SECOND EDITION

EIGHTEENTH-CENTURY KEYBOARD MUSIC

Edited by ROBERT L. MARSHALL

Eighteenth-Century Keyboard Music

ROUTLEDGE STUDIES IN MUSICAL GENRES

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Preface

The eighteenth century, the century of revolution, abundantly deserves its reputation with respect to the history of music. When it began, the human voice still reigned, unchallenged after millennia, as the principal and most respected agent of musical expression. If anything, by 1700 its prestige was greater than ever before, thanks to its glorification in the most prestigious musical form of the time: Italian opera seria. Instrumental music, for its part, clearly less lofty in status, was dominated by the violin, and, once again, a largely Italian repertoire of chamber music and concertos. Among keyboard instruments the organ and its repertoire, rooted in and nourished by the needs and traditions of the church, continued to thrive, and in the music of J.S.Bach, were about to reach their artistic zenith. The stringed keyboard instruments, on the other hand, by and large had a far more modest role to play in European musical life. The principal, if not sole, task of the harpsichord, after all, was to accompany; that of the clavichord was even more humble—being mostly relegated to private, domestic music making or serving as a practice instrument.

By century's end, the unlikely but popular opera buffa had risen to a position of artistic, if not social, parity with opera seria; instrumental music, similarly, had developed a repertoire as significant as its vocal counterpart—a repertoire whose source of vitality, embodied in innumerable manifestations, was a principle of musical organization that effectively had not existed in the year 1700 but by 1800 had become ubiquitous: the sonata, or sonata-allegro, form. One of the greatest beneficiaries of this development was a keyboard instrument with a hammer mechanism that effectively had not existed in the year 1700 either. By century's end this new instrument, known by a host of names, most commonly "pianoforte" or "fortepiano," had become ubiquitous, too, while both the harpsichord and clavichord had fallen into oblivion and the organ, artistically speaking, into irrelevance.

Given such enormous transformations, can the structure of this book—beginning around 1700 and ending around 1800—be justified? Can such a volume have any compelling coherence? The best-known musical "fact" about the eighteenth century, after all, is that it was split almost precisely in half into two distinct, and virtually antithetical, stylistic periods. Yet despite the prima facie appearance of a fundamental shift at some point (ca. 1720? ca. 1730? ca. 1750?) from a well-established and long-standing "Baroque" style to something quite different, the century need not be viewed as an altogether artificial and arbitrary division: beginning before the end of one stylistic period (the Baroque) and breaking off before the end of another (the Classical). In fact, a strong case can be made for regarding the hundred years from 1700 to 1800 as constituting a meaningful historical unit—one capable, we trust, of validating the conception of this volume.

The case begins with an argument of a distinctly technical character. The generation of composers who came to maturity circa 1700 was the first born into the fully established system of functional tonality—to inherit it, so to speak, as a native language—after it was

first consolidated in the music of the Italian concerto composers of the preceding generation. Tonality, of course, was to prevail as the supreme system of musical syntax in Western civilization for the next two hundred years. But its gradual dissolution had begun, significantly, by the beginning of the nineteenth century. And by the end of Beethoven's life almost all the "self-evident" principles of organization and coherence that underlay the tonal system had suffered at the least their first significant challenges.

For our purposes, it is important to recognize, too, that the first and the principal benefits of the tonal system were to be derived in the realm of instrumental music. Instrumental music had been a distinctly limited channel for the cultivation of ambitious musical invention until the last two decades of the seventeenth century; but then—for the first time in the history of Western music—the establishment of functional tonality enabled the construction of autonomous, closed, instrumental compositions on a large scale. The consequence was the rapid evolution and perfection of two impressive instrumental forms: the concerto and, about a generation later, the sonata. While the violin and other melody instruments were the first important protagonists of the modern concerto, the modern sonata was first nurtured and cultivated on keyboard instruments. Before long, however—still in the early decades of the new century—sonata form had engendered the early prototypes of the symphony and the string quartet.

