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4. 18th century.

(i) France.

The history of French harpsichord making at the beginning of the 18th century is largely an account of the rapid expansion of the keyboard compass and the definitive adoption of a national variant of the thick-cased, long-scaled Ruckers design. Although harpsichords of the 1690s were still made with the typical 17th-century compass of $G/B-c'''$ and sometimes with other features of earlier styles, such as thin cases and moulded bridges, a harpsichord made by Nicolas Dumont in Paris in 1707 (private collection, France), with compass $F-e'''$, has most of the characteristics of a mature 18th-century French instrument. The reasons for these changes seem to have been the preference of musicians for the tone of Ruckers harpsichords and for the expanded musical possibilities inherent in larger instruments.

Although Ruckers harpsichords had long been known in France, they had existed alongside native instruments, many of which were radically dissimilar in scaling and construction. Even those instruments from the middle of the 17th century (such as those made by Jean Denis in 1648, Claude Jacquet in 1652 and Louis Denis in 1658; see §3(ii)(a) above) whose external design coincidentally resembles that of Ruckers harpsichords are significantly different internally, having, for example, ribs crossing under the bridges and much lighter 4' hitch-pin rails. The increasing regard for Ruckers harpsichords towards the end of the century, however, is shown by deliberate imitations of them by French makers, for example by Michel Richard in 1688 (see §3(ii)(a) above) and by a certain 'D.F.' (undated instrument in the collection of Yannick Guillou, Paris, described by Anselm, C1996). Both instruments are not only thick-cased and long-scaled but also decorated with Antwerp-style soundboard painting and, in the 'D.F.', block-printed papers. While some divergences from Ruckers practice, such as the positioning of the bottom braces nearly perpendicular to the bentside rather than to the spine, may be seen as reasonable efforts to strengthen the case, the reinforcement of the soundboard with ribs crossing under the bridges suggests that Richard and 'D.F.' did not entirely appreciate all the subtleties of Ruckers soundboard design. Nevertheless, the massive Ruckers-style 4' hitch-pin rails in these harpsichords indicates that their makers were beginning to adopt Ruckers principles more than superficially.

Knowledge of all aspects of the design of Ruckers harpsichords was undoubtedly acquired during *ravalement*, the process of rebuilding old harpsichords to suit new musical requirements. A normal Ruckers transposing harpsichord with the range of $C/E-f'''$ on the lower manual could accommodate the normal 17th-century French compass of $G/B-c'''$ without altering the string spacing on the bridge or the scale, simply by aligning the keyboards. While the original Ruckers keys were usually retained in *ravalements* done in the Low Countries, French rebuilders routinely supplied new keyboards and actions in their own more delicate style. That this was already being done in the 1680s is suggested by the Richard harpsichord of 1688, which, with a false 'HR' rose and the date '1613' painted on the soundboard, was evidently intended to be passed off from the start as a Ruckers rebuilt with French keyboards and disposition. *Ravalement* also normally

included the addition of a second choir of 8' strings. Almost as many Ruckers or Couchet harpsichords with French keyboards and actions, but with unaltered cases and soundboards, survive from the first quarter of the 18th century, as do original French instruments of the period. Likewise attesting to their popularity in this period are workshop inventories of Nicholas and François-Etienne (ii) Blanchet (see Hubbard, A1965), which list nearly as many 'Flemish' harpsichords as there are new instruments under construction. This popularity continued throughout the century, but the demand for an increased compass altered the purity of design of these early *ravalements*. A $G^1-c^{\prime\prime\prime}$ keyboard with the narrower French spacing could be fitted in to the case of a standard Ruckers double. The less common type of Ruckers double with chromatic basses could accommodate a $G^1-c^{\prime\prime\prime}$ compass without alteration of the spacing and, with French-style keyboards, the compass could be $G^1-d^{\prime\prime\prime}$ or even $e^{\prime\prime\prime}$. Further extensions of the compass, however, required more radical rebuilding of the old harpsichords.

The full five-octave compass of $F^1-f^{\prime\prime\prime}$, which was to remain standard until the decline in harpsichord making at the end of the century, is already found in instruments made by Pierre Donzelague in Lyons in 1711 (London, private collection) and 1716 (Musée Lyonnais des Arts Décoratifs, Lyons). In Parisian harpsichords, however, the standard range from early in the century until about 1760 was $F^1-e^{\prime\prime\prime}$, but $G^1-e^{\prime\prime\prime}$ was not uncommon. This is strange as the music of the period almost never exceeds $G^1-d^{\prime\prime\prime}$. The F^1 was used in one piece each by Rameau and François Couperin (ii) in their solo harpsichord works, but it was not in general use until the 1740s. Neither Couperin nor Rameau employed $e^{\prime\prime\prime}$ in their solo works. Dagincourt used it in 1733 (*Pièces de clavecin*), but it was not often found until the F^1 was commonly written. The $e^{\prime\prime\prime}$ seems to have fulfilled a sense of order: the keyboards were balanced with one natural after a group of sharps at each end. $G^1-e^{\prime\prime\prime}$ instruments, such as a Louis Bellot of 1742 (Metropolitan Museum of Art, New York) and a Jean Goermans of 1748 (private collection, USA), continued to be made almost to mid-century. Indeed, much of the repertory from the first half of the century is playable on instruments with the old compass beginning on G^1/B^1 , especially if there are a divided E^1_b key and the $c^{\sharp\prime\prime\prime}$ and $d^{\prime\prime\prime}$ that were often crowded into the existing cases of old instruments undergoing *ravalement*. Perhaps the major advantage of chromatic basses beginning on F^1 or G^1 was not the availability of more accidentals in the bass but rather the more sonorous tone resulting from larger soundboards and longer bass strings. Already in the first volume of François Couperin's *Pièces de clavecin* (1713), several pieces exploit this rich low tessitura. By 1760 the compass $F^1-f^{\prime\prime\prime}$ had become standard in Parisian harpsichords. During the late 1770s and the 1780s a few harpsichords were made with the compass $E^1-f^{\prime\prime\prime}$. The purpose of the added E^1 key is not known, but it may have been tuned to a lower note in some short-octave arrangement along with the seldom-used $F^{\sharp\prime\prime\prime}$ and $G^{\sharp\prime\prime\prime}$ keys.

