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Eighteenth-Century English Sources for a History of Swiss Wooden Bridges

by PIERRE DE LA RUFFINIÈRE DU PREY

The extent of Swiss artistic influence upon eighteenth-century England is usually confined to the impression made by Alpine scenery¹. The majestic impact exerted by the mountains upon generations of British artists and travellers has all but obscured their contemporary interest in the wooden bridges of Switzerland. This article seeks to rectify the imbalance by recounting the story of a neglected chapter in Anglo-Swiss cultural relations.

The individual who can be held personally responsible for first making Swiss bridges known in the British Isles was the brilliant if eccentric Frederick Hervey, the Anglican Bishop of Derry in Northern Ireland. Born in 1730, Hervey was the younger son of an aristocratic Suffolk family who chose the socially acceptable career of a churchman. His connections in high places insured him rapid promotion. He became a chaplain to King George III in 1763, Bishop of Cloyne in Ireland in 1769, and finally Bishop of Derry the year after². Later he succeeded to the title of 4th Earl of Bristol, by which name he is immortalized in the string of Hotel Bristols across Europe commemorating his visits. But Frederick Hervey was much more than a rich and inveterate tourist. He listed among his many accomplishments those of linguist, art collector, bibliophile, architectural connoisseur, amateur geologist, and would-be world statesman. Especially in matters of art and architecture he demonstrated time and again an amazingly advanced, almost prophetic taste. His interest in the hanging work wooden bridges of Switzerland is a case in point. He realized their revolutionary character only a few years after the construction of the finest examples of them.

The three chief traits of the Bishop's character were: boundless energy; irrepressible curiosity; and *wanderlust*. Beginning in 1765 he gratified all three by undertaking regular trips abroad lasting several years at a stretch. Characteristically, he died in 1803 in Italy, far from his Irish diocese. Right from the start Switzerland attracted him. On his first Grand Tour, in 1765, he left his children for schooling in Geneva, and visited Voltaire at Ferney³. On his way back to Geneva in late October of 1766, he stopped at Schaffhausen and presumably admired the wooden bridge there, completed only eight years earlier⁴. This can be surmised from his letter of April, 1768, to Jean-Baptiste Bourguignon d'Anville, the geographer he had met the previous winter on his way through Paris. With typical impetuosity and outspokenness the Bishop

wrote: «Si par hasard vous connoissez quelqu'un qui tient le Plan et l'élévation du Grand Pont à Schaffhausen en Suisse, ayez la bonté de m'en faire tenir une copie, le plutôt qu'il vous serait possible... ces pauvres misérables Suisses ne peuvent pas m'en fournir un plan⁵.»

Interest in the bridges of Switzerland was not new. As early as 1615 the Italian architect, Vincenzo Scamozzi, had written about his admiration of the Swiss ingenuity in bridge construction⁶. In the meanwhile, however, the prototypes of Scamozzi's day had found their mature expression in the mid-eighteenth-century hanging work bridges of the brothers Hans Ulrich and Johann Grubenmann⁷. The unique contribution of the Grubenmanns requires a few words of technical explanation.

In essence, the Grubenmanns applied to all-wood construction the age-old principle of suspension—hence the term “hanging work” to describe the floating effect they achieved in their bridges. Their exceptionally long, externally unsupported spans, resulted from a variety of devices that reinforced one another. Of course, strongly built piers were essential to buttress the structure from each bank of the body of water to be crossed. From pier to pier stretched pairs of continuous beams, either straight, curved in an arch, or a combination of the two. These great lengths were made possible by joining together intricately notched smaller pieces of wood to form the whole. Wooden wedges, metal screws and tie bars, pressed the individual blocks tightly together for extra tensile strength. The laminated beams were kept from swaying laterally by upright members, called hang posts, and from swaying up or down by braces arranged in the manner of trusses. These several systems, physically counterbalancing the stresses generated by the weight of traffic, and of the wood itself, accounted for the relative firmness of the bridges. The beams holding up the roof and supporting the floor both from above and below, could not sag because of the truss-work. In addition, to prevent lateral sway, the roof and floor had cross bracing. Despite all precautions, the natural give-and-take of wood created a built-in propensity for vibration, but this did not indicate weakness as some critics thought. Thus the Grubenmann structures stood as supreme monuments to the ancient art of joinery rather than as true suspension bridges. The brothers formed the culmination of a long tradition of local craftsmanship among Swiss carpenter bridge builders like themselves. Still, the new combination of such advantages as long

spans, strength, level road bed, lightness, cheapness, and speed of construction could not go without international recognition for long.

The Bishop of Derry was not necessarily the first to grasp the virtues of the hanging work bridges. Already in 1771, Jacques-François Blondel, Professor at the Académie royale d'architecture, displayed before his colleagues in Paris drawings of the Schaffhausen bridge and the slightly later one at Wettingen, also by the Grubenmanns⁸. A model of the Schaffhausen bridge entered the collection of the great French civil engineering school, the Ecole des ponts et chaussées⁹. In contrast to the theoretical concerns of the Frenchmen, the Bishop had more pragmatic goals in mind. He wrote d'Anville concerning the Schaffhausen bridge: «Je suis sur le point d'en faire construire un semblable pour notre ville de Derry¹⁰.» The Bishop saw the practical applicability of the hanging work principle to his adopted home of Ireland.

Almost immediately after his transferral to the prosperous bishopric of Derry, the new Bishop, in writing to d'Anville, had expressed the intention of using his revenues in an humanitarian bridge proposal. Hitherto the Foyle River, separating his capital of Londonderry from the southern part of his diocese, had only a slow ferry service. The Bishop initiated the bridge scheme with a personal gift of £1,000, besides investing an infinite amount of time. With customary lack of regard for national boundaries he mobilized forces from the frontiers of knowledge to aid him. One of his earliest responses came from the Irish architect, Davis Duckart, who wrote from Dublin about various plans he had in hand. He estimated that a stone bridge would cost less than £32,000, but added "I am also drawing the plan of a wooden bridge...¹¹" At around the same time, the Bishop appealed abroad for advice. He explained to his correspondent, Sir William Hamilton: "When I undertook the measure of building a bridge at Derry, of an enormous extent, I publish'd my scheme in the different Gazettes of Switzerland & Germany, the two countries where such fabricks are most in use, & it is incredible what a number of excellent plans & contrivances were sent me...¹²" The Bishop, as was his habit, baited his request for information with vague promises of future employment. He thus gained a rich haul of free advice from an international assortment of prospective designers.

The information the Bishop obtained for his proposed bridge over the Foyle River proved insufficient. Anyway, once having launched a project, he tended to devour relevant material about it almost insatiably. So, in 1770–1772, a considerable portion of his second Grand Tour was consecrated to collecting data relating to his new passion for bridges. In this great task he had the assistance of his two companions: his eldest son, John Augustus Hervey (1757–1796), and an Irish architect/draftsman, Michael Shanahan. From the surviving evi-

dence, it appears that Shanahan was a native of Cork, and had entered the Bishop's service when the latter came to the see of Cloyne¹³. For many years thereafter, Shanahan remained the Bishop's trusted and self-opinionated factotum. The journey of the three travellers across Europe can only be pieced together from scattered sources, but it is known that they passed through the Auvergne in France before reaching Switzerland in the summer of 1770¹⁴. The Bishop had a letter of introduction to Count Peter de Salis, whose family castle was strategically located in the Grisons. Count Peter knew better than anyone of the Bishop's recent activities. On 25 October, 1770, he stated that the Anglo-Irish party had made a collection of measured drawings of bridges, concentrating upon Swiss wooden ones¹⁵.