By the late 1690s the solo concerto had begun to supplant the concerto grosso as the concerto genre of choice. There was, at just the same time, a notable shift of emphasis (signaled by Corelli's sonatas op. 5, published in 1700) from the trio to the solo sonata. The new-found fascination with the persona of the instrumental soloist was to have a profound effect on the nature of musical form. It led, for example, to the introduction of a new and potentially dramatic principle of solo-tutti thematic differentiation. But the enhanced stature of the soloist—more properly, the individual instrumentalist—also led to a reappraisal of the nature and status of keyboard instruments. Keyboard instruments—and their players—were, after all, uniquely autonomous. But if the secular keyboard repertoire was to expand its expressive and stylistic range (and its audience appeal) significantly beyond the limits represented by toccatas, variations, stylized dances, and learned contrapuntal inquiries, then the instrument itself would have to become more responsive, sensitive, touch-sensitive. Enter, at the threshold of the new century, Bartolomeo Cristofori, with his "arpicembalo che fà il piano e il forte."

The turn of the century was a watershed in other ways as well. It may or may not have more than nominal significance that the first use of the term "sonata" with reference to works for solo keyboard seems to appear in Johann Kuhnau's *Biblische Historien,* published in 1700; but it is certainly significant that in this collection Kuhnau not only transferred the Italian church sonata to the solo harpsichord but combined it with the largely French idea of programmatic instrumental music. The program, however, was something typically German and Lutheran owing to its religious theme. At just the same time—the 1690s—the Frenchman Couperin began to adopt the Italian sonata as well, composing trios that he would later publish under the title *Les Nations.* That is, both the coming of age of instrumental music and the interest in exploring and exploiting the distinctions between the national styles of music—what Couperin himself in another collection would call *Les goûts-réunis*—had begun in earnest just about the year 1700.

The phenomenon of national styles, and the compulsion to confront the challenge posed by their existence, constitutes one of the characteristic hallmarks of eighteenth-

century music. The entire century—the celebrated style shift notwithstanding—was occupied first with their definition and description; then with attempts at their combination, coordination, and fusion; and finally with their transcendance and transformation into something perceived as ideologically and aesthetically far more desirable: a universal musical style. The duration of this process, incidentally, was approximately coterminous with the actual calendrical century.

The crystallization of discrete and powerful national musical styles was complete by—and recognized by—the beginning of the eighteenth century.[1] During the first part of the century theorists and commentators were accustomed to discussing music in terms of national styles. Contemporaries perceived a bipolar hegemony shared by Italy and France. As for other nations, it was their mission—quite explicit in the case of the Germans—to effect some sort of reconciliation, or union, of the principal national styles with their own traditions. The early fruits of this effort to create the *vermischter Geschmack*—the mixed style—prop-agated by Quantz and others are evident in J.S.Bach's "fusion of national styles" (to borrow the apt description of Manfred Bukofzer).[2]

By the second half of the century, the notion of a union or synthesis of national styles had matured into the idea of a universal musical style—of music as a universal language. The ultimate form of this universal musical language was rooted in formal conventions and procedures developed first in Italy—basically those manifested in the Italian sonata—but colored by folk music idioms imported from many national and ethnic traditions and enriched, finally, with sophisticated harmonic and contrapuntal techniques inherited from the Germans. This is a description, of course, of the music of the Viennese Classical Masters. The telling point, however, is that the "heroes" of this development—Bach, Gluck, Mozart, Haydn, Beethoven—all but Gluck profoundly important in the development and cultivation of both instrumental music in general and keyboard music in particular—were consciously aware of their historical and cultural missions. Joseph Haydn once remarked, "My language is understood in the whole world."[3]

The present volume is most decidedly a "history of heroes." After two historically conceived chapters tracing the development of keyboard instruments and performance practices throughout the course of the century, entire chapters are devoted in turn to the keyboard music of Johann Sebastian Bach, Domenico Scarlatti, Carl Philipp Emanuel Bach, Joseph Haydn, Wolfgang Amadeus Mozart, and Ludwig van Beethoven. Even the chapters on French and Early Italian Classical Masters have major figures—Couperin, Rameau, Johann Christian Bach—as their primary focus. But the approach throughout consists in equal measure of critical and historical analysis. That is, the objective is not only to understand the accomplishments of the protagonists, but also to evaluate the historical context to which they belonged, and to assess their contributions to the stylistic development of keyboard music and the keyboard idiom.