Nicholas Blanchet, who was admitted to the guild in 1689, founded the most important dynasty of Parisian harpsichord makers, which included his son François-Etienne (i), grandson François-Etienne (ii) and Pascal Taskin, who worked for the last-named and married his widow. Eight harpsichords by the Blanchets and seven by Taskin are known to survive. In the 1740s the Blanchets' connection with the court began, and shortly after the middle of the century their firm became 'facteur des clavessins du Roi'. During this time, besides their maintenance work for the court, they became increasingly occupied with the rebuilding of Ruckers and Couchet harpsichords into large five-octave French instruments. About as many of these rebuilds survive as do harpsichords entirely made by Blanchet and Taskin. Two other families were notable: Jean Goermans and his son Jacques (c1740–89; later Jacques Germain), and Henri Hemsch (1700–69), his brother Guillaume (1709–74) and their nephew Jean-Henri Moers (1734–93). About nine of the Goermans' harpsichords and nine by the Hemsch family survive; four of Henri Hemsch's date from the decade 1751–61, a remarkable survival rate. The majority of 18th-century French harpsichord makers were of the Parisian school, but there was a distinct though similar school in Lyons. 18th-century harpsichords from other parts of France are rare, and most of them are either archaic or are the occasional work of an artisan of another craft such as organ building.

A great portion of the energies of 18th-century French harpsichord makers appears to have gone into the massive rebuilding of older harpsichords, especially those of the Ruckers family. Since a rebuilt Ruckers harpsichord was worth several times as much as a new instrument in 18th-century Paris, such a diversion of the makers' efforts from building new instruments was clearly justified on a financial basis. It led not only to the most elaborate sort of rebuilding, including the conversion of narrow 45-note-compass single-manual instruments to five-octave doubles and the building of new harpsichords around the soundboards of old virginals, but also to outright faking

of new instruments to make them look like rebuilds. But as the rebuilding was intended to update earlier instruments to current musical requirements and not to preserve their antique qualities, the sound of a Ruckers or Couchet harpsichord rebuilt by Taskin represents late-18th-century Paris rather than 17th-century Antwerp.

The Blanchets and Taskin were famous for their work in this vein, and they applied to it all the ingenuity and craftsmanship found in the instruments they built in their own names, producing neither crude enlargements in which extra notes were crammed into the bass (in effect sliding the keyboard towards the treble, thereby disastrously shortening the scaling) nor such dubious expedients as the jointing of extensions on to the wrest plank and belly rail. Rather, they used a wide variety of slightly differing techniques, determined by the nature of the original instruments. Of these, the most subtle and ingenious involved rebuilding the spine, in addition to the usual extending of the bentside and bridges and replacement of the cheekpiece, wrest plank and belly rail with new ones of appropriate length. The front of the original spine was cut down to the level of the soundboard. A tapered layer of new wood of the same size would then be added on the outside of the cut-down original spine; then a wholly new spine of the same height as the rest of the case, and long enough to reach the front of the instrument, would be glued on to the outside of the tapered piece. The result was simultaneously to provide more room at the front of the instrument for additional bass keys and to rotate the entire body of the instrument with respect to the strings. This rotation, in turn, had the effect of lengthening the scaling to compensate for the shortening produced by the addition of the new notes in the bass. For all their rebuilds, the Blanchets, Taskin and other reputable makers also supplied beautifully made new French-style keyboards and actions.

Except for their size, the construction of early 18th-century French harpsichords was very similar to that of Ruckers. The framing was a bit heavier, especially the upper struts, which were more numerous. A horizontal brace was glued to the back edges of the upper belly rail in two Blanchet harpsichords of 1730 (private collection, USA) and 1733 (Château de Thoiry). This brace or 'T' section, a normal feature of later Blanchet and Taskin harpsichords, enormously stiffened the belly rail, and struts running from it to the bentside, along with gap spacers between the wrest plank and belly rail, strengthened this critical area. In some instruments by other makers, including Henri Hemsch, the upper struts are set on edge and butt against the liners rather than lying flat under them. Case sides were sometimes of a softwood (spruce or fir) rather than poplar, which was invariably used by the Ruckers. Bentsides, however, were usually of poplar, since resinous softwoods are difficult to wet-bend. While Ruckers bentsides and those of most 17th-century French harpsichords are curved throughout their entire length, French bentsides early in the 18th century assumed a characteristic shape with the curve concentrated in the treble and the remainder, towards the tail, straight. Those of the 1730 and 1733 Blanchets are straight for almost two thirds of their lengths. This shape continued in use in the Blanchet-Taskin workshop and was also used by Henri Hemsch and others; completely curved bentsides occur only occasionally later in the century. Bentsides were never made to incorporate the tail in an S-curve. In the second half of the century, the framing became a bit heavier and more sophisticated, and the sides were a little thicker, walls of 18 mm being not uncommon and spines even thicker, up to about 24 mm. In Taskin's harpsichords the framing, liners, ribbing and 4' hitch-pin rail are beautifully rounded.

The soundboard barring generally follows the Ruckers pattern but, especially in the first half of the century, was not so standardized. The 1707 Dumont and 1733 Blanchet lack cut-off bars, and the ribs perpendicular to the spine extend to the 4' hitch-pin rail. The 1730 Blanchet has a normal cut-off bar but, like the 1707 Dumont, it has two ribs crossing the 8' section of the soundboard around the midsection and tenor, and a third approaches the bass of the 8' bridge from the 4' hitch-pin rail. Harpsichords by Henri Hemsch, probably 1736 (Museum of Fine Arts, Boston), and by Hemsch's master, Antoine Vater, in 1738 (private collection, France), have ribs parallel to the spine crossing the bridges. All known 18th-century French ribs were cut out to free the soundboard where they pass under bridges. Cross-ribs are not found in the later Blanchet and Taskin instruments and were only occasionally used by makers in the second half of the century, as in a Jacques Germain harpsichord of 1785 (America's Shrine to Music Museum, Vermillion, South Dakota) in which a rib crosses under the 8' bridge in the tenor. Some makers, including Vater and Henri Hemsch, curved their cut-off bars to be parallel to the 4' bridge.

The keyboards and actions of 18th-century French harpsichords continue the design of the previous century but are a little heavier, with wider jacks, a slightly wider key span (the three-

octave measure typically 477 mm), and thicker key levers, especially in the lower manual. Boxwood arcades replaced the carved trefoils on the key fronts, and the sharps, instead of being solid bone, were composed of a thin bone slip glued to a black stained wooden base. The jack-slides and guides were still made of wood covered with punched-leather bearing surfaces, and the accurately made jacks were slightly tapered in width and thickness, fitting the slide only when at rest. These actions were light and quiet, and repeated very quickly. Apparently very few single-manual harpsichords were made; these were almost always disposed 2 × 8'. The two-manual disposition of an 8' and 4' register on the lower manual, shove coupler, and an 8' on the upper, with the 4' between the 8's and the lower 8' plucking the longer strings remained absolutely standard until the third quarter of the century.