From the Castle of Bondo the Bishop and his two companions proceeded into Italy, staying the autumn months in the area of Vicenza and Padua. It was there that the idea occurred to them of publishing their findings on bridges with the assistance of a Vicentine engraver, Cristoforo dall'Acqua (1734–1787). Out of this multinational collaboration grew an extraordinary series of thirty plates, of which one unique exemplar seems to have survived¹⁶. Only the fourteenth plate provides any chronological point of reference. It is signed by Michael Shanahan and dated Vicenza, 1770. In all, Shanahan took credit for twenty-eight of the original drawings and the others were supplied by John Augustus Hervey, including that of Liuch, modern-day Leuk in the canton of Valais (fig. 1). Shanahan taught drawing to young Hervey, so that the output of master and pupil are in every way indistinguishable. The engraving of the "Liuch" bridge is typical of the rest in the series by being delineated from several points of view. Usually the most prominent of these shows the side elevation, stripped of its wooden boards so as to reveal the beams and trusswork. Other views normally consist of a cross section or two, plans of the cross bracing of the floor, and sometimes a detail of the joinery. All the bridges are measured in English feet, except for the last two where the scale changes to "Ellen." Some are Italian bridges, some are French, but the vast majority are Swiss wooden ones¹⁷. By any standards, the material compiled by Shanahan and Hervey, and engraved by dall'Acqua, constitutes a remarkably extensive survey of the state of wooden bridge building in Switzerland around the year 1770.

As comprehensive a survey as that just described cannot have been carried out within a few brief months in the summer and early autumn of 1770. Shanahan's movements remain shadowy, despite references to him that crop up in contemporary correspondence¹⁸. Following his own whims, the Irishman crisscrossed the Alps, collecting more drawings and passing them along to dall'Acqua in Vicenza. Only in one instance is the chronology of such an excursion secure. On 3 October, 1771, John Augustus

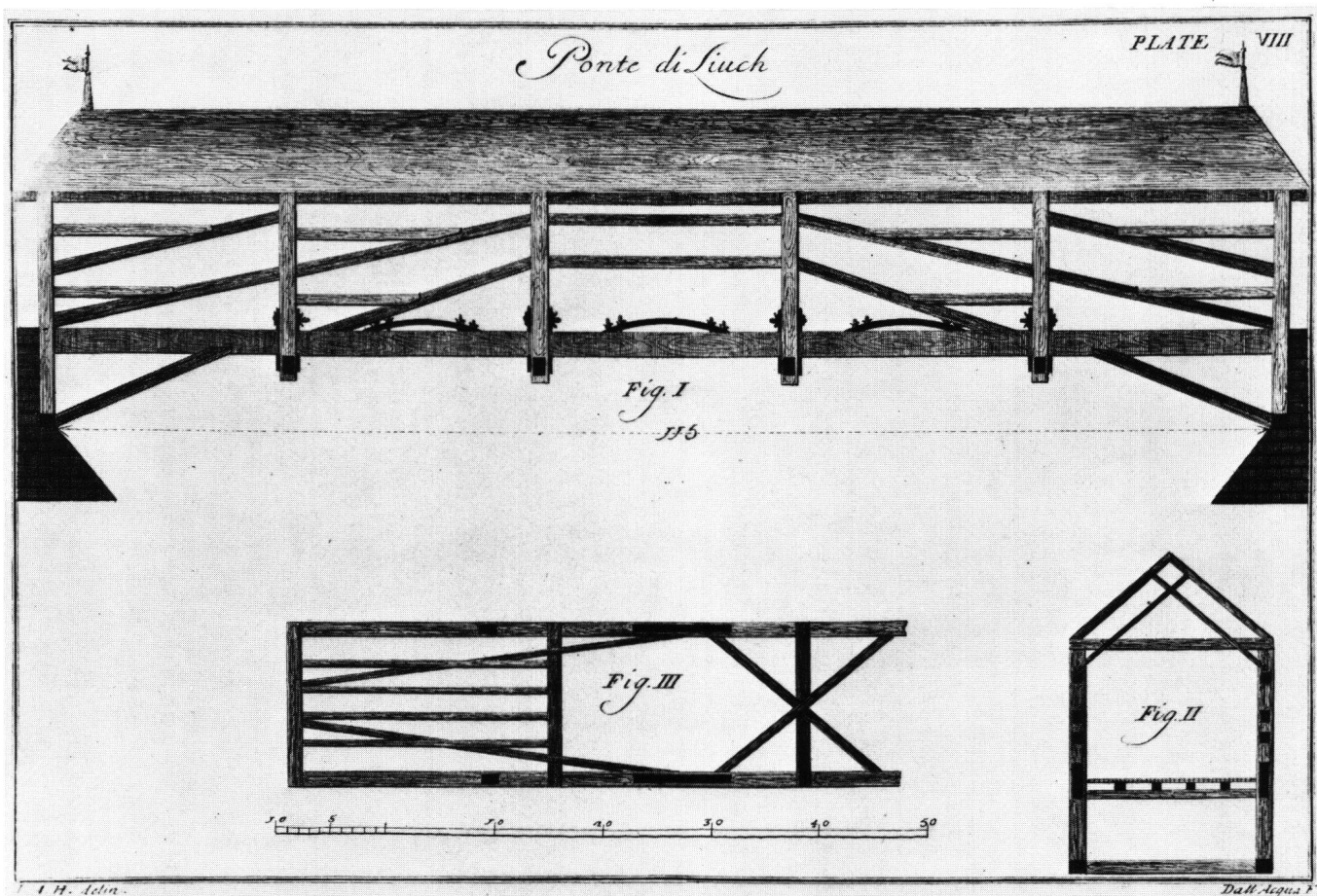


Fig. 1 Bridge at Leuk; print after John Augustus Hervey showing plan, elevation and section

Hervey wrote to Count Peter de Salis: "Pray Sir if Mr. Shanahan comes to you send him on with a guide the shortest way to Coire where Papa desires he would examine the plans of the bridges until he joins him." But a subsequent letter of the thirtieth of the month informed de Salis that Shanahan was on his way to Bondo from Italy to collect 100 Louis deposited there, and would proceed to Coire¹⁹.

Chur, or Coire, stands near Reichenau where two wooden bridges once crossed the confluence of the Vorderrhein and Hinterrhein rivers. In November, 1771, Shanahan studied this pair of structures. Eventually they were engraved as plates xxi and xxii in the series. They must be among the last drawings to have been executed, because in April 1772 the Bishop and his party left Italy²⁰ (figs. 2, 3). The engravings conform to the usual pattern, except that the one showing the longer of the two bridges (fig. 2) has the addition of naturalistic elements such as rocks or shrubs. In the case of the two illustrations reproduced here, their effect is heightened (cf. fig. 1) because of the use of watercolour. Both are in fact copies of ca. 1792 made from the engravings by the pupils of the architect

John Soane (1753–1837). More will be heard of Soane shortly. For the time being, the special interest of these watercolour copies, two of a number made, rests in that they provide a loose *terminus ante quem* for the series of engravings, the exact date of whose publication remains unknown²¹.

Later correspondence from the Bishop of Derry indicates the frustrations he encountered trying to extract the promised copper plates from dall'Acqua. Early in 1776 he complained: "I thought that Dall'acqua, from whom & of whom I have not heard for an age, was confin'd solely to our Architecture: poor Shanahan is much distress'd for want of it, & will be publishing his labors, when people here have quite forgot we had undertaken them²²." The reading public had to wait a good deal longer. Ten years later the misplaced plates finally turned up, and were sent to Shanahan. He deferred publication still further. In fact it is not clear that they ever saw the light of day in the full sense. This explains the extreme rarity of the set of engravings which never made the sort of impact it might have done if generally available.

