impacts of technology than the impacts on technology.

### **A future for TA**

TA has come a long way. Its early, and as the case of the lost expertise shows, risky analyses of technological and environmental hazards, have developed into an art, a science, and a politics. Attempts to undermine its moral and intellectual integrity largely belong to the past (although one must always keep a vigilant eye on the historians). But there is room for improvement.

The future (think of business in the next century) needs a poetics of TA. This means above all a healthy dose of irony and self-reflection. TA's general tendency to mimic scientific objectiveness looks by now a bit dated, to say the least. In order to bring TA safely into the next century, it would help, if its practitioners and ideologues realised that it is not only post-modern historians and new sociologists of science, but old-European historians and TA experts as well who 'tell the story as they like it', as Professor Himmelfarb so succinctly put it.

There can be little doubt today that conventional expertise in matters of technical progress has become somewhat obsolete. The scientific convictions and rhetoric of TA have become shaky, and in this far more fundamental sense, the profession may rapidly be losing its expertise. It is time to understand that the most valuable expertise at the end of the millennium (and one which will in time find its lucrative markets, too) is a particular competence: to be able to demonstrate in non-aggressive

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<sup>21</sup> For the terrible accidents and loss of life see especially Max M. von Weber, *Die Technik des Eisenbahnbetriebs in bezug auf die Sicherheit desselben* (Leipzig, 1854); for an early assessment of environmental damage see R. Hasenclever, 'Über die Beschädigung der Vegetation durch saure Gase', *Chemische Industrie*, Vol. 2 (1879), 225-31, 275-80.

<sup>22</sup> Weber, op. cit. note 21, 7.

ways that, in any given case, the versions of reality advanced by its interested parties are, as they say, 'socially constructed'.<sup>23</sup> In TA terms this means: they are negotiable.

Methodologically, the practise of constructionist TA (CTA) hinges on the strict observance of the aforementioned principle of double coincidence (PDC).

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<sup>23</sup> German TA researchers, holding fast (!) to a realist view of things, prefer to talk about "competing rationalities"; cf. Alfons Bora and Rainer Döbert, 'Konkurrierende Rationalitäten: Politischer und technisch-wissenschaftlicher Diskurs im Rahmen einer Technikfolgenabschätzung von gentechnisch erzeugter Herbizidresistenz in Kulturpflanzen', *Soziale Welt*, Vol. 44, No. 1 (1993), 75-97.

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