DEMands of an Increasing Traffic

In December 1817, only three years after Hanover had been restituted as kingdom within the German Confederation created as a result of the Vienna Congress, Victor Leberecht Prutt (1781–1857) as an engineer lieutenant colonel the technical chief of the General Board of Roads presented his general road construction plan (Hindelang an Walther 1989, 14). His proposal was to improve the communication in that kingdom by laying out a net finally comprising about 3000 km of main roads and more than 2000 km of secondary or connecting roads. At this moment only 920 km of these roads being composed of a bottoming between kerbstones and paved with sand, gravel, or limestone were opened to traffic.

In the former electorate of Hanover road construction had started during the 1760s just after the Seven Years’ War. Between 1764 and the early 1780s three main lines were going to be completed under supervision of the Royal Electoral General Intendance of Road Construction established by a grant of George III. The reason for taking up the roadworks was of both military and commercial concern (Baldermann 1968, 75). Whereas the roads running from the capital to the fortified cities of Hamelin and Nienburg watching the river Weser were more of military importance, the road passing on its run south to Cassel the Hanoverian towns of Einbeck, Northeim, Gottingen, and Munden, would be more of commercial interest. About 1830 goods transport on the road from Hanover via Northeim and Gottingen to Cassel or destinations in Thuringia made approximately 6,000 tons a year, while a little more than 2,000 tons annually were crossing the Weser at Hamelin to get their destinations in Lippe or eastern Westphalia (von Reden 1839, 2: 301 and 321). In the long term Hanoverian efforts in road construction would shift the main link between the seaports of Hamburg or Bremen and trading centers like Frankfurt on the Main or Nuremberg from its traditional route via Brunswick more to the west focusing the capital and the Leine valley (Scholl 1978, 46). Following a policy of pushing long distance transit routes Hanover tried to keep the goods transport as long as possible within the borders of her territory. Hoping for raising benefits from a transit trade dragged out in such a way, the kingdom was going to convert roads into a new kind of staples (Rauers 1913, 29 and 42).

Before the Hanoverian exchequer, however, would be able to meet those expectations, heavy investments were to be made not at least into bridge building. As each of the three 18th century roads merely had to cross brooks or creeks, for the time only small stone arch bridges would have become necessary. For passing rivers like the Rhume at Northeim, the Werra at Munden, or the Weser at Nienburg and Hamelin furthermore existent bridges could be used, but which in 1817 each still had remained in the property of those municipalities. Albeit they were raising tolls, the bridges, however, lacked constant maintenance
and therefore appeared in more or less a rather bad condition. Largely of medieval origin almost every of these stone arch bridges by that time even had undergone considerable decay. Damages caused by heavy ice motion, flood, or military action during the Napoleonic wars had added to. In particular most bridges had lost at least one of their vaults and sometimes also one or, like that at Hamelin, even two of the piers. Because the municipal budgets could not afford more, strut frames had to compensate for. Albeit better than a ferry such structures, as chosen for the bridges at Northeim, Nienburg, and Hamelin, as well as at Minden, the Prussian fortress watching the river Weser downstreams Porta Westfalica, were nothing more than rather a stopgap solution. If one of them fully would have to be replaced by a new structure, first the state had to take command. In the case of Hanover this meant that the General Board of Roads then would become responsible for the entire project, the design as well as construction and further maintenance or frequent repair.

Soon after the French occupation troops had withdrawn from Northwest Germany the bridge at Hamelin anew would have to undergo at least sweeping repair, a measure which had become inevitable as Hanover by the agreements of the Vienna Congress was obliged to take care of the improvements necessary to enable both an unrestrained navigation on the river Weser and an open communication for troop movements between Prussia’s central and western provinces. Whereas the character of the Weser as an «international» river formally would get confirmed by the Weser Navigation Act of 1823, the communication crossing that river at Hamelin would become one of the eighteen most important routes mentioned by Prott in his 1817 proposal.