After the middle of the century several additions to the standard French two-manual disposition began to appear. The buff stop, rare in the first half of the century, became almost universal. During the late 1750s harpsichords began to be equipped with a variety of foot- or knee-operated devices for producing crescendo effects and for changing registers without taking the hands from the keyboard. The first of these, developed by the Dutch maker Andries Veltman (Weltman, Wittman) in collaboration with a certain Dumontier, was advertised in Paris in 1758 and was demonstrated the following year to the Royal Academy of Sciences. In addition to knee levers to control the registers it was provided with a hammer action and glockenspiel. In the late 1760s an innovation of more lasting significance was introduced, a fourth register having jacks fitted with plectra of soft buff leather (*peau de buffle*) added behind the three registers of the normal two-manual disposition as a special solo stop. The *peau de buffle* jacks pluck the same strings as the normal, quilled, lower-manual 8' jacks, which should be disengaged when the fourth register is in use. Most writings of the period credit the invention of the *peau de buffle* register to Taskin in 1768, although J.-B. de La Borde (*Essai sur la musique*, Paris, 1780) ascribed the initial idea to the prominent organist, harpsichordist and composer Claude-Bénigne Balbastre, who is known to have had a harpsichord fitted with this device in 1770. A similar invention was claimed by a certain de Laine, who in 1769 announced an instrument fitted with leather plectra and a pedal to change the registers. Soft *peau de buffle* plectra tend to stroke the strings rather than pluck them. Thus a certain amount of dynamic nuance is made possible by touch alone. Except, perhaps, for the occasional three-register harpsichord provided with *peau de buffle* as a substitute for the customary quill of the lower-manual 8', *peau de buffle* was normally only used as a fourth register in harpsichords also provided with knee levers to change the stops. As devised by Taskin in 1768 and found in most of the extant late 18th-century harpsichords made or rebuilt by Taskin or other Parisian builders, five or six pommels, to be raised by the knees, are held in the front rail of the harpsichord's stand. From left to right these control: a *decrescendo*, which gradually removes the 4', then the lower-manual quilled 8', then the upper 8', leaving the *piano* tone of the *peau de buffle*; the 4'; the lower-manual quilled 8'; the shove coupler (in some instruments this pommel is absent and the coupler is controlled by hand in the usual manner); the *peau de buffle*; and a batten that raises all the *peau de buffle* jacks when they are not in use in order to keep the touch as light as possible.

The *peau de buffle* and knee levers or pedals to change the stops came into being at about the same time as the piano was being introduced to France from Germany and England. Grand pianos by Johann Heinrich Silbermann of Strasbourg were known in Paris by 1759, and in 1763 Balbastre owned a *clavecin à marteaux* (grand piano) made by Blanchet. Another was in Blanchet's workshop at the time of his death in 1766. Although the repertory associated with the early German-style grand pianos and the English square pianos which became very popular in Paris in the late 1760s was in the Italian and German styles, the addition of knee levers and *peau de buffle* to the beloved French harpsichord was manifestly an attempt, far more successful than most such efforts, to graft on to it some of the qualities of the piano, which itself was incapable of realizing works in the highly idiomatic style of the *clavecinistes*. Late 18th-century French harpsichords with these devices possess all the musical qualities of earlier harpsichords, and the *peau de buffle* provides the option of a voluptuous tone which is quite similar to that of pianos by Cristofori and the Silbermanns.

The plan of the average 18th-century French harpsichord more nearly follows that of the chromatic rather than the short-octave Ruckers transposer. This design had shorter tenor scaling to keep the tailpiece from becoming too wide in a wider instrument of the same length. The French tonal ideal around 1700 was that of Ruckers, but making larger instruments resulted in a grander and smoother tone. Although the 'presence' and immediacy of a small instrument were lost, the sound was no less transparent. As the century passed, the tone grew more complex and less

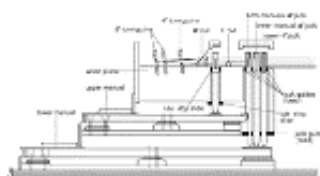
direct; nevertheless even the late Taskins never lost the balance between attack and sustaining power that permits cleanness of articulation. The declamatory style of French keyboard music from the 17th century to the Rococo period required this sensitivity to articulation, and their harpsichords met the demand well. Indeed, although there is little evidence that French harpsichords were exported to other countries during the 18th century, it has been recognized during the 20th-century revival of the harpsichord that the classic five-octave French double perhaps comes closest to the ideal of an all-purpose instrument, versatile enough to be a satisfactory medium for the interpretation of harpsichord music of all countries and periods. Thus modern harpsichords modelled after the work of Taskin and other 18th-century French makers have been in widespread use since the last half of the 20th century.

Whether new or rebuilt, a French 18th-century harpsichord was a major piece of decorative furniture. The soundboards were painted with flowers in a more sophisticated style than the Flemish, the cases were painted or lacquered in any of a variety of fashionable styles and the instruments were equipped with elaborate six-, seven- or eight-legged bases often carved and gilded in one of the royal styles. Simpler instruments were painted in one or two colours, panelled with gold bands and mouldings and fitted with less elaborate bases but still in one of the royal styles. Despite the use of walnut and marquetry in 17th-century harpsichords, and the superb quality of veneered furniture in 18th-century France, French harpsichords seem never to have been veneered.

William R. Dowd/John Koster

(ii) England.

The standard 18th-century national type of harpsichord seems to have crystallized slightly earlier in England than in France, namely in the work of Hermann Tabel (*d* 1738), a builder, trained in Antwerp, who moved to London in about 1700. Both of the makers whose firms dominated English harpsichord building in the 18th century, Burkat Shudi (1702–73) and Jacob Kirkman (1710–92), worked in Tabel's shop and both built instruments strikingly like the sole surviving example of Tabel's work, a double-manual harpsichord dated 1721.



English two-manual harpsichord action, 18th century

A typical Shudi or Kirkman double has a 2 × 8', 1 × 4' specification, disposed so that one 8' register, known as the dogleg, is available from both manuals, while the lower manual has the second 8' and the 4' register, and the upper manual has a lute register as an alternative to the dogleg. In addition, a buff stop on a Shudi acts on the lower-manual 8' strings, and on a Kirkman on the dogleg 8' strings (**fig.3**). Their cases are made of oak, and are veneered

mostly in walnut in early examples and mahogany in later ones. All are invariably cross-banded with a wide range of stringings, and some, particularly those of Kirkman, have splendidly rich marquetry in the keywell. The instrument is supported on a trestle stand with four legs, which vary throughout the 18th century from turned George II to square Chippendale; occasional special examples have rather ungraceful cabriole legs curving outwards from the level of the trestle's lower stretchers. The soundboards are not decorated with paintings, and Shudi soundboards do not have a gilded metal rose; the barring and case bracing are rather like those of a Ruckers harpsichord. Like the bottom, all the braces are pine. The lower ones are not as tall as in a Ruckers instrument; there are only two transverse bottom braces in addition to the lower belly rail, but these are supplemented by a diagonal brace running along the bottom from the intersection of the rear brace and the bentside to the centre of the forward brace. In addition, there are two or three longitudinal braces running upwards from the front bottom brace to the upper belly rail. The upper-level braces are more numerous than on a Ruckers harpsichord, where there are three set nearly parallel to one another and at a slightly oblique angle to the spine. In a Kirkman or Shudi harpsichord there are four such braces which, however, are set vertically rather than flat, so that they bear on the face of the liner rather than merely being nailed to its underside. These four are supplemented by a fifth, heavier one, that passes from the bentside to the upper belly rail in the crucial treble area. (For excellent illustrations of the inner construction of a Kirkman harpsichord see van der Meer, C1991, p.146, and Koster, C1994, p.99.) The inner case construction of a single-manual Kirkman or Shudi is identical to that of a double, and the specification of single-

manual harpsichords by both makers is either $2 \times 8'$, or $2 \times 8'$, $1 \times 4'$.