From the beginning, the Bishop's publication plan for

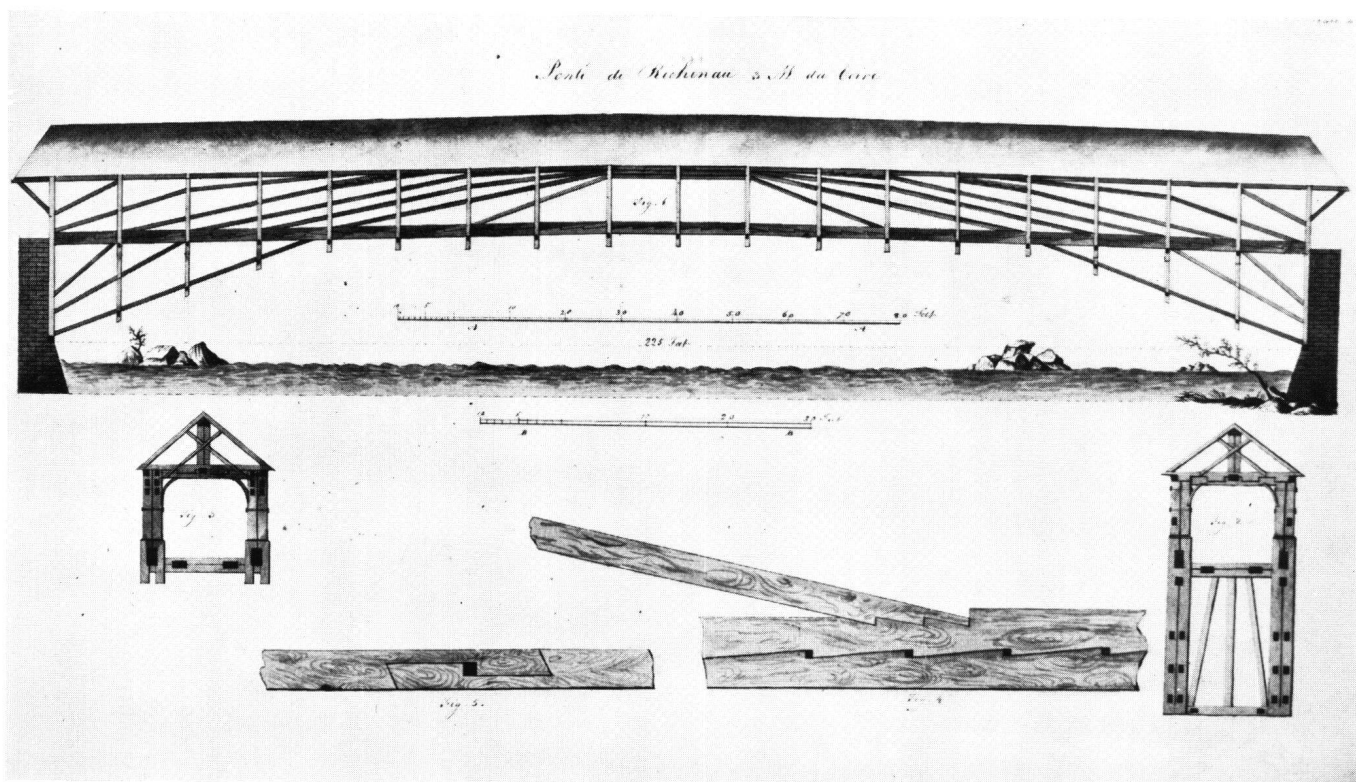


Fig. 2 Long bridge at Reichenau; watercolour copy of a print after Michael Shanahan showing elevation, sections and details

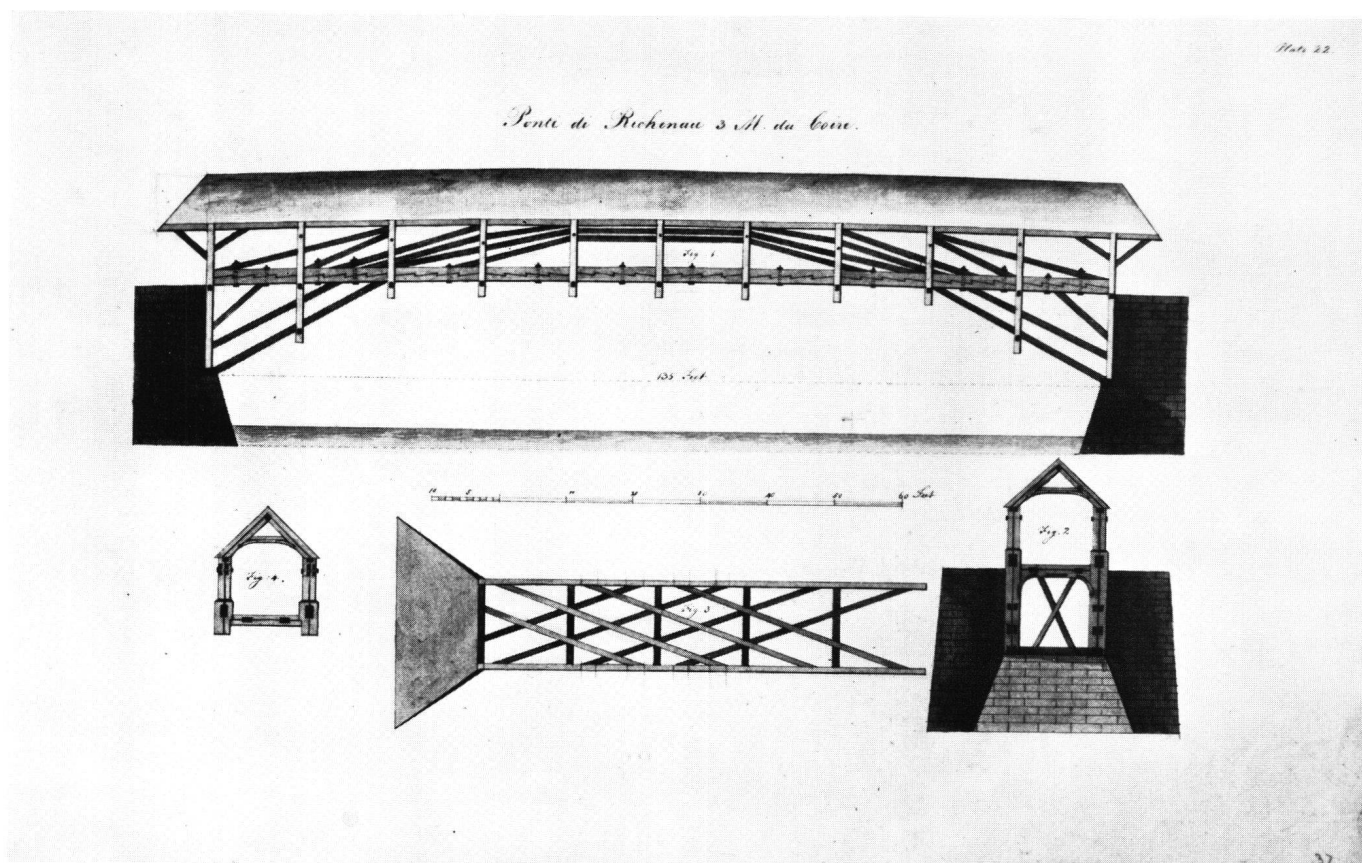


Fig. 3 Short bridge at Reichenau; watercolour copy of a print after Michael Shanahan showing plan, elevation and sections

the Swiss wooden bridges went hand in hand with his scheme for building one on similar lines across the Foyle River at Londonderry. In the important letter of 25 October, 1770, written by Peter de Salis, the Count was already aware of the Bishop's activities on this second front. The Bishop, he said, had particularly admired the bridges of the Grubenmanns, and had asked their foreman to build a wooden model for the proposed Foyle River bridge. A prize of 100 Louis would be awarded upon the approval of the design by a committee formed of Shanahan and an unnamed Zürich architect²³. Presumably this is the same 100 Louis sum that Shanahan picked up from de Salis a year later to pay the winner. The model was certainly in existence in 1772 when the Bishop passed through Paris on his return to the British Isles. The architect Jean-Baptiste Rondelet recalled seeing it then. He further revealed the maker to have been one "Klaus." Rondelet's recollection of a structure meant to span 1,000 feet helps to single out an unnumbered engraving added to Shanahan's and dall'Acqua's series as representing this model²⁴ (fig. 4). The audacity of the proposed bridge is breathtaking. Two 500 foot arches, composed of wooden pieces joined together, meet at a central pier. Moreover, a gently curving single arch covers the entire distance from shore to shore. For a structure of comparable size one has to turn ahead to 1800 and Thomas Telford's revolutionary proposal of that year to rebuild London Bridge with an uninterrupted 600 foot span of iron²⁵.

The inscription on dall'Acqua's engraving which refers to "The First Model of the Bridge of Derry" implies other models and, in fact, one more at least is known to have been prepared at Padua, presumably during the Bishop's illness there in the winter of 1771–1772. On 25 March, 1775, the Bishop, writing to his friend, John Strange, asked if Strange would "enquire at Padua for the Abbate who made the Model of my bridge". The Bishop wanted to know whether this unnamed individual would make extra copies²⁶. One or the other of these models may have been that which survived in Ireland until very recently, when it was destroyed before proper photographs could be taken²⁷. Similar fates befell many of the Bishop's high-minded ventures, while others were abandoned when they ceased to intrigue him.