At this moment seven of the German states of quite a different size and political impact were neighbouring the river Weser: besides Hanover also Hesse-Cassel, Prussia, Brunswick, Lippe and Schaumburg-Lippe, finally Bremen and Oldenburg. Then bridges were crossing the river only at six points, most of them located in Hanover. Apart from Hamelin and Nienburg there existed also bridges downstreams at Hoya and upstreams at Munden over the river Werra, just before it is joining the river Fulda and both shape the Weser. Each a single bridge was crossing the river at Bremen, at Rinteln in the Hessian exclave of Schaumburg, and at Minden in Prussian Westphalia, while the bridge at Hoxter upstreams in the same province since 1673 had kept ruined (Grunsky 1998, 108).

ADOPTING A NEW TYPE OF BRIDGE CONSTRUCTION

According to the agreements made among these states by the Weser Navigation Act none of these bridges should present an obstacle to shipping traffic. Albeit first attempts to sail by steam boat had been made in 1816, both passenger traffic and goods transport on barges towed by a paddle wheel tug sustainedly would become successful only since the late 1830s. Within a few years, however, Hamelin then would become the dominating location for steam navigation upstream of Bremen. Compared with the barges of the trains until the mid 19th century generally used for goods transport, the paddle wheel passenger boats and tugs would be much broader. Considering the design of a new bridge that meant above all to diminish the number of its piers and so to widen its openings, both by the way also a precaution against damages by heavy flooding or ice motion. At Hamelin this aspect was of particular importance because both the holm dividing the river Weser into two arms and the falls at their entrance. Controlled by weirs across both arms these falls were powering mills located as well on the holm as at the townside wharf, whereas locks installed 1732–33 allowed that boats could pass without lightening.

The Hamelin bridge therefore not only was to take over one of Germany’s soon main through roads running from east to west, but also to give furthermore free access to the holm with its mills and locks. Designing a new structure of this bridge had to consider that the number of waggons, carts, or carriages passing it presumebly would increase and beyond that their load could increase, too. Whereas in 1822 the performance of a horse was estimated at 0.5 to 0.8 tons, in 1830 it would have been 1.2 or even 1.4 tons, so that a waggton pulled by four horses on a stone paved road, of which Hanover at this moment possessed totally a little less than 450 km, might have been loaded with up to six tons of goods (von Reden 1838, 2: 345 and 380).

At the beginning of the 19th century the Hamelin bridge was a timbered super structure on stone piers.
Its western part comprised five trusses and four river piers, the eastern part connecting the city with the mill and lock holm besides each two trusses and piers also a double flap bridge with the lifting gate on a timbered pier in between both its decks. As in the course of the Napoleonic Wars each part of the bridge had lost one of its piers and two of its trusses, both the municipality and the General Board of Hydraulic Engineering soon after the armistice was urged to consider repair and beyond that improvements, too. In a way following out the proposals made in January 1818 by Lock Commissioner Anton Heinrich Dammert (ca. 1755–1828), the remains of the destroyed piers as well as the flap bridge were abandoned and longer, but still timbered trusses took the place so that on each side a passage of about 33m could have been received (Hausmann and Plath 1973, 50; NHStA Hann 109, 1028 and 13b/Hameln 6pg).

Apparently the renewed structure merely a couple of years later again would need radical repair. By their report of April 1824 Anton Heinrich and Richard Dammert, both sons of the Lock Commissioner and as engineering officers working with Prott and the General Board of Roads, therefore argued for a cast iron bridge (NHStA 109, 1028 and 13b/Hameln 8pg). Their project was inspired by Thomas Wilson’s bridge of 1796 over the river Wear at Sunderland. This cast iron bridge basing on Thomas Paine’s design and consisting of six ribs, each made up of 105 iron blocks casted again at the foundry of the Walker brothers at Rotherham (DeLony 2000, 43), was by its single-span of 72m at that time not at least for German eyes a still spectacular feature.