Except in matters of decoration, these instruments changed little throughout the century, apart from a shift in the plucking-points of Shudi harpsichords after 1770 that produces a rounder and less incisive tone in the later instruments (a change in line with the occasional substitution of leather for quill plectra in the lower-manual 8' jacks), and the addition of the pedal-operated mechanisms described below. The overall lengths of Kirkman's harpsichords (and, correspondingly, of their longest *F* string) varied over the years, being around 180.3 cm in 1745, decreasing to around 172.7 cm in the early 1760s and increasing again to around 177.8 cm in the 1770s and 80s. The reason for these changes is not known.

Tabel's five-octave *FG'-f'''* keyboard had lacked the *F#'* (presumably for reasons of visual symmetry), and Kirkman and Shudi, like other English builders, followed this practice until about 1780, when the *F#'* was included as a matter of course.

A minor difference between Shudi and Kirkman harpsichords concerns the arrangement of the stop-knobs in two-manual instruments. On Shudi double-manual harpsichords the three stop-knobs at the left side of the nameboard control are (from left to right) the lute stop, the 4' and the buff stop, whereas in a Kirkman the order is buff stop, lute stop and 4'; both have 8' stops located at the right side of the nameboard with the dogleg controlled by the left-hand knob and the lower manual 8' controlled by the right-hand knob. As a result of this arrangement, one can rapidly engage whichever of the unison stops may temporarily have been disengaged simply by squeezing the knobs together. Although Kirkman is known only once (1772) to have built an instrument with a compass greater than five octaves (a double of *F-c'''*), Shudi regularly made instruments with a compass of *C'-f'''*, of which 12 dating from 1765 to 1782 have survived.

The tone of a Kirkman or Shudi harpsichord is enormously rich and powerful; whereas that of a French harpsichord may be compared to the sound of a woodwind ensemble, the tone of these developed English instruments, with their brilliant trebles and imposing basses, may be compared to that of a brass band. The sound thus lacks the subtlety of a French instrument but more than compensates by its volume and sensual impact. As is true of many of the harpsichords made in the second half of the 18th century – that is, after the great age of harpsichord composition – the sound of these instruments sometimes tends to call attention to itself rather than merely serving as a vehicle for projecting the music, a quality that may in abstract terms be viewed as a defect despite its splendour. (For further discussion of tone and voicing see [KIRKMAN](#).)

Beginning no later than the early 1760s, English harpsichords were customarily fitted with crescendo devices. The so-called **MACHINE STOP** of Kirkman and Shudi disengages the 4' register and then the front 8' register as a pedal is depressed (on double-manual instruments, since the disengagement of the front 8' register would silence the upper manual, it simultaneously engages the lute stop); thus when the pedal is fully depressed the registration on the upper manual of dogleg 8' is replaced by lute stop, and that on the lower of dogleg 8', lower-manual 8' and 4' by lower-manual 8' alone. In both single- and double-manual instruments, the machine stop can be disengaged when desired to permit normal hand-stop operation. Small variations on this arrangement may be found in the harpsichords of Thomas Haxby and of Longman and Broderip. By 1766, the machine stop was supplemented by a second crescendo device, the 'nag's head **SWELL**', which enabled the performer to open either a section of the harpsichord's lid (if not already raised) or the 'Venetian swell', a series of louvres covering the soundboard. The two devices used in conjunction with one another produce a surprisingly wide and effective crescendo, beginning with the *pianissimo* of the lower-manual 8' alone with the lid or louvres closed, followed by the successive addition of the front 8' and the 4' and finally the gradual opening of lid or louvres to permit the *fortissimo* of the full harpsichord.

Edwin M. Ripin, Howard Schott/Charles Mould

(iii) Italy.

Most of the known 18th-century Italian harpsichord makers were active in Florence and among

these [BARTOLOMEO CRISTOFORI](#) was pre-eminent. His few surviving harpsichords show a number of refinements in design aimed at better structural or tonal performance. Those he influenced included not only his assistant Giovanni Ferrini, but also makers who worked in other towns, such as Giuseppe Solfanelli (active in Florence and Pisa) and Giuseppe Maria Goccini of Bologna.

Even in the 18th century *C/E-c'''* was still a widely used compass (as also in Italian organs of the same period); for the accompaniment of the human voice this compass was presumably sufficient. However, the once common *C/E-f'''* compass became practically obsolete. Of

compasses reaching below *C*, the majority started on *G'A'* (i.e. without *G#'*). Those having a *G'/B'* short octave were no more common than in the 17th century. More chromatic compasses beginning on *G'* were used than in the 17th century but were only slightly more common than *G'/B'* compasses. Compasses starting on *F'G'A'* became more popular than previously, being produced in almost the same numbers as *G'A'* compasses. Most keyboard compasses did not exceed *c'''*, even when starting on *F'*, but a few reached *f'''*, or even *g'''*.

After 1700 the majority of dispositions were $2 \times 8'$, but four instruments have survived which had three $8'$ registers. Six $2 \times 4'$ harpsichords are also known. Although many 16th-century instruments had only a single $8'$ register, this disposition became a rarity after 1700. In contrast to instruments from north of the Alps, a $2 \times 8'$, $1 \times 4'$ registration remained rare in Italy. A general lack of interest in the possibility of registration changes is suggested both by the rarity of two-manual Italian harpsichords and by the absence of stop levers in many 18th-century Italian harpsichords.

Although some jacks in surviving instruments now contain square slots for leather plectra it is likely that some of these are later modifications; the preference at the time was for bird quill. Some experimentation is recorded in the description of the [CEMBALO ANGELICO](#), invented in Rome in 1775 (see Russell, A1959, appendix 2), which enabled a range of different tone colours to be produced.