Despite difficulty in convincing the authorities of the viability of a wooden bridge over the Foyle River²⁸, the Bishop did not lose interest in this particular project. On the contrary, during his third Grand Tour, lasting from the spring of 1777 until the autumn of 1779, he persisted with the matter. In the process of accumulating still more information, he enlisted the services of a young English architect studying in Rome. John Soane, later to become famous, was at the time a relatively obscure student who had been sent to Italy in 1778 on a scholarship from the Royal Academy of Arts, London. Sometime in the autumn of that year the Bishop adopted Soane as his special protégé. Thereafter the two men travelled constantly in one another's company until the Bishop departed from Rome in April 1779. Later that year, on 22 December, the Bishop quite suddenly inherited the title and vast estates of the Earldom of Bristol, and he appointed Soane architect of all his works²⁹.

Neither Soane's autobiographical *Memoirs*, nor his other writings, ever mention involvement with the bridge building schemes of the Bishop of Derry. But in Soane's capacity as Professor of Architecture at the Royal Academy from 1809–1836, he praised the Swiss wooden bridges for their wide spans and level road beds³⁰. He thus made known his personal acquaintance with these structures. The full extent of his knowledge is borne out by his manuscript travel notebooks, and the measured drawings made on his homeward journey in 1780, undertaken at the Bishop's urgent request. Soane purposely routed his itinerary through Switzerland in such a way as to permit sketching stopovers at the three principal Grubenmann bridges of Reichenau, Wettingen and Schaffhausen.

Soane's first contact with Switzerland occurred on 26 May, 1780, when he crossed the Splügen Pass, and noted on his descent "the two famous Wood bridges³¹" at Reichenau. From his point of view these bridges were "famous" simply because of his prior acquaintance with the activities of Shanahan and the Bishop of Derry. Soane's protector, the Bishop, would have recounted to Soane the record made of the bridges in 1770–1771. The architect may have been motivated to show the Bishop his superiority by trying to outdo Shanahan's efforts. Certainly, after a night spent at Chur, Soane retraced his steps the

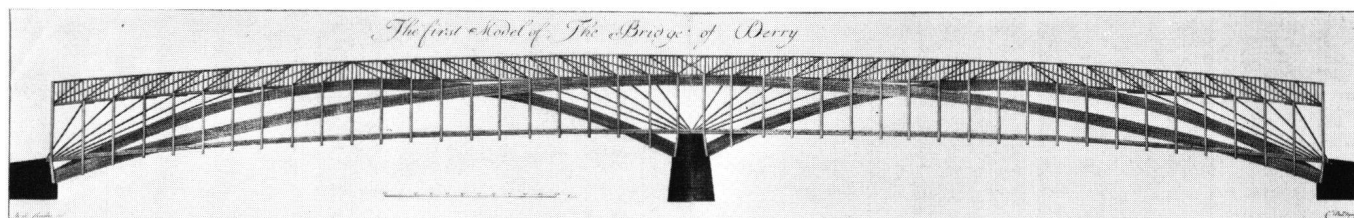


Fig. 4 Proposed bridge over the Foyle River, Londonderry; print after Michael Shanahan showing elevation

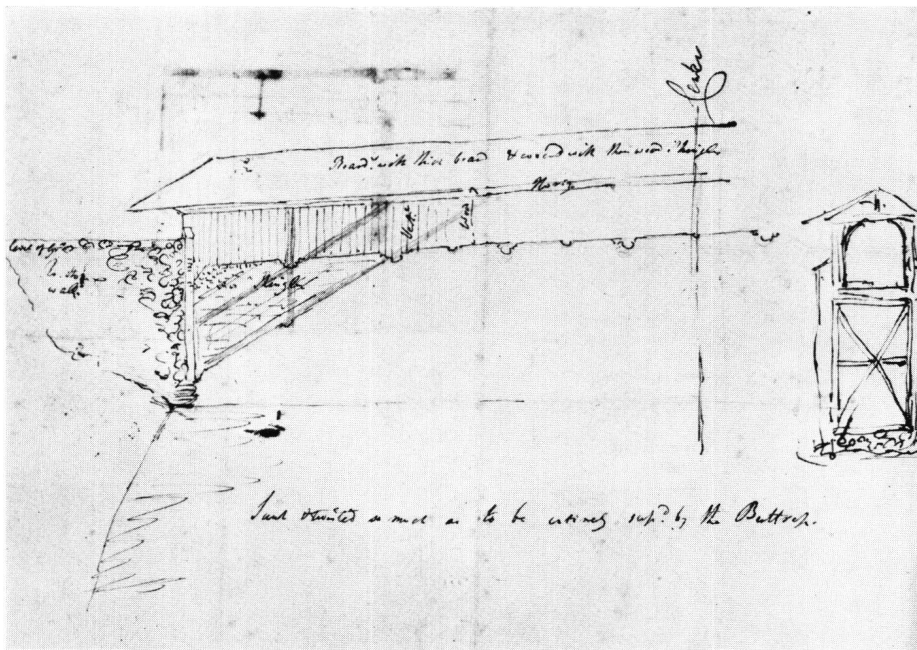


Fig. 5 John Soane: short bridge at Reichenau; drawing showing elevation and section

next morning, 27 May, to Reichenau where he spent the entire day measuring the smaller of the two wooden bridges. He produced a side elevation (fig. 5), various sections and a stripped-down study of the timbering (fig. 6). Compare these to the copy of Shanahan's survey (fig. 3). Soane's greater attention to minutely measured structural members is very noticeable, particularly in some of the elaborately studied sectional drawings (fig. 6, bottom). Soane, unlike Shanahan, brought to his subject an academic architectural training with a special emphasis on bridge construction³². Above all, Soane contributed to the survey of Reichenau his own opinions and criticisms, jotted down on the sheet of paper alongside the sketches. He characterized the construction as "exceedingly rude," "Exceedingly decay'd," and "twisted exceed[ing]ly in many diff[erent] directions" (fig. 5). Soane lacked adjectives but he made up for that with up-to-the-minute technical observations totally absent from Shanahan's engravings. Thus Soane's drawings form an important contribution to our knowledge of the condition in which certain Swiss hanging work bridges appeared in 1780.

On 28 May Soane resumed his journey in the direction of the Walensee. From the windows of the post coach he observed near Chur "a bridge ab.[out] 80 feet cover'd & of the same construction as that I measured." Further on he noted another "wooden Bridge with Piles, 10 or 12 Arches" wide³³. Later the same day he arrived at Weesen on the western shore of the Walensee. The following dawn he was ferried along the river connecting to the Zürichsee and wrote of passing under "another Br.[idge] abt 100 feet, the Arch rises very little & is very strong and in good

repair³⁴." At this point Soane broke off keeping his notebook, and resumed the day-by-day account of his travels in the upper right hand corner of a sheet of paper covered with measured drawings of other bridges (fig. 7). He mentioned the mile-long pile bridge still crossing the lake at Rapperswil. He described it as "much out of repair." The night of the twenty-ninth he spent at the "Epée" in Zürich, where he admired the covered bridge "with stone piers & wooden superstructure." The next morning he departed for the wooden bridge at Wettingen, which was to be the highpoint of his entire Swiss itinerary.

The bridge over the Limmat River at Wettingen is generally considered the Grubenmanns' masterpiece. Built after the experiments at Schaffhausen and Reichenau, it profited from their experience³⁵. By Soane's standards of reticence, his commentary on the bridge was nothing short of ecstatic: "the Bridge of W. beyond each Idea I had form'd of it . . . stay'd some hours at W. to measure the Bridge." Under the date "May 30th, 1780" on the verso of the same piece of paper (fig. 8, bottom half), Soane drew a half elevation of the side of the Wettingen bridge in stripped-down form. Meticulous measurements are augmented by a welter of annotations scribbled all over the drawing and in the margin below. The most significant remark reads: "Very well put together & no want of Iron." This contrasts with the adverse criticism he had made earlier of Reichenau: "very great want of Iron" (fig. 6). From these two observations by Soane his main criterion can be deduced. It seems that he attributed stability in a hanging work bridge to the quantity of iron screws and tie bars employed. From his point

of view, then, the Grubenmanns' latest structure at Wettingen was a distinct improvement over the earlier one at Reichenau. Regardless of the logic of Soane's prejudice in favour of more iron, his attitude is an interesting one, coming as it does on the threshold of the Industrial Revolution³⁵.