Figure 1
August Heinrich Dammert and Richard A. Dammert, two alternatives of the proposed cast iron bridge, plate VII of the report No 2, 1829 (NHStA 13b/Hameln 8pg)

Figure 1b
August Heinrich Dammert and Richard A. Dammert, project of a cast iron bridge to be erected across the river Weser at Hamelin, 1829 (NHStA 13b/Hameln 9pm)
Being not very sure about the reaction on their proposal from the beginning they presented two alternative designs, either on each side two or even merely one segmental arch. Certainly the latter solution promised more advantages, but would be harder to achieve by the means contemporarily available with the domestic ironworks of the Harz or at Usar in the Solling near the Weser about 80 km upstream the construction site. Compared to timber cast iron was though the more resistant material which allowed longer span and beyond that a less arched superstructure. This again also meant that the ramps could get a minor gradient whereas the pitch could remain rather low. Additional arguments offered in favour of cast iron bridges were underlining that they would be rather light and cheap structures needing only quite a short time for both prefabrication and erection. If an iron bridge would not serve its purpose anymore, its components moreover either could be reused elsewhere or might fully be recycled in a foundry as scrap for new castings (LBA 1594.3 [1828], 9v–11r).

In spite of all these merits the project of a cast iron bridge never would be executed. It was destined to fail in the same way as the related project of a 28m spanning cast iron bridge over the river Innerste at Hildesheim (LBA 1594.3 [1824], 2v–3r). Albeit the idea to erect such a bridge in this commercial town passed by the road from Brunswick to Hamelin still was pursued for several years by the royal Hanoverian administration of the ironworks at Rothehutte in the eastern part of the Harz because its positive effects on employment, meanwhile Prott, however, had put his mind to build a suspension bridge across the river Weser instead. In his report handed over to the General Board of Roads in August 1829 he pointed out that unlike the cast iron bridge as designed by the Dammert brothers a suspension bridge would not need any river pier and in the case of a military conflict a couple of carpenters easily could prevent a crossing of the river by dismantling within a few hours slowly the bridge deck (NHStA Hann 109.1028 [1829], §§ 3, 4, an 6).

Looking to the exchequer Prott underlined the rather low budget a suspension bridge would require. As its construction materials primarily would be iron and stone such a bridge promised «a durability of centuries». Merely the wooden bridge deck would need constant but not very expensive repair and therefore a continuous flow of tolls could be expected. Because the bridge would «suspended above the river» it certainly could be assumed that it never might be damaged by even the worst flood desaster or ice motion. Prott supposed besides that an absence of river piers would improve flood protection also of the city itself (NHStA Hann 109.1028 [1829], 1 and 3).

Concerning the question, if at Hamelin a «wire bridge» or a chain bridge would to be preferred, taking the bridges «recently built across the river Rhône near Serrières and Tournon» as an example, Prott plead at the moment for the former. To achieve a safe load of 42 tons he estimated its material requirements at merely 18.6 tons of iron wire less than 4mm in diameter, 12.5 tons of wrought iron, and 3.1 tons of cast iron which in his view altogether could be supplied by the state-owned ironworks of the domestic Harz. By a letter sent in late September 1829 to the General Board of Hydraulic Engineering Prott again urged the necessity for an immediate handing over of the bridge from the municipality to the state and then start on doing the preparational work (NHStA Hann 109.1028).

Although Prott’s letter actually had been of crucial impact in launching the project it would take, however, some six years of an intense debate in many authorities were presenting their opinion or respectively their opposing views. By a memorandum of February 1830 the General Board of Hydraulic Works would lead off. To promote again the proposals by the Dammert brothers the board reminded that there would have been meanwhile good experiences with many cast iron bridges in England, France, and other countries, whereas there still would be a lack of such a certainty regarding suspension bridges. Albeit the board recommended the book published in 1824 by Henri Dufour on his iron wire suspension bridge at Geneva as a basis for further assessment, however, the memorandum was emphasizing that there still would have been almost nothing known about the impact changes in temperature, particularly frost, shocks, or lightnings, which could made. Beyond that there also could not be discerned any component able to compensate even only one of the cables in the case of its rupture. Thus the board finally felt constrained to warn against the «great danger» a suspension bridge generally might imply. This fear also was supported by the impression...
that this type simply was too much a novelty and its special demands of elasticity would not to be met by domestic iron reputed more for its temper if not its brittleness (NHStA Hann 109.1028 [1830]).