It is easier to draw conclusions about 18th-century scalings than about those of the 16th and 17th centuries. Documentary evidence and the design of scales combine to show that brass wire was used in most designs, where a *c''* of between about 25 cm and 28.5 cm is found (see Wraight, H1997). Some instruments by Cristofori and others show the combined use of iron and brass scales, with separate bridges, in order to overcome space restrictions. The scaling of both harpsichords and virginals suggests that a range of $8'$ pitch was used throughout Italy which covered a whole tone, with *c''* measuring 25 to 28.5 cm. Within this range of a tone in there were in Florence three further divisions rather than two semitone sizes. It is probable that this whole-tone range of pitches was in simultaneous use, although scales of 25 cm are first found around 1740. Thus, there is no clear evidence from these instruments that pitch rose in the 18th century compared with earlier times; rather, the range of pitches for which instruments were made remained at a constant level from the 16th to the 18th centuries. The evidence of 18th-century pitches is mainly from Florentine harpsichords; virtually none have been identified from Venice, Milan or Rome. In 1704 Goccini modified a 1530 harpsichord by Alessandro Trasuntino from $1 \times 8'$, $1 \times 4'$ disposition and *C/E-f'''* compass to $2 \times 8'$ with *G'/B'-c'''*; another instrument, by Vito Trasuntino (dated 1560; Staatliches Institut für Musikforschung, Berlin), was rebuilt with a shorter scale. This gives the impression that the pitch was raised, but since brass was used instead of iron the pitch was lowered by a minor whole tone (ratio 10:9).

Research on harpsichords of all countries has attempted to elucidate the ways in which instruments were strung in order to understand better the makers' intentions and permit more faithful restorations (O'Brien, A1981, and Gug, A1984). Comparison of the few known diameters of old wire with archival and documentary sources and the identification of old wire bobbins shows that Nuremberg wire was used in Italy in the 18th century. It has been discovered that a basic principle of stringing using a system of gauges (with only slight variations) was employed mainly by Cristofori and other Florentine makers, by which the top ten notes were strung with gauge 10 wire, the next nine with gauge 9, and so on down to gauge 2 (for details, see Wraight, H2000).

Denzil Wraight

(iv) Germany and other European countries.

Compared to the number of surviving 18th-century harpsichords from Italy, France, England and the Low Countries, there are progressively fewer from Germany, Scandinavia, Portugal and Spain, and hence progressively less information is available concerning the character and development of the instrument in these areas. This is specially regrettable since Germany and Spain in particular produced so much harpsichord music of interest.

(a) Germany.

There were arguably four schools of harpsichord making in Germany during the 18th century, in Hamburg, Berlin, Saxony and Thuringia. Hamburg was a major centre whose sphere of influence extended to Stockholm in the north and Hanover in the south, and is the only school represented by an appreciable number of surviving examples. Two harpsichords (one a reworking of an instrument originally built by Johannes Ruckers in 1618) survive by Johann Christoph Fleischer and three by his younger brother Carl Conrad Fleischer. There are six extant harpsichords signed by Hieronymus Albrecht Hass, two by his son Johann Adolph Hass and three by Christian Zell, who married Carl Fleischer's widow.

Harpisichords of the Hamburg school vary greatly in size, compass and disposition, but are all built in essentially the same manner. Coniferous wood is used for the case sides, the baseboard and the lid, and beech for the wrest plank, nuts, bridges and jackrail. As with Flemish harpsichords the case sides are glued and doweled to the upper surface of the baseboard; Flemish influence is also evident in the soundboard layout and in the bridge cross-section of early Hass harpsichords which is similar to that of Ruckers harpsichords. Rather than a bentside and an angled tail, however, Hamburg harpsichords are characterized by an S-shaped bentside, made either of oak or lime. Full-depth braces cross the case from the bentside to the spine, with no upper-level bracing.

The natural keys are veneered with ivory or tortoiseshell and the sharp blocks are of lime or beech (often ebonized) covered with ebony, ivory or tortoiseshell. The natural fronts are decorated with embossed paper, incised paper glued to a red backing, or small blocks of ebony or ivory in which a semicircular moulding has been cut. Key levers of single-manual harpsichords and of the lower manual of double-manual harpsichords are guided by wooden or whalebone slips riding in the vertical slots of a rack. Upper-manual keys are guided either by vertical pins positioned between the tails of the key levers or by vertical pins positioned in mortises cut in the centre of the key tails. The three-octave span of the natural keys ranges from 49 to 50 cm. On the double-manual harpsichords built by H.A. Hass in 1723 (Musikhistorisk Museum, Copenhagen) and 1734 (Brussels Conservatory) there are small padded blocks on the underside of the upper-manual keys and on the upper surface of the lower-manual keys. The manuals are coupled together either by pushing in the upper manual (1723) or by pulling out the lower one (1734). In the harpsichord built by J.A. Hass around 1760 (Yale University), short doglegs are provided for the upper-manual 8' jacks; small padded blocks on the lower-manual keys are positioned under the doglegs so that when the lower manual is pushed in the lower-manual keys lift the upper-manual jacks without the upper-manual keys having to be moved.

Most Hamburg harpsichords have iron scales of about 36 cm, but a few instruments, including the 1728 Zell (Museum für Kunst und Gewerbe, Hamburg) and the 1740 Hass (Puyana Collection, Paris) have scales of about 34 cm; these harpsichords may have been intended to sound about a semitone higher than the longer-scaled instruments.

Although some Hamburg-built harpsichords have the classic 2 × 8', 1 × 4' disposition, five instruments by H.A. Hass are exceptions. One made in 1726 (Leuvsta Bruk Manor House, Sweden) has the typical 16th-century Italian disposition of 1 × 8', 1 × 4', while two others originally had three choirs of 8' strings. The Hass 1723 harpsichord is disposed 3 × 8', 1 × 4', with the 8' nut stepped such that there are two levels of 8' strings: two sets are positioned on the upper section of the nut with the third set positioned on the lower section and passing through the nut to the tuning pins. A 1721 harpsichord by Hass (City Museum, Gothenburg) survives as a single-manual piano, but seems to have originally had two manuals and the unique disposition of 3 × 8', 2 × 4'.

Various 18th-century German makers (including J.C. Fleischer, Michael Mietke, Harass, Zacharias Hildebrandt, Gottfried and J.A. Silbermann and J.A. Stein) are now thought to have built

harpisichords with a set of 16' strings. No two of the three surviving Hass harpischords with a 16' register are exactly alike, but their 16' strings are arranged in the same ingenious fashion. Inside the case a low curving rim is attached to the deep frame members and follows the line that the bentside of a normal instrument would take. This rim serves as a hitch-pin rail for the 8' strings. Beyond it and at a slightly higher level there is a completely separate soundboard for the 16' bridge, and the 16' strings are hitched to the pins driven into the lining of the bentside along the far edge of this soundboard. As a result, the 16' bridge does not have to be pierced to permit the 8' strings to be hitched at the bentside, and the layout of the 8' and 4' strings, which still comprise the basic core of the harpischord, is undisturbed.