The evening after leaving Wettingen Soane reached the most famous of the Grubenmann bridges, that across the Rhine at Schaffhausen. He devoted to it his largest series of drawings. These included a full side elevation (fig. 8, upper right), a stripped-down view of the shorter of the two spans, and a ground plan faintly drawn beside it in pencil (fig. 8, upper left). Back on the recto Soane added a stripped-down elevation of the longer span drawn in two halves, each reading from left to right (fig. 7, bottom half). He included in the top left corner a detailed study of the joint between the floor of the bridge and the hang posts. Elsewhere he redrew the pencil ground plan in ink and did a section of the props beneath the floor boards at

one end of the bridge. He sketched a full cross section on the short axis and along with it a detail of the curbing block that prevented cart wheels from damaging the side walls³⁷.

Despite ample evidence of the infinite pains to which Soane went at Schaffhausen, it clearly came as an anticlimax after Wettingen. At Wettingen the Grubenmanns had successfully employed the system of a resilient, spring-like arch of wood. Soane used the word "Airy" to describe the light effect (fig. 8). In contrast, at Schaffhausen, the Grubenmann system utilized fairly rigid main beams. Soane noted of the bridge that it "Shakes very much" (fig. 7), thus expressing the typical malaise felt by those who had to cross from shore to shore. But most authorities concur in dismissing the shakiness of Schaffhausen as in any way reflecting adversely upon the strength of the bridge. Soane's remarks, therefore, may appear to be more well informed than in fact they are. Still, whatever its oversights, his commentary provides a detailed analysis of the poor state of preservation that became noticeable at