In contrast count Munster heading the Hanoverian government some month later, in November 1830, joined the expertise made by Georg Ludwig Friedrich Laves (1788–1864) who in his function as the director of the Board of Surveyors had pointed out that a suspension bridge would bring about economic benefits because of timber savings as well as of more employment in domestic mining and local crafts. Beyond that, Laves had continued his statement, it also would match very well with the beauty of the Weser valley (NHStA Hann 109.1028 [1830]). Until June 1833, however, it remained still unsettled if either wire cables or chains, either flat or round rods, should be applied. When George Wendelstadt (1790–1860) who, already prior to 1820 working with the General Board of Roads as an engineer and in 1826–30 being responsible for the design and erection of the remarkable viaducts near Einbeck, Northeim, and Munden (Schwartz 1989, 53), in 1832 was put in charge of the Hamelin project, he at first had to deal again with the old timber truss bridge there. By his report submitted in September that year he only could state an advanced stage of dilapidation.

Whereas Prott in his quotation presented three weeks later still was speaking about a «wire cable bridge», he would have changed his mind during the following spring. By his memorandum made in early June 1833 he eventually appeared being convinced that at Hamelin a «chain bridge» would be the best solution. Wendelstadt on the other hand would explain it by his final report of November 1833 referring to foreign models in meantime proved successful (NHStA 109.1028). Prott who in 1834 was mentioned as a subscriber of Franz Joseph Gerstner’s handbook of mechanics (Gerstner 1834, 3: end papers w/o p.) in its first volume also dealing in detail with suspension bridges (Gerstner 1831, 1: 253 and 449), when he read it apparently got both the decisive inspiration and all the information needed.

Gerstner (1756–1832), since 1789 professor for mathematics at the university of Prague and in 1806 there the founder and first director of the Politecnic Institut, carried weight as an authority on both theory and practice of mechanics. Together with his son Anton (1793–1840) as early as the beginning of the 1820s, he conducted experiments on domestic iron wire, bar iron, and wrought iron chains as materials useful to suspension bridges (Ferjeneik and Hruban 1992, 543). As chairman of the Bohemian Society of Sciences in 1825 he gave a special lecture on his experiences, illustration it with the model of a chain bridge. As a conclusion he thus would rank «suspension or chain bridges among the more important subjects of recent mechanics and architecture» and meanwhile «the glory in having realized the largest and most perfect structures of this kind belongs to the Englishmen» (Gerstner 1831, 2: 449).

DEVELOPING A BRIDGE DESIGN BY ADAPTATION

When Prott had to defend his project for a last time in September 1836 he could derive an advantage from quoting the British experience as being confirmed by Gerstner. He had to refute the objections previously raised by the government building surveyors Hagemann and Mosengel that a chain bridge might not really be appropriate. In this regard they particularly had referred to the collapsed Pont des Invalides over the Seine in Paris. It was designed by Henri Navier (1785–1836) who by his «Rapport et Mémoires sur les ponts suspendus» published already in 1823 had described a fundamental theory on the design and calculation of suspension bridges. Albeit thus the doubts were to be taken seriously, Prott putting the rhetorical question «what at the end all these collapsed bridges» would prove, however, confidently answered that it would prove nothing more than the examples of all the stone arch bridges being collapsed already before (NHStA Hann 109.1029, 30). Referring to British leadership he pointed out that neither the chain bridges on the Holyhead Road across the Menai strait and at Conway designed by Thomas Telford (1757–1834) nor the chain bridge since 1827 crossing the Thames at Hammersmith in nowadays London had done so (HNStA Hann 109.1029, 32 and 50).