The 1734 double-manual harpischord by H.A. Hass has the compass $G'-d''''$ and the disposition $1 \times 16', 2 \times 8', 1 \times 4'$, lute. The 1740 Hass, which is the only unquestionably genuine three-manual historical harpischord still in existence, has the compass $FG'-f''''$ (i.e. lacking $F\sharp$), and the disposition $1 \times 16', 2 \times 8', 1 \times 4', 1 \times 2'$, lute. The upper two manuals of this instrument provide a lute stop on the upper manual, a dogleg 8' register played by both the upper and the middle manuals, and a 4' and a second 8' playable on the middle manual only. The doglegs reach down to the middle manual, and there is no coupler between these two keyboards. The 16' and the 2' are confined to the lowest manual, which (like the keyboards of some organs) can be pushed entirely into the case like a drawer for playing on only the 8' and 4' registers, but can be pulled partly forward so as to play the 16' and 2' by themselves, or further forward to permit all the registers except the lute stop to sound at once from the lowest manual.

The remaining Hass instrument with a 16' stop has only two keyboards, but compensates by having two rows of 2' jacks (both playing the same strings), one on the upper manual and one on the lower. Its date is not known for certain, but comparison with Hass clavichords suggests about 1760. As on the 1734 double, buff stops are provided for the lower-manual 8' and the 16', and the lower-manual 2' (like that on the 1740 triple) extends only from F' to c'' . This curtailment is necessary because, even with the narrow jackslides used on these instruments, the gap between the wrest plank and the belly rail required for the five slides (and thus the minimum distance between the 2' nut and the 2' bridge) must be so wide that no string stretched across it could be tuned appreciably higher than the c'''' equivalent to c'' at 2' pitch. This explains why the sixth slide carrying the jacks of the upper-manual 2' on the instrument of about 1760 goes only to b .

The outer case and lid of Hamburg instruments are always painted, sometimes with chinoiserie, while the inside of the lid often bears a painting in oils, with subjects including (on instruments by H.A. Hass) *The Grand Concert in the Garden* (1723) and *The Trojan Horse* (1734). The keywell area above the keyboard is usually veneered in hardwoods and exotic materials. Most soundboards are decorated with painted flowers, the near edge being reserved for the signature and sometimes small groups of classical or pastoral figures. Only the harpischords of the Fleischer brothers have a soundboard rose, which is geometrical and multi-layered. The stand for the H.A. Hass harpischords of 1726, 1732 and 1734, as well as the 1728 Zell, appear to be original, and consist of turned and carved legs between an upper and a lower stretcher.

Only two harpischords survive from Hanover: a single-manual of 1738 by Christian Vater with the compass $G'/B'-e''''$ (Germanisches Nationalmuseum, Nuremberg), and a claviorgan of 1712 by Hermann Willenbrock with the compass $CD-c''''$ (Metropolitan Museum of Art, New York). Like the Hamburg instruments, both have S-shaped bentsides; the keywell veneering of the Willenbrock is reminiscent of the work of Zell. There are, however, various differences between these instruments and those of Hamburg: the Vater, for example, has a brass scale of 27 cm, and both instruments have ebony rather than ivory natural plates.

Harpischord builders active in Berlin during the 18th century included Johann Hohlfeld (1711–71), Johann Straube (1725–1802) and Johann Oesterlein (*b* 1728/9), who is represented by a single surviving harpischord dated 1792 (Berlin Museum). The Berlin school is, however, dominated by the court instrument builder Michael Mietke, whom J.S. Bach visited in 1719 to take delivery of a double-manual harpischord for the Duke of Anhalt-Köthen. A single-manual harpischord signed by Mietke and dated 1710 survives (Hälsinglands Museum, Hudiksvall, Sweden). According to Kilström (H1994) this instrument, constructed mostly from walnut, has the compass $G'A'-c''''$ and the disposition $2 \times 8'$. Two further harpischords (Schloss Charlottenburg, Berlin) have been attributed to Mietke and dated to before 1713: a single-manual white harpischord disposed $2 \times 8'$, whose compass was originally $G'A'-c''''$, and a double-manual black harpischord disposed $2 \times 8'$,

1 × 4', originally with the compass *FG'A'-c'''* (the compasses of both were later extended to *FG'-e'''*). All the Mietke instruments have S-shaped bentsides and use box slides to guide the jacks rather than upper and lower registers. The *c'''* scaling of the double-manual Mietke was originally 29 cm which, when compared with the shorter 27.5 cm scale of the Hudiksvall Mietke, would suggest that both instruments were designed to be strung in brass but were intended to sound at two different pitches, about a semitone apart.

Surviving harpsichords from the Saxon school include a double-manual instrument by Jacob Hartmann (Bach-Haus, Eisenach) and a double-manual instrument attributed to Gottfried Horn (Museum für Kunsthandwerk, Dresden). There are five extant harpsichords signed by members of the Gräbner family, and two vis-à-vis harpsichord-piano combination instruments by Johann Andreas Stein. These instruments all differ significantly from those of the Hamburg school: the cases, made of hardwood or veneered, are not painted and have angled tails, and the soundboard barring includes transverse ribs running under the bridges. Although only one of the Stein combination instruments now includes a 16' stop, there is documentary evidence (see Henkel, F1990) of a harpsichord by Gottfried Silbermann which was also disposed with a set of 16' strings.

The possible existence of a Thuringian school of harpsichord building has been given weight by Krickeberg's attribution (in Restle, ed., F1995) of an unsigned harpsichord (the so-called **BACH HARPSICHORD**, Berlin Museum, no.316; see §5 below) to either Johann Heinrich Harass the elder or Johann Matthias Harass of Gross-Breitenbach, on the basis of the instrument's similarity to a double-manual harpsichord (Schloss Museum, Sondershausen) believed to have been signed by Harass. Krickeberg and others have suggested that the Berlin instrument was designed to include a set of strings at 16' pitch.

Edwin M. Ripin, Howard Schott/Lance Whitehead

(b) Austria.

The few extant 18th-century Austrian harpsichords have cases mostly of solid walnut or walnut veneer with a double-curved bentside and sloping cheeks (similar to the early South German and Viennese pianos). The most important feature of instruments before about 1760, appearing on eight surviving harpsichords and one clavichord, is the 'Viennese bass octave', with multiple divided keys starting at *F*. Haydn must have had access to an instrument of this kind during his early period (Walter, F1970). The earliest signed and dated Viennese harpsichord was made in 1747 by Johann Christoph Pantzner (*d* 1761). The short scaling of most Austrian harpsichords indicates stringing throughout with brass wire and a high pitch (*a'* = 450–470) which corresponds with the Chorton pitch of most organs of the period. Besides several anonymous 18th-century instruments, the only other signed Austrian harpsichords or spinets that survive are by Viennese makers: Johann Leydecker, 1755 (Landesmuseum Joanneum, Graz); Matthias Blum, 1778 (Schloss Greillenstein, Lower Austria); Gottfried Malleck, 1778 (Mestské múzeum, Bratislava); Englebert Klingler, 1799 (Narodni múzeum, Prague). A spinet built in 1804 by Christoph Bock (Kunsthistorisches Museum, Vienna) is thought to be the last Austrian plucked keyboard instrument built before the 20th-century revival.