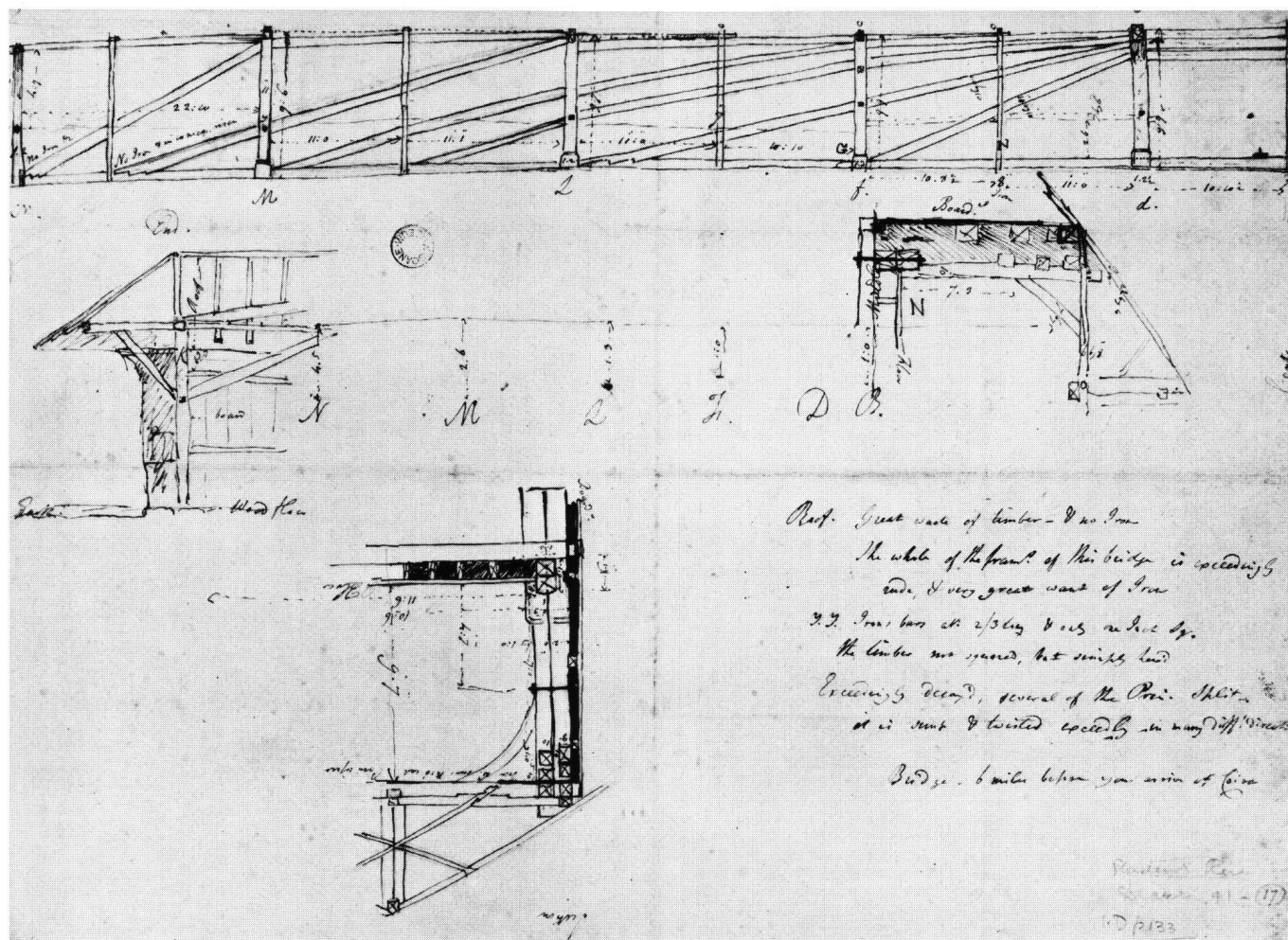


Fig. 6 John Soane: short bridge at Reichenau; drawing showing sections

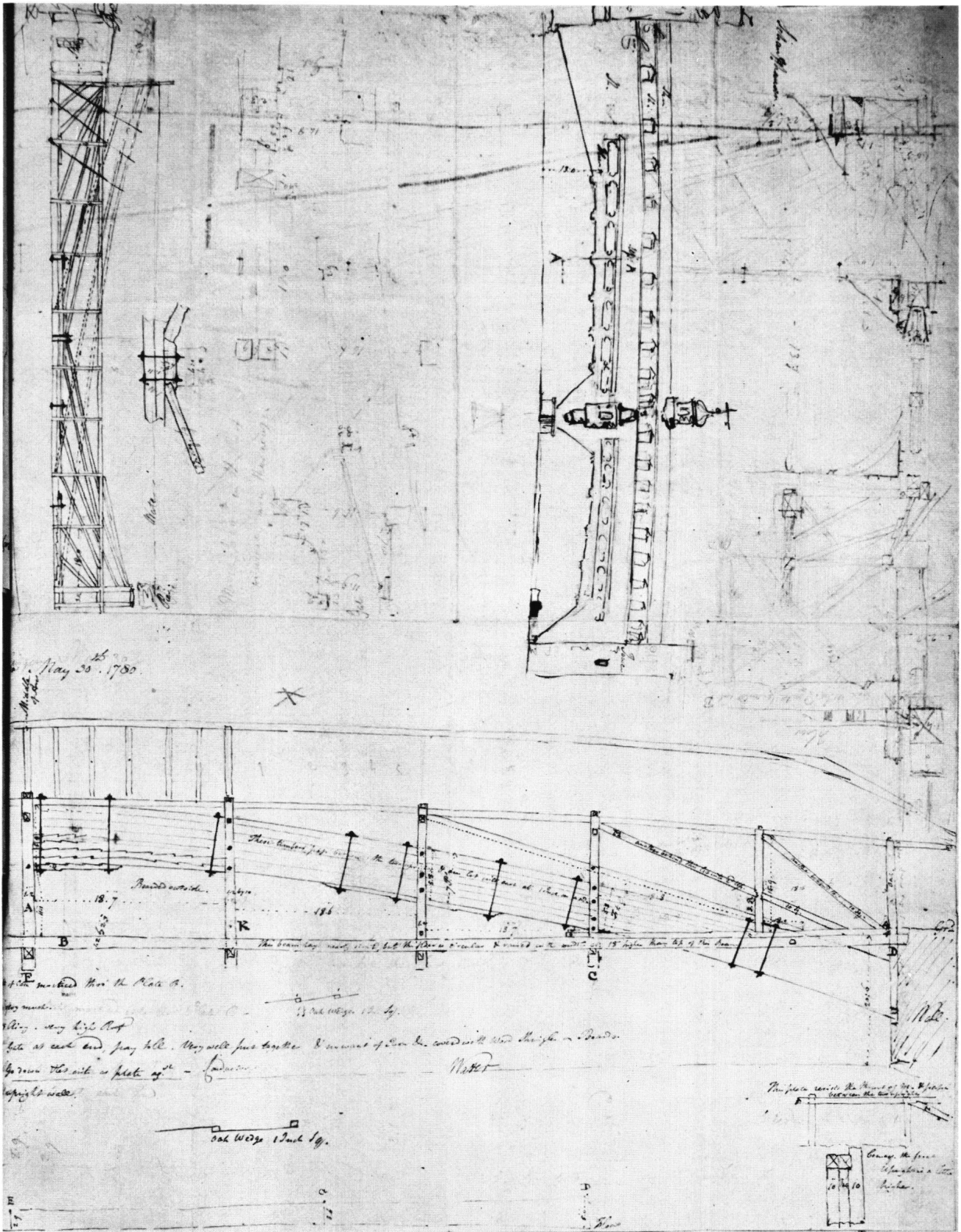


Fig. 8 John Soane: bridges of Wettingen (bottom half) and Schaffhausen (top half); drawing showing plan, elevation, sections and details

Schaffhausen in the 1780's. Until now such eye-witness evidence has been entirely unavailable. If Soane contemplated publishing his findings to rival Shanahan's, he never did so. Nor were his experiences put to concrete use in the construction of a Foyle River bridge. Upon reaching his journey's end in Northern Ireland on 27 July, 1780, Soane discovered that the Bishop's enthusiasm for him had cooled. After some weeks of trying to cater to the Bishop's changing whims Soane resigned. Construction of the Foyle River bridge actually began at last in 1786, but Soane had no part in it³⁸. In an indirect way, however, his investigations came to public notice and were not entirely lost, as had been the case with Shanahan's.

In 1798 Johann Gottfried Ebel began publication of his two volume *Schilderung der Gebirgsvölker der Schweiz*³⁹. The first volume, largely devoted to the Appenzell region, contains a well-known discussion of the Grubenmanns—natives of Teufen—and of their work. To illustrate the text Ebel introduced two fold-out-engravings showing the Schaffhausen and Wettingen bridges. Quite surprisingly, the print of Wettingen bears the signature “John Soane del” (fig. 9). Soane's uniquely complete personal library in London contains no complimentary copy of the *Schilderung*, nor does any correspondence with Ebel survive there. Ebel, in some roundabout manner, must have obtained a copy of Soane's survey and published it, apparently without the author's consent or knowledge⁴⁰. Soane, in any case, would not have been proud to acknowledge the work as his own. Compared to the sensitive drawing of the same structure by him, Medardus Thoenert's plate is singularly nasty. This mean end product marks a sad conclusion to the abortive efforts of the Anglo-Irish admirers of Swiss wooden bridges.

Before the end of the eighteenth century, however, glowing reports of the Swiss wooden bridges, from travellers, and in the popular English press, raised general

curiosity in Britain to a high pitch. The *Monthly Review* in 1798 remarked: “the boldness and beautiful simplicity, as well as the apparent simplicity and intrinsic strength of the wooden bridges constructed by Grubenmann, cannot be sufficiently admired⁴¹.” A year later the interest originally generated by men such as Shanahan, Soane, and the Bishop of Derry, culminated in one of the most unusual publications to issue from Josiah Taylor's Architectural Library in London. It was a large, hand-coloured print, dated 1 August, 1799, showing the bridge at Schaffhausen (fig. 10). The various measured architectural drawings resemble those that had appeared on an engraving in the second edition of Johann Gerhard Reinhard Andreae's *Briefe aus der Schweiz* ...⁷ One feature not present in Andreae is the vignette of the bridge in the form of a small unrolled scroll of paper. This acquatint is tightly squeezed into place. It gives the appearance of having been added at a later date. The same holds true for the right hand section of the lower inscription, for which the printer used a different type face. He added the following words: “with a descriptive Account in Letter Press.” The logical conclusion is that after the plate had been initially prepared in 1799, it was decided to increase popularity by accompanying it with some text. The sixteen-page pamphlet which eventually emerged utilizes four existing descriptions of the bridge: Andreae's mentioned above; that of William Coxe's *Travels in Switzerland*; that of Ebel's *Schilderung* ...; and that of an anonymous review of Ebel's first volume⁴². There are occasional prefatory remarks by an editor, presumably Taylor himself. The date of the pamphlet can be closely placed between 1799 and 1802, in which year an advertisement appeared for it. (As with other ventures, this did not prevent Taylor from reissuing the pamphlet later with an updated title page⁴³.) Thus, at the turn of the century, the general reading public in England could have ready access to information about a Swiss hanging work bridge.

Ironically, the timing of Taylor's publication could not have been worse. The Bishop of Derry, in a letter of 1799, announced the defeat of General Jourdan's army in Switzerland that April. Someone as well informed as the prelate could not have been unaware that the retreating French on the thirteenth of that month had set fire to and destroyed his beloved bridge at Schaffhausen⁴⁴. The preface of Taylor's pamphlet lamented “the sad fate this curious and important bridge experienced being burnt by the French.” Moreover, at the same troubled time, the Grubenmann structures at Wettingen and Reichenau were also destroyed. In one fell swoop the best examples of the brothers' work were simultaneously annihilated, just at the moment when their notoriety had reached a peak in England.

At an early stage, British civil engineering had been dominated by Swiss technology when Charles Labelye came to London from Vevey. Beginning in 1734 he