In particular this bridge designed by William Tierney Clark and in 1824 examined by Telford, not only for Prott, but also for many of his contemporaries soon had become the most sophisticated «model for a chain bridge» (Heinzerling 1868/69, 73). When Prott commissioned Wendelstadt in 1833 to draw up the
design for the Hamelin bridge it thus was suggested as the essential pattern to follow. Wendelstadt, however, was not allowed simply to copy the Hammersmith bridge just as he could not join implicitly Gerstner’s descriptions. On the contrary he had to adapt it to the peculiarities of the site and the technical potential being available at the domestic ironworks. Wendelstadt thus was to detail the structure of the bridge and to fix the dimensions of every of its components as well as he was to make sure that the forgers and foundrymen of the Hanoverian ironworks, who never before were occupied with such an order, really would be able to prefabricate them in a proper precision and without any material fault. But not at least he had to close gaps in his own experience and comprehension of some particularities in the mechanics of suspension bridge structures.

Like Prott also Wendelstadt in this regard mainly had to rely on technical literature. Apparently both of them never had visited one of the suspension bridges since 1824 built at several places in the German Federation, neither the still existing footbridge by Johann Georg Kuppler over the river Pegnitz at Nuremberg following the pattern of Samuel Brown’s Union Bridge at Berwick as in 1822 described by Robert Stevenson (Stevenson 1822, 116), nor the bridge at the Prussian ironworks of Malapane in Upper Silesia in 1827 constructed in a similar design, or the road bridge across the river Regnitz at Bamberg in Bavarian Upper Franconia designed in 1828 by Franz Joseph Schierlinger (Schepe 1987, 163). Probably they also did not hear anything about the projects drawn up by the Prussian district architect Hermann Eberhard who in 1824 was commissioned by the government and had suggested to build across the river Weser at Hoxter either a three span cable bridge following Navier’s proposals or chain bridge as being described by Stevenson (Grunsky 1998, 109). Quite obviously the reason was that Eberhard’s suggestions soon would be rejected as it was the same with Peter Joseph Krahe’s 1826/27 design of an asymmetric cable bridge to be erected over the river Oker at Brunswick (Dorn 1997, 51 and 318). They both would vanish for many decades into the respective filing cabinets.

By their career, however, Prott and Wendelstadt actually had not been unprepared. Both they were familiar with mathematics as well as with mechanics and each of them disposed of his own experience in civil engineering. While Prott, born at Hamelin as son of an artillery officer, after 1803 had worked in
Englad as a lieutenant with the engineering corps of the Kings's German Legion on the layout of fortifications, Wendelstadt, who was born at Wetzlar as son of a physician, first had studied chemistry at Marburg in Hesse. In 1813 he joined the Hanoverian army as an officer within the engineering corps, then in 1815 was released from duty to take up studies in science at Gottingen, before he finally was going to become virtually the head of every bridge building project to be executed for the Hanoverian state (Scholl 1978, 49 and 64).

The main difference to the Hammersmith bridge Wendelstadt had to consider, was that the Hamelin bridge needed three piers instead of only two. Whereas both piers of the Hammersmith bridge each were standing in the river near the embankment, Wendelstadt decided to place the central pier on the upper bulwark of the mill and lock holm and to integrate both the lateral piers just into the straight line of the embankment (NHStA 13b Hameln 3k [1833]).

As the deck of the Hamelin bridge, its crossbeams as well as its planked surface entirely should be of timber, the whole structure would be specifically lighter than its English counterpart. Therefore the chains as well as the pairs of their cast iron bearing chairs, each of them to be mounted on one of the piers, also were to be more slightly dimensioned.