Virtually nothing is known of any 18th-century harpsichord building in what are now the Czech Republic, Poland, Hungary, Slovakia or Slovenia, although the craft seems to have been practised there from the 16th century to the 18th. A harpsichord made by the Pressburg organ builder Glöckner is in the Slovak National Museum, Bratislava.

Alfons Huber

(c) Spain.

The S-shaped bentside began to appear in some Spanish harpsichords at the beginning of the 18th century, perhaps due to the influence of imports from Hamburg. Three examples showing this style are a harpsichord, later converted into a piano, labelled as being made in Seville in

1734, a photograph of a lost five-octave, single-manual harpsichord made, also in Seville, in 1754 by Francesco Pérez Mirabel (who also built the earliest surviving Spanish piano), and a claviorgan, also converted into later into a piano, bearing the label of Tadeo Tornel of Murcia and the date 1777. Mirabel's instruments, like several by other makers, were decorated with chinoiserie. In contrast, three related instruments, one of which was built in Valladolid in 1728 by Andrés Fernández Santos, have angled tails. In the latter part of the century Juan del Mármol made instruments combining harpsichord and piano actions. Perhaps the greatest Spanish harpsichord maker of the period was Diego Fernández Caparrós (1703–75), who was maker and repairer to the Spanish royal family from 1722 until his death. None of his instruments survives, but the wills of Scarlatti's pupil Queen María Bárbara, Antonio Soler's patron Infante Gabriel, and of the singer Farinelli give some idea of his work. For the Queen he made at least two 61-note harpsichords in the Italian style, a smaller one, and a *cembalo di registri*: a five-register instrument with button pedals for operating the wire-strung, gut-strung and flute-like registers, some of which were divided. He also built instruments with a 63-note compass for Infante Gabriel. Farinelli owned a Spanish transposing harpsichord probably by Fernández. According to Burney, Farinelli's Spanish harpsichords were built in the Italian manner with a separate outer case. Some of Queen María Bárbara's instruments were made of cedar and cypress with a white poplar outer case, but Fernández also made walnut instruments apparently without a separate case. Two three-manual harpsichords were advertised for sale in Madrid in the late 18th century. The only surviving signed harpsichord of Catalonian origin is a single-manual 2 × 8' instrument with the surprisingly conservative compass of *C/E-c'''*, made in Barcelona in 1743 by Salvador Bofill.

Beryl Kenyon de Pascual

(d) Denmark.

The only catalogued Danish 18th-century instruments of the harpsichord family that survive are a small *C-d'''* virginal from 1762 (Rosenborg Castle, Copenhagen) by Christian Ferdinand Speer, a Silesian émigré active in Copenhagen, and a one-manual harpsichord of 1770 (Falsters Minder Museum, Nykøbing) by Moritz Georg Moshack, a Copenhagen maker. The Speer virginal has a short *c''* scale of only 17.5 cm and was probably designed to be strung in iron and to sound an octave above normal pitch. The 1770 Moshack has an S-shaped bentside and case dimensions so close to those of the 1764 Hass (Russell Collection, Edinburgh) that it seems likely that Moshack either learnt his craft in Hamburg or copied an imported Hamburg instrument.

Edwin M. Ripin, Howard Schott/Lance Whitehead

(e) Sweden.

In Sweden, a number of instruments and some secondary evidence indicate that harpsichord making flourished during the 18th century, especially after 1756, when the government banned the import of musical instruments to encourage native builders. A one-manual five-octave harpsichord (Musikmuseet, Stockholm) dated 1748 is signed by Philip Jakob Specken, who learnt his craft in Dresden before moving to Stockholm. Niels (or Nicolas) Brelin, a clergyman, is known to have built an upright harpsichord (clavicytherium) in 1741 with eight registration pedals. A contemporary sketch printed in the proceedings of the Swedish Royal Academy shows that it had a five-octave compass and that its disposition included a 4' stop. Brelin is said to have made two trips abroad to study instrument building, but where and with whom he worked is not known.

The harpsichord signed 'Johannes Broman, Stockholm 1756' (Musikmuseet, Stockholm) is a five-octave two-manual instrument similar in construction to a Hamburg harpsichord (including an S-shaped bentside). It is disposed 3 × 8', 1 × 4', lute, and designed, incredibly, to have iron strings throughout the compass; it consequently measures 360 cm. The two-manual five-octave instrument signed 'Gottlieb Rosenau, Stockholm 1786' (Musikhistorisk Museum, Copenhagen), while also similar in style to contemporaneous Hamburg instruments, has strings which foreshorten in the usual way and a standard case length of 276 cm.

Edwin M. Ripin, Howard Schott/Lance Whitehead**(f) North Netherlands.**

Few 18th-century harpsichords from the northern Netherlands are recorded as extant: two instruments made in Amsterdam in the 1760s, a 1787 instrument from Leiden, and from Roermond a curious survival of 17th-century style, dated 1734. The Roermond instrument (Museum Plantin-Moretus, Antwerp) is an unusual two-manual harpsichord with a virginal filling out the space between the bentside and the extended cheekpiece. The harpsichord portion is reminiscent of an earlier transposing double after alignment. The compass is certainly the normal late 17th-century Flemish range, $G'/B'-c'''$, the lower manual plays sets of 8' and 4' jacks, and the upper controls a dogleg 8' and a second set of 4' jacks playing on the same strings as those of the lower-manual 4'. The virginal, with a keyboard to the left, has a compass of $CD-c'''$. The maker, Johannes Josephus Coenen, was a priest and the organist of Roermond Cathedral, and seems to have made instruments in his spare time.

In sharp contrast a modern, large two-manual instrument with a 16' stop was advertised for sale in Amsterdam just a year later by Rutgert Pleunis. His career as one of the most inventive keyboard instrument builders of his time was centred from 1741 in London, where he was known as Roger Plenius. Unfortunately no instrument of his survives.

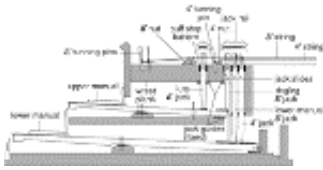
A harpsichord now at Leipzig, unsigned but with the initials 'L.V.' in the rose, bears the date 1766 on the highest key (f''') and its place of origin, Amsterdam, on the lowest (G'/B'). A one-manual harpsichord of 1768, by C.F. Laeske of Amsterdam (private collection, New York) is disposed $2 \times 8'$, $1 \times 4'$ and has the compass $C-f'''$. A harpsichord by Abraham Leenhouver of Leiden (Gemeentemuseum, The Hague), a standard two-manual instrument of five-octave compass disposed $2 \times 8'$, $1 \times 4'$, is remarkable not only for its late date, 1787, but also for the archaic stop-knobs, which are extended register ends protruding through the cheekpiece. This feature, also found in the Coenen, 'L.V.' and Laeske harpsichords, seems to have survived longer in the northern Netherlands than anywhere else.