It is currently fashionable, however, to disparage the writing of history in terms of its "heroes" in favor of its institutions. This position has been argued most eloquently by the late Carl Dahlhaus.[4] Since the leading musical institution during the eighteenth century was "opera, and indeed mainly opera seria," it is not surprising that J.S.Bach, for example, is dismissed by Dahlhaus as a historically irrelevant "outsider," an "esoteric who knowingly withdrew from the world and drew the compositional consequences from that." But even Bach, the outsider and esoteric, was capable of observing from his

historical vantage point in the century's evolution—namely at the moment of *vermischter Geschmack* on the road to the universal style—that "German musicians are expected to be capable of performing…all kinds of music, whether it comes from Italy or France, England or Poland." As the pertinent chapter in this volume will argue, J.S.Bach certainly "drew the compositional consequences" from *that*!

One final word on heroes: it is symptomatic that the eighteenth century did not just produce an inordinate number of musical geniuses: it created the very idea of the musical genius—defined, that is, as a human personality rather than as a gift or talent one possessed. The conceit was evidently the inspiration of Diderot, who, in offering Jean-Philippe Rameau as the symbol of this "genius" in his novel *Le Neveu de Rameau,* even introduced the necessary linguistic adjustment, replacing the hitherto normal usage *avoir de génie* with the new formulation *être un génie.*[5]

With respect to the institutions, theorists and commentators of the time emphasized that art music was cultivated not just in the opera house but in three domains: the church, the chamber, and the theater, each with its own appropriate conventions, styles, and genres. Despite their passion for Italian opera, the courts were by no means oblivous to the importance and attractions of the new instrumental music. Frederick the Great, after all, did not only engage Hasse to write operas but also C.P.E.Bach to write keyboard and other instrumental works for his chamber. Domenico Scarlatti certainly composed and performed his keyboard sonatas for the delectation of a monarch. It would be hard, though, to determine the relative importance of the courts and the bourgeoisie in cultivating the development of instrumental music in the eighteenth century. Commercial concert life was just beginning at this time. Moreover, music publishing was an emphatically middle-class business whose growth in importance during the course of the century had an overwhelming impact not only on the circulation of particular works and the making of individual reputations but also in transmitting and disseminating new styles and genres—among them the sonata and other new keyboard genres aimed at the delectation and edification of *Kenner und Liebhaber.*

We must return to the fundamental problem of eighteenth-century music raised at the outset of these remarks, namely, the "fact" that the century was split into two antithetical periods. The question can be framed as a paradox: "How could Mozart be possible so soon after Bach?"—or, in terms of the subject matter of this volume: How could Mozart's piano sonatas be possible so soon after Bach's fugues for the clavier? The traditional answer only aggravates the question by positing a style shift around mid-century: the end of the "Baroque" era marked by the deaths of Bach and Handel followed at once by a radically simpler, preparatory "Pre-Classical" style until, after a mere thirty years of evolution, the mature masterpieces of Mozart and Haydn in the early 1780s heralded the advent of the "High Classical" or "Viennese Classical" style.

The answer to the paradox lies in the recognition that it is not really a question of chronology but of geography, that is, once again, of national culture and tradition. The historical process in fact did not go directly "from Bach to Mozart" at all. Rather (to oversimplify), both mas-ters essentially belonged to, and indeed represented in each instance the historical culmination of two long and distinct lines of development: in the case of Bach the Protestant tradition of central and northern Germany, for Mozart the Catholic—really the secular—tradition that had its roots in the south, that is, in Italy.[6] Of

course, Bach would not have been possible without Italy (and France), and Mozart (and Haydn) would not have been possible without Bach.