Considering their stitch Wendelstadt had studied besides the Hammersmith bridge also those of Paris, Bamberg, and the Menai Strait. Whereas the weight of the chains at Menai made 1300 and at Hammersmith 1050 tons, at Hamelin, however, it would not exceed 378 tons. Here also the chain stress was adjusted of merely a quarter of that to be met at Menai or Hammersmith. The safety factor, on the other hand, was equalized to that of the Menai bridge, in both cases raising by 25% above that of the Hammersmith bridge (NHStA Hann 109, 1029 [1836], 139). For the stitch of the Hamelin bridge itself Wendelstadt in a way was compromising between Navier on one and Telford or Clark on the other side. He took a relation of 1 : 12 for the stitch and chord length of the catenary, whereas that was about 1 : 9 in Paris, 1 : 13 at Menai, or even 1 : 15.5 in London (NHStA Hann 109, 1029 [1836], 127). A crucial point to be minded by Wendelstadt was that the chains were to cover all three piers without interruption between their anchorings on both sides of the bridge. As it also would have openings of different span, Wendelstadt paid special attention to rollers being more resistant and softer running in their bearing chairs on top of particularly the central pier than those at Menai or Hammersmith. To fix the hangers at the eyes of the chain bars he preferred screws instead of bolts like for instance Clark did (NHStA Hann 109, 1029 [1836], 152).

Beyond finding the solutions for structural adaptations Wendelstadt, however, still remained dependent of the capabilities of the state ironworks at Uslar. To clear the imponderables he had to make templates for each of the various kinds of forgings requested in particular for the chains. As it even though still remained uncertain, if each of all these components would achieve the same homogeneity, Wendelstadt first had to test about forty proofs on the

Figure 3
George Wendelstadt, view of a chain roller bearing chair and the chain position, a) in the central pier, b) in a bank pier; right part of a draft presenting the cross and longitudinal sections of the Hamelin suspension bridge piers, autumn 1833 (NHStA 13b/Hameln 4pg).
tensile testing machine at Carl Anton Henschel’s engineering workshop in Cassel (LBA 1594. 4 [1836], 7v and 21v) before it could be decided, if each chain was to comprise «8 and 9, or 9 and 10 lat bars» as Prott had noted in a letter to Wendelstadt (NHStA Hann 109.1046 [1836]).

Regarding the bearing chairs Wendelstadt had oriented on the elasticity modulus according to Thomas Tredgold, regarding the flat bars for the chains on that according to Telford (LBA 1594. 4, 22r and 23v). For the forgers at Uslar ironworks, the Sollingerhutte, it was, however, hard to meet these measures because every component there had to be prefabricated on a water-powered belly or tail helve. The material was wrought iron refined by traditional Harz methods on from an alloy of charcoal pig iron originating from two different kinds of ores. Refining was made in two steps, first forging crude bars which then were to be bundled and welded together. Here the main problem was to prevent welding splits.

In total both refining forges of the Sollingerhutte had to supply 2204 flat bars of seven different shapes and sizes altogether summing up to 1235 tons of wrought iron. The eyes of the flat bars were to be drilled out. If the bars should be brought into a curved shape this had to be done by forging but not simply bending them and if the tolerance of about 1.2mm would have been missed the respective part had to be touched up by filing it (LBA 1594, 4, 11v). To protect the iron parts against corrosion they were covered with charcoal tar. Besides the flat bars 250 hanger rods, about 200 bolts of three different types, and various other wrought iron components had to be supplied to the construction site where the last parts would arrive only in December 1838, mainly on barges. Just the prefabrication of the chains was to take the Sollingerhutte 21 weeks (LBA 1594, 4, 88r and 162v).

Quite a Practical Success but Rather Minor Perception

After the chains were mounted until March 1839, the Hamelin chain bridge finally could be opened to traffic in late August that year (NHStA Hann 109.1047). A first sweeping repair would be necessary not before 1851, but then only to concern the timber components of the deck, in particular the cross beams. George Luttich, who after having finished his studies in technology, chemistry, and construction engineering at the Superior School of Industry at Hanover already had worked as Wendelstadt’s resident engineer, suggested that cross beams of riveted wrought iron plate now should replace those of timber. The surface of the deck, however, as well as the longitudinally strutting parapet would be renewed in timber again (NHStA Hann 109.1029 [1851]).