Edwin M. Ripin, Howard Schott/Lance Whitehead**(g) South Netherlands.**

From the southern Netherlands a considerable number of instruments remain to substantiate the written record. In the early 18th century new harpsichords began to be made in the form characteristic of earlier instruments of the Ruckers type after they were enlarged in the late 17th century. Two 8' stops rather than a single unison register were the rule. Two-manual instruments had either three sets of jacks (one each for the two 8' and one 4' choirs) or four, as in the earlier transposing harpsichords. In the latter case, the fourth set would be used either as a second 4' stop playing on the upper manual (as on the Coenen harpsichord of 1734), or for a cut-through lute stop, plucking one of the unison choirs close to the nut. But quite a few simpler instruments continued to be produced, even in the late 18th century. Albert Delin of Tournai, for instance, seems to have done without a second manual or 4' stop, although he was a builder of great skill and refinement, judging from his surviving ten or so instruments dated 1750 to 1770. In addition to making conventional harpsichords and spinets, Delin also produced clavicytheria that are outstanding for both their mechanical excellence and their rich sound. Three examples survive (Berlin Collection; Brussels Conservatory; Gemeentemuseum, The Hague).

Jérôme Mahieu of Brussels (d 1737) was probably active before 1732, the earliest date recorded for him. He built harpsichords with both one and two manuals, generally with three registers ($2 \times 8'$, $1 \times 4'$) but occasionally with only two, in which case he preferred the older $1 \times 8'$, $1 \times 4'$ disposition to the more modern $2 \times 8'$. The compass was either of 58 notes ($G'-e'''$) or 61 ($F'-f'''$). (The 1732 Mahieu instrument with an apparent compass of $D'-d'''$ reported in Paris in 1952 was presumably altered by a 19th-century restoration from the original $F'-f'''$ range.) Also active during the mid-18th century was Jacobus Van den Elsche of Antwerp. One instrument (Meeshuis Museum, Antwerp), dated 1763, survives from his workshop; apart from its exceptionally sturdy

construction it is a standard two-manual five-octave harpsichord disposed $2 \times 8'$, $1 \times 4'$. Another instrument (formerly in Berlin; destroyed 1945) was ostensibly dated 1710, seven years before Van den Elsche's entry into the Guild of St Luke, and signed to indicate that it was rebuilt in 1790 by Johann Heinemann of Antwerp. A one-manual harpsichord by Heinemann (Brussels) with a $C/E-d'''$ compass, disposed $2 \times 8'$, is dated 1793; this would make it apparently the latest extant Flemish harpsichord, but the short-octave keyboard is strangely archaic in view of the date.



Flemish two-manual harpsichord action, 18th century

Members of the Dulcken family were distinguished harpsichord builders in the region during the 18th century. At least eight harpsichords by Joannes Daniel Dulcken (bap. 1706; d 1757), who worked mainly in Antwerp, are known (instruments made in Brussels and bearing later dates are the work of his sons). His harpsichords tend to have long scales, the single-manual harpsichord of about 1740 (private collection, Edinburgh) having a c''

scale of nearly 39 cm. Consequently the cases are long, his two-manual instruments being some 260 cm. Occasionally he used a singular type of construction with both an inner and an outer bentside. All his mature instruments have a five-octave compass, disposed $2 \times 8'$, $1 \times 4'$, often with a cut-through lute stop on the upper manual. Dulcken preferred to use a dogleg jack for the normal upper 8' rather than a coupler (fig.4). But since the lute register and the lower 8' usually pluck the same choir, with the second unison strings sounding only when the dogleg 8' is engaged, no dialogue of lower 8' and lute stop is normally possible and the upper manual is limited to providing a softer sound contrasting with the tutti of the lower manual. Johannes Petrus Bull, another German who settled in Antwerp, was apprenticed to J.D. Dulcken there. Four of his instruments have survived, dated 1776 to 1789, all of five-octave compass and disposed $2 \times 8'$, $1 \times 4'$. Three are two-manual instruments. One of these, dated 1778, has most ingeniously wrought, very wide upper-manual dogleg jacks, with two tongues facing in opposite directions. These jacks can pluck either 8' choir and thus a combination of $2 \times 8'$ is available on each manual, since the dogleg and the lute stop can be combined on the upper keyboard. But the lower 8' jacks are fitted with *peau de buffle* plectra so that only the dogleg 8' is available to give a normal quilled 8' sound on the lower manual. Thus, as with Dulcken, no dialogue of a quilled lower 8' and a lute stop is possible in the manner of the English double harpsichord. A later two-manual instrument by Bull (1789) lacks the double tongues in the dogleg upper-manual jacks, but it is so arranged that damper interference between the lower 8' jacks and the dogleg upper 8' prevents the use of the upper keyboard as an echo manual.

Edwin M. Ripin, Howard Schott/Lance Whitehead

(h) Switzerland.

Although in Switzerland some sparse records survive of harpsichord making as far back as the late 15th century, the only surviving instruments identifiable as Swiss date from the 18th century and come from the German-speaking area. There is no firm evidence that the craft ever took root in the other regions. (A spinettino in the Schweizerisches Landesmuseum Zurich, known to have been decorated in Stupan, Engadin, in 1722, is of uncertain origin and probably 17th-century.) Swiss harpsichords of the 18th century were probably similar in construction to the models produced in Strasbourg, particularly to those made in the Silbermann workshop. Peter Friedrich Brosi, a native of Swabia, was apprenticed to Silbermann before moving to Basle where he set up as an organ and harpsichord builder. A spinet signed by him (Schweizerisches Landesmuseum) is somewhat archaic for its date (1755), with a compass of $C-e'''$, a distinctly 17th-century type of dark walnut case and a black-stained stand of heavy turned legs connected by a stretcher. A spinet of 1755 signed by his son, Johann Jacob Brosi, is closer in dimensions, compass ($F-f'''$) and appearance to the late German type of instrument. An instrument by the Zurich craftsman Hans Conrad Schmutz, dated 1761, is in the Alstetten Museum. It is a single harpsichord of five-octave compass with two 8' registers; the rather plain walnut case and simple turned legs suggest provincial origins. An *ottavino* by his elder brother, Leonhard Schmutz, was sold in Paris in 1924 on the dispersal of the Savoye Collection.

Edwin M. Ripin, Howard Schott/Lance Whitehead