There remains one last question. Granted that the history of eighteenth-century music in fact began around 1700, when did it end? This is more difficult to say. Plausible suggestions would be 1798, the year of Haydn's *Creation,* or 1803, the year of the "Eroica": both are landmark works that confirm the arrival not only of new harmonic, tonal, and formal procedures but of a new musical aesthetic—indeed of a new musical ethos—as well. But the keyboard clearly had a pivotal historical role to play at the end of the century, too. We shall learn in the closing pages of this volume that the seeds of something new, including the seeds of dissolution, can be found in Beethoven's piano sonatas of 1800–1801: in particular, the sonatas of op. 27 and 31—not least, the "Moonlight" and "Tempest" sonatas, works whose familiar nicknames, though of questionable authenticity, are, in light of what was to come, nothing less than prophetic.

Robert L.Marshall

Notes

1. See, in particular, François Raguenet's *Parallèle des Italiens et des Francais,* published in 1702, and the response by Le Cerf de La Viéville, *Comparaison de la musique italienne et de la musique française,* published in 1705. Pertinent excerpts are printed in translation in Oliver Strunk, *Source Readings in Music History,* revised edition, ed. Leo Treitler (New York, 1998), 670–82.
2. Manfred F.Bukofzer, *Music in the Baroque Era* (New York, 1947).
3. Cited in Friedrich Blume, *Classic and Romantic Music* (New York, 1970), 28.
4. Carl Dahlhaus, *Die Musik des 18. Jahrhunderts,* Das neue Handbuch der Musikwissenschaft, vol. 5 (Laaber, 1985). The introductory chapter, translated by Ernest Harriss, appears in *College Music Symposium* 26 (1986): 1–6. Citations from that chapter in the following are taken from the Harriss translation.
5. Herbert Dieckmann, "Diderot's Conception of Genius," citcd in Edward E. Lewinsky, "Musical Genius: Evolution and Origins of a Concept," *The Musical Quarterly* 50 (1964): 335.
6. See Hans Heinrich Eggebrecht, "Über Bachs geschichtlichen Ort," reprinted in Walter Blankenburg, ed., *Johann Sebastian Bach,* Wege der Forschung, vol. 170 (Darmstadt, 1970), 247–89.

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Second Edition

This volume offers a corrected and updated version of the original edition. While the substantive content remains essentially unaltered, the contributors have taken the opportunity of the new printing to eliminate obvious errors and misprints, to clarify potential ambiguities, and to include in the selected bibliographies at the end of the individual chapters some of the more significant scholarly literature on eighteenth-century keyboard music to have appeared since the volume's original publication in 1994.

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CHAPTER ONE
The Instruments

Laurence Libin

Eighteenth-century keyboard instruments comprise three main families differentiated by their means of tone production. Stringed keyboards include those wherein stretched strings are sounded by plucking (as in the harpsichord and spinet), striking (clavichord and piano), or, rarely, bowing *(Bogenclavier).* Organs constitute a second family, involving whistle-like flue pipes and pipes that incorporate vibrating reeds. Large church organs commonly have both flue and reed pipes; portable chamber organs often have only flues, but one variety, called the regal, is limited to a single rank of reeds. The third category, in which hammers hit resonant solid bodies such as bells, includes tower carillons and keyed glockenspiels.

Aside from the types named above, the eighteenth century knew many other keyboard instruments, now mostly forgotten. Some of these merit description even though they engendered no lasting repertoire; their importance lies in revealing the fascination musical mechanisms of all kinds held among the intelligentsia, and in illustrating the central role of keyboards in musical culture. Why musicians preferred some types of keyboard instruments and ignored others can be understood only against this background.

Idioms and Instruments

Before 1800, much music was played interchangeably on different keyboard instruments without concern for modern precepts of authenticity or faithfulness to a composer's intentions. Often, composers seem to have had no particular instrument in mind for their works but were content to have them played, with appropriate adjustments, on any available kind. Publishers appealed to a broad market by indicating on title pages that pieces could be played, for example, on either harpsichord or piano, or simply skirted the issue by specifying "for clavier," a generic designation for keyboards, though commonly confined to stringed types after the mid-eighteenth century.[1]