The Hamelin chain bridge remained on its site until 1895 when it was to be dismantled, because the deck and its passage through both triumphal arch piers had become too narrow related to the meanwhile increasing traffic. Its center pier on the holm between both arms of the river, also stood too close to the directly neighbouring flourmill. This mill had been enlarged and needed more space at its loading platform as well as a more convenient ramp to the bridge. After a new cable-stayed steel bridge was opened to traffic, Wendelstadt’s chain bridge was transferred to Hessisch Oldendorf, a small country town about 20 km downstream where it remained until it was blown up at the end of World War II.

With the completion of the chain bridge in 1839, Prott, as its initiator, had been appointed an honorary citizen of Hamelin, and the bridge itself shortly came to be seen as the «largest and finest bridge in Germany» (Deurer et al. 1841, I 11). Although no special publication on it appears to have been published, the bridge soon became widely known outside Hanoverian circles. Only weeks after the Hamelin bridge was opened to traffic, Wendelstadt was invited to deliver a design, together with a cost estimate, for a chain bridge across the river Neckar by the city council of Mannheim in Baden.

The debate which subsequently arose at Mannheim and lasted about two years was in many respects similar to the earlier debate within the Hanoverian bureaucracy. In 1824 William von Traiteur (1788–1859), who then was working as an engineer and «innovator of Russian architecture» in Saint Petersburg (Fedorov 2000), where he made the design for a couple of chain bridges across the canals, had already proposed a chain bridge based on Telford’s model at Menai Strait. His suggestion was rejected as it was, in 1835, the project for a stone arched bridge (Deurer et al. 1841, 5). As a result of the debate, around 1840 a final decision had to be made between
the offer of a French company to erect a cable suspension bridge similar to those constructed earlier in France and Switzerland, in particular like the one by Chaley across the river Saane at Fribourg, and the suggestion for a chain bridge by Wendelstadt whom at the end the majority of the city council decided to appoint. He became head of a team with Luttich again as resident engineer, and the Hanoverian railway engineer Adolph Funk (1819–89), who just had returned from England where he had met the Stevensons, Isambard Kingdom Brunel, and others, and who afterwards would become head of the Hanoverian corps of railway engineers (Luttich 1858; Scholl 1978, 95, 107, 186, and 200). Wendelstadt in 1834 was to change his position as a military engineer when the General Board of Roads became a civil body and in would retire as road construction councilor at Stade in 1856. Since Hanover was going to build her railway net, road construction became of secondary importance. Mayor bridges, too, solely would be to design and to construct as railway bridges. In most cases, however, these bridges either were not as spectacular as it was the Hamelin chain bridge during the 1840s, or they were, in particular after 1866, built on the base of standard design. Their number raised and it became usual that their construction was executed by specialized firms like Louis Eilers established in 1871 at Hanover. As the Hanoverian State Railways were taken over by Prussian authorities in 1866, when the kingdom was annexed as a province, the more prominent bridges like that on the line between Luneburg and Schwerin crossing the river Elbe near Domitz were to be designed by the Prussian engineer John William Schwedler (1823–94) or his collaborators. All this made that Wendelstadt and his work very soon was overshadowed and at the end going to be neglected. On the other hand, however, meanwhile considerable changes also were to be stated. At least since the mid 19th century the heyday for wrought iron chain bridges everywhere was over and only in some really prominent cases bridge building would occupy an entire bureaucracy or touch a broader public by mainly its aesthetics. Finally in this regard it should not be neglected that the communities of engineering officers, architects, and noble officials inspired by the ideas of late enlightenment, characterizing the period around 1800, by the alternation of the generations was going to fall apart around 1850 at the latest.

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