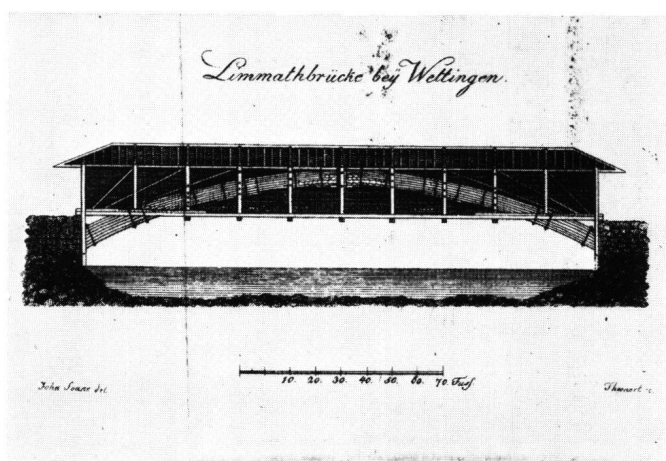


Fig. 9 Bridge at Wettingen; print after John Soane showing elevation

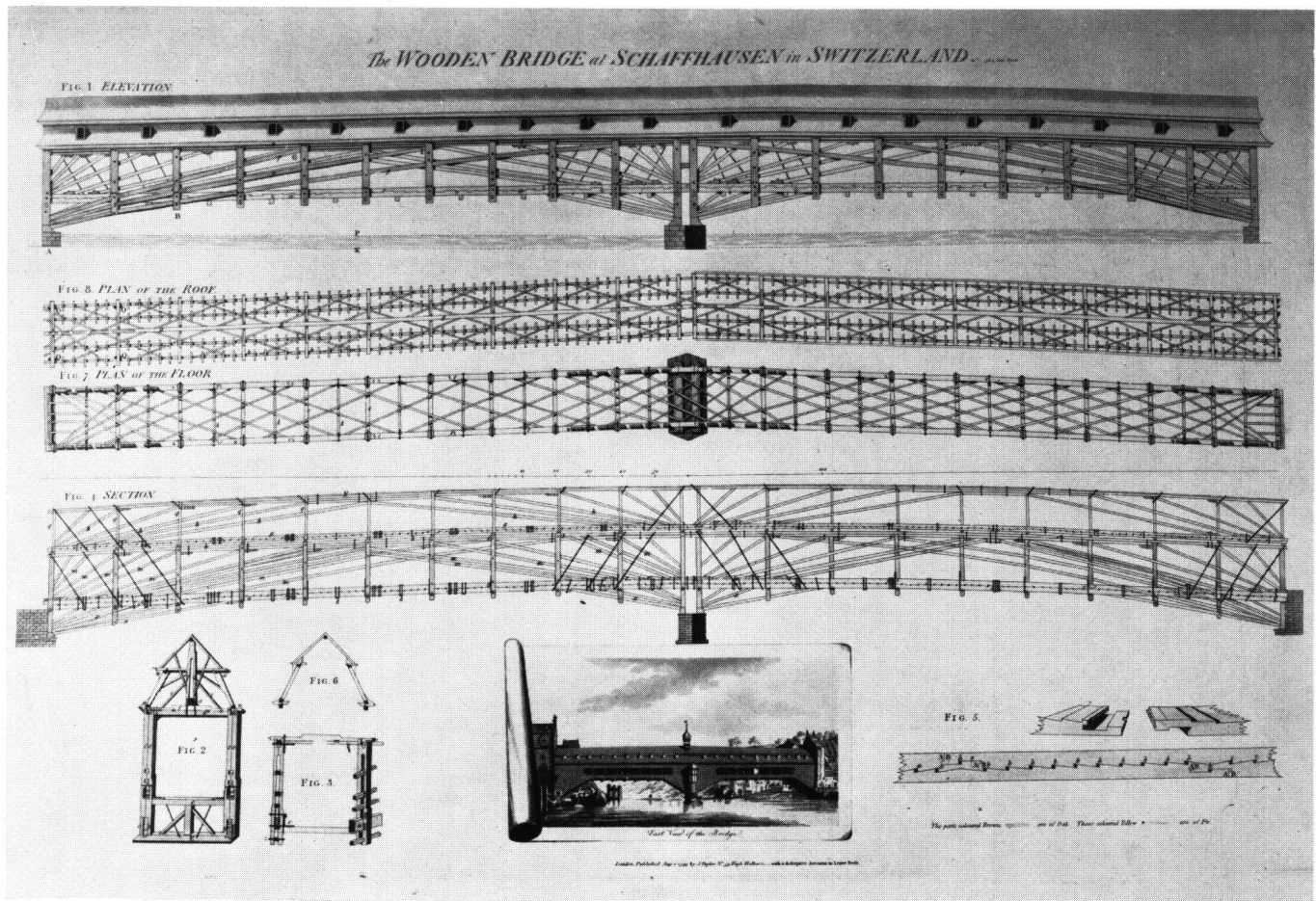


Fig. 10 Bridge at Schaffhausen; print after Josiah Taylor showing plans, elevations, sections and details

designed, and subsequently supervised the construction of, the stone bridge over the Thames at Westminster. Although the English resented what one of them called an “insolvent, ignorant, arrogating Swiss⁴⁵,” the epochmaking construction of Westminster Bridge ushered in a new era. The pioneering efforts of the Bishop of Derry, the extensive studies of Shanahan, the meticulous drawings of Soane, and the publication of Josiah Taylor’s print, all paved the way for a second wave of Swiss influence. It never came about. The loss of the hanging work bridges may have been a contributing factor. But well before that there were signs of an emerging native-born trend. In 1779 the world’s first iron bridge had been constructed at Coalbrookdale, Shropshire. Two hundred years later it still stands; the Grubenmann structures are no more. Iron shared many of the inherent advantages that wood had over stone. In addition, iron possessed durability and the possibility of mass production. The first iron bridge established a new precedent which influenced the entire development of bridge design in the next century. The Grubenmanns’ structural innovations were linked

to the woodworking craft. The nineteenth century would be welded instead to the industrial production of iron.

On several accounts the English interest in Swiss wooden bridges elucidates much more than a technological dead end. In one important sense the whole phenomenon discussed here reflects upon the late eighteenth century as a whole. In the worlds of art and science the pursuit of knowledge quickly became an international affair which knew no political borders. Farsighted men like Soane and the Bishop of Derry were willing to seek out excellence wherever it was to be found. In view of the difficulties of communication at the period, they seem amazingly aware of events occurring even in relatively remote valleys of Switzerland. The international acclaim accorded the Swiss hanging work bridges illustrates the freedom with which knowledge was available and was exchanged. Taken from another historiographical point of view, the material the Englishman assembled about Swiss wooden bridges provides a rich legacy today. These documentary sources will be invaluable when the fascinating history of the Swiss wooden bridges comes to be written.

Abbreviations

BM. British Museum Department of Manuscripts, London
 RDS. Royal Dublin Society, Dublin
 RIBA. Royal Institute of British Architects Library, London
 SM. Sir John Soane's Museum, London

- ¹ GAVIN DE BEER, *Travellers in Switzerland*, Oxford 1949, and *Early Travellers in the Alps*, New York 1967.
- ² The biographies of the Bishop are by WILLIAM SHAKESPEARE CHILDE-PEMBERTON, *The Earl Bishop*, 2 vols., London 1925, and BRIAN FOTHERGILL, *The Mitred Earl an Eighteenth-Century Eccentric*, London 1974.
- ³ GAVIN DE BEER and ANDRÉ MICHEL ROUSSEAU, *Voltaire's British Visitors*, Studies on Voltaire and the Eighteenth Century, XLIX, 1967, pp. 97–101.
- ⁴ CHILDE-PEMBERTON (see note 2), I, p. 81, quoting from SYDENHAM HERVEY, *Letter Books of John Hervey First Earl of Bristol*, Suffolk Green Books, Wells 1894.
- ⁵ CHILDE-PEMBERTON (see note 2), I, p. 95. The letter bears no year but can confidently be assigned from internal evidence to 1768. See also PETER RANKIN, *Irish Building Ventures of the Earl Bishop of Derry*, Belfast 1972, p. 11.
- ⁶ VINCENZO SCAMOZZI, *L'Idée dell'architettura*, Venice 1615, pt. ii, bk. viii, p. 350, mentions several Swiss bridges.
- ⁷ For a contemporary account of the Grubenmann brothers see JOHANN GOTTFRIED EBEL, *Schilderung der Gebirgsvölker der Schweiz*, 2 vols., Leipzig 1798–1802, I, pp. 388–391, and JOHANN GERHARD REINHARD ANDREAE, *Briefe aus der Schweiz nach Hannover geschrieben in den Jahre 1763*, Zürich 1776, pp. xi–xxii.
- ⁸ HENRY LEMONNIER, *Procès-verbaux de l'académie royale d'architecture 1671–1793*, Paris 1924, VIII, pp. 103, 107. Copies of the drawings by the architect Jetzler of Schaffhausen were eventually purchased by the Académie.
- ⁹ EBEL (see note 7), I, p. 389.
- ¹⁰ See note 5.
- ¹¹ RANKIN (see note 5), p. 11.
- ¹² ALFRED MORRISON, *The Hamilton and Nelson Papers*, 2 vols., London 1893, I, p. 55.
- ¹³ FOTHERGILL (see note 2), p. 41.
- ¹⁴ BM., Add. MS 23,729, f. 265, is a letter from Shanahan to John Strange, the British Resident in Venice. In the letter, dated "Vicenza, 14th May, 1771" Shanahan spoke of his journey to Brioude in the Auvergne. Shanahan drew the bridge there and it was later engraved (see note 17). Shanahan's original drawing may be the one preserved in the SM., Portfolio III "Bridges," Item 12.
- ¹⁵ FOTHERGILL (see note 2), p. 136, quotes from an original letter, from Count Peter de Salis to his father, preserved in the archives of Count Charles de Salis. CHILDE-PEMBERTON (see note 2), I, p. 106, mentions the letter of the Bishop of 9 October, 1770, to Count Peter de Salis, also in the de Salis archives.
- ¹⁶ The only copy I have found is RIBA., E.W. 725.95. On the spine of the volume are stamped the words "Designs of Bridges." There is no title page and hence no date of publication. I am grateful to Dr. Edward McParland for bringing my attention to this volume.
- ¹⁷ The following is a list of the contents of Shanahan's book (see note 16). The titles are quoted exactly as they appear on the engravings:

Pl. i	"Ponte di Brioude."
Pl. ii	"Ponte del Vivares 3 M. da Tournon."
Pl. iii	"Ponte del Vivares 3 M. da Tournon."
Pl. iv	"Ponte di Clet 3 M. da Grenoble."
Pl. v	"Ponte di Vizelle 9 M. da Grenoble."
Pl. vi	"Ponte 7 M. da Vizelle."
Pl. vii	"Ponte di Livet 13 M. da Vizelle."
Pl. viii	"Ponte di Liuch." (= Leuk)
Pl. viiii	"Ponte di Thun 18 M. da Bern."
Pl. x	"Ponte di Wettingen."
Pl. xi	"Ponte di Schaffhausen."
Pl. xii	"Ponte di Baden 23 M. da Schaffhausen."
Pl. xiii	"Bridge At Schindellege Itchin 4 M. of Einsideln."
Pl. xiiii	"Bridge at Einsidlen."
Pl. xv	"Ponte di Richeborg 6 M. da Glaris."
Pl. xvi	"Ponte di Zolbruh 3 M. da Glaris."
Pl. xvii	"Ponte di Naffels."
Pl. xviii	"Ponte di Enneda E. Glaris."
Pl. xviii	"Ponte di Schrvanden, 3 M. da Glaris." (= Schwanden)
Pl. xx	"Ponte di Schwanden 3 M. da Glaris."
Pl. xxi	"Ponte di Richenau 3 M. da Coire."
Pl. xxii	"Ponte di Richenau 3 M. da Coire."
Pl. xxiii	"Ponte di Motecchau in val Camonica."
Pl. xxiiii	none included but a copy of pl. xxii in its place
Pl. xxv	"Ponte di S. Michele a Vicenza."
Pl. xxvi	"Ponte de Lavis 4 M. da Trent."
no number	"Ponte del Castel Vecchio di Verona."
no number	"Ponte di Rialto."
no number	"The First Model of The Bridge of Derry."
no number	"Section of the Bridge al Meisson"
no number	"Bridge al Meisson"
- ¹⁸ Letters quoted in CHILDE-PEMBERTON (see note 2), I, pp. 110, 117.
- ¹⁹ Letters sent from Vernei in the de Salis archives, quoted by CHILDE-PEMBERTON (see note 2), I, pp. 117–118.
- ²⁰ CHILDE-PEMBERTON (see note 2), I, pp. 122–124, letter to Peter de Salis.
- ²¹ SM., Portfolio III "Bridges," Items 10, 11, 12, 36, 37 are copies of Shanahan's plates x, xi, i, xi, xii respectively (see note 17).
- ²² BM., Egerton MS. 2,001, f. 113 verso (letter of 23 January, 1776). Other letters in a similar vein are MS. 2,001, f. 60 (27 July, 1774); f. 67 (20 December, 1774); f. 69 (17 January, 1775). See RANKIN (see note 5), p. 23, who publishes an extract from one of these letters.
- ²³ FOTHERGILL (see note 2) p. 136. Fothergill transcribes the letter in the de Salis archives as referring to "Piderman of Appenzel," but this must be a mistake for the Grubenmanns of Appenzell. The Count in his letter also alludes incorrectly to the River Shannon instead of the Foyle.
- ²⁴ JEAN-BAPTISTE RONDELET, *Traité théorique et pratique de l'art de bâtir*, 8 vols., Paris 1867, III, p. 97, fn. 2. Rondelet mentioned an engraving of the bridge model done in 1773 by George-Louis Le Rouge, but I have not seen a copy of it. EBEL (see note 7) I, p. 391, gives credit for the Derry bridge model directly to Hans Ulrich Grubenmann.
- ²⁵ NIKOLAUS PEVSNER, *Pioneers of Modern Design*, Baltimore 1965, p. 126.
- ²⁶ BM., Egerton MS. 2,001, f. 80.
- ²⁷ I have conflicting information about the appearance of this model before its destruction because of woodworm. Alan R. Eager, Librarian of the RDS., kindly writes me that the model in question was of the bridge at Schaffhausen and had been presented to the RDS. in 1771 by the Bishop of Derry himself. But Dr. Maurice Craig has told me from personal

recollection that the model was a very long one, and hence it would more likely relate to the one prepared for the Foyle River bridge. Other than Mr. Eager's letter I have no further evidence of the existence of a Schaffhausen model, although such a thing was not uncommon for the Bishop to have made. CHILDE-PEMBERTON (see note 2), II, pp. 411–413, records the Bishop's attempts to procure a model of the pagoda at Chanteloup in 1789.

²⁸ *A Concise View of the Origin, Constitution and Proceedings of the Honorable Society of Governor and Assistants of London . . . commonly called the Irish Society*, London 1822, p. 126, recorded the abortive attempts of 1769 to have the wooden bridge approved by the Irish Society. Eventually (pp. 132–133), work commenced in 1786.

²⁹ For an account of Soane's relations to the Bishop of Derry see the present author's *John Soane's Architectural Education 1753–80*, New York 1977; *Soane and Hardwick in Rome: A Neo-Classical Partnership*, Architectural History, XV, 1971, pp. 51–67; and *Je N'Oublierai Jamais: John Soane and Downhill*, Bulletin of the Irish Georgian Society, XXI, 1978, pp. 17–40.

³⁰ JOHN SOANE, *Lectures on Architecture*, London 1929, p. 187.

³¹ SM., Sir John Soane's MS. notebook "Notes Italy and Italian Language," p. 299.

³² Soane won a gold medal at the Royal Academy in London for his design of 1776 for a triumphal bridge. The lectures he attended at the Academy, given by Professor Thomas Sandby, featured a long section devoted to bridge construction. (MS. copies of Sandby's lectures are in the RIBA., and the SM.)

³³ See note 31, p. 294 of Soane's notebook.

³⁴ See note 31, p. 292 of Soane's notebook.

³⁵ RONDELET gives the history and design of the Wettingen Bridge (see note 24). Rondelet extracted much of his text directly from CHRISTIAN VON MECHEL, *Plans, coupes et élévations de trois ponts de bois les plus remarquables de la Suisse*, Basle 1803 (see: L.H. WÜTHRICH, *Das Œuvre des Kupferstechers Christian von Mechel*, Basel 1959, p. 158).

³⁶ Soane never built an iron bridge, let alone a hanging work

wooden one. Yet among the stone bridges designed by him (see DOROTHY STROUD, *The Architecture of Sir John Soane*, London 1961), the one at Norwich contained an unusually high proportion of metal within it.

³⁷ The additional drawings are SM., Portfolio III "Bridges," Items 15 verso, 14 verso, 14 recto, respectively.

³⁸ CHILDE-PEMBERTON (see note 2), I, p. 97, stated that the executant of the Foyle River wooden bridge was the firm of Lemuel Cox of Boston, USA. In the later planning stages Robert Mylne and James Paine II were also involved on the design which cost £10,000 to carry out.

³⁹ See note 7. First editions of 1798–1802 are listed in bibliographies as having been printed in both Leipzig and Tübingen. Volume I appeared in 1798 and the second one four years later.

⁴⁰ The only reference I have found to Soane's engraving is in the entry on Soane in WYATT PAPWORTH, *Dictionary of Architecture*, London 1852–1892. The SM. contains the grangerized copy of this dictionary, but it gives no indications as to where Papworth found his information initially.

⁴¹ Anon. review, *Monthly Review*, XXVII n.s., 1798, p. 488.

⁴² ANDREAEE (see note 7); WILLIAM COXE, *Travels in Switzerland in a Series of Letters to William Melmoth*, London 1789; EBEL (see note 7); Anon. review (see note 41).

⁴³ An 1802 sales catalogue of Taylor's publications is in the Henry Huntington Library, San Marino, California (bound into NA. 2620 S6). I have so far found only one copy of the pamphlet entitled *Description of the Curious Wooden Bridge across the Rhine at Schaffhausen, in Switzerland Extracted from Andreae's Letters on Switzerland and other Authorities to Accompany the Print of the Bridge*. The exemplar is in the SM., Pamphlet Cupboard 86, and is dated on the title page 1808.

⁴⁴ The Bishop's letter of 24 April, 1799 to Sir William Hamilton is quoted by CHILDE-PEMBERTON (see note 2), II, p. 588.

⁴⁵ HOWARD COLVIN, writes on Labelye in *A Biographical Dictionary of British Architects 1600–1840*, London 1978. See also JOHN SUMMERSON, *Georgian London*, London 1962, pp. 113–116.

PHOTOGRAPHIC SOURCES

Figs. 1, 4: RIBA.

Figs. 2, 3, 5–8, 10: SM. (courtesy the Trustees of Sir John Soane's Museum)

Fig. 9: BM.