Despite this apparently casual attitude, composer-performers who were intimately familiar with their instruments' expressive and technical possibilities developed distinctive idioms for various keyboards. François Couperin's *pieces croisées* (pieces requiring crossed hands) and many of J.S.Bach's "Goldberg" variations, for example, were conceived for two-manual harpsichords and suffer when played on other instruments. Emergence of idiomatic writing was tied to larger stylistic developments as well as to increasing availability and functional divergence of keyboards during the century. Thus, while the first music published for the nascent piano, Lodovico Giustini's twelve sonatas *"da cimbalo di piano e forte"* ("for harpsichord with soft and loud

[gradations]"), printed in Florence in 1732,[2] is nearly indistinguishable from contemporary Italian harpsichord music, by the 1790s an unmistakably pianistic style had emerged, notably in slow movements of Mozart's late keyboard concertos, where texture, articulation, phrasing, and dynamics are treated with great sensitivity to the piano's unique properties.

Some of Haydn's clavier sonatas of the mid-1770s and 1780s adumbrate the full-fledged piano idiom, which arose in the wake of an intellectual movement, *Empfindsamkeit,* that rejuvenated the clavichord in German-speaking lands. C.P.E.Bach's highly influential *Versuch über die wahre Art das Clavier zu spielen* (Berlin, 1753 and 1762), among other treatises, identifies idiomatic effects for the clavichord, among them *Bebung,* a vibrato inimitable on organ, harpsichord, or piano. Bach's impassioned compositions, aimed at connoisseurs, as well as his astonishing style of playing, fully realized the clavichord's potential to stir emotion. The instrument's capacity for intense affects, quite out of proportion to its tiny sound, undoubtedly appealed to Haydn, whose *empfindsamer* solos from the late 1760s and early 1770s sound to perfection on a good clavichord.

Not all keyboard instruments fared so well in the face of stylistic ferment. When the intricate, colorful style of the early eighteenth-century *clavecinistes* was overshadowed by Italian and Central European developments, the French Baroque harpsichord, to which François Couperin's *ordres* were subtly but inseparably tailored, lost its central reason for existence. Other nations' harpsichords suffered the same fate, as limpid textures premised on dynamic expressiveness overwhelmed counterpoint and florid embellishment, to which the harpsichord's clear but rigid sound was exquisitely suited. Mozart sometimes played the harpsichord in public as late as 1787, but by that time it was no longer the instrument of choice for concerts.[3] The latest known Italian harpsi-chord, by Vincenzo Sodi, was constructed in 1792; harpsichord building ceased in England about 1809.[4]

No inherent structural or mechanical defects led to the harpsichord's desuetude; in terms of design it was at least as refined as the piano that replaced it, and its tone at the fullest was no less loud or sustained than the early piano's. Only dynamic flexibility was conspicuously lacking; otherwise, the harpsichord's demise was by no means inevitable.

The survival or decline of different instruments can hardly be separated from the viability—not necessarily the quality—of their respective repertoires. Church organs continued to be erected despite the waning vitality of organ design and liturgical composition after mid-century. Likewise, despite a paucity of adventurous music, carillons filled their niche in Dutch and Flemish civic life so well that, like certain archaic reptiles, they seemed immune both to evolution and extinction. Although the Louvain carillonneur Matthias van den Gheyn (1721–1785) wrote eleven noteworthy preludes,[5] most carillon music consisted of sacred and (especially in Catholic cities) secular tunes arranged for individual carillons by their own players, as had long been customary. These arrangements were usually improvised; little carillon music was notated, much less published, except as a guide for programming automatic carillons.

In an age when polite society for the most part fervently pursued novelty, those instruments thrived that best accommodated evolving needs for increased power, range of notes, and above all, dynamic nuance. As popular musical fashion, led after about 1760 by operatic reforms, moved toward more vocally oriented modes of expression, progressive critics complained increasingly of the harpsichord's (and to a lesser extent

the organ's) dynamic inflexibility.[6] While the harpsichord gradually became outmoded as listeners tired of its intrinsic limitations, the piano adapted successfully to the new musical challenges.

Whether musicians drove or followed instrument makers in the direction of enhanced expressive possibilities and greater range is controversial. Certain composer-performers, such as J.S.Bach and Jan Ladislav Dussek, actively collaborated with keyboard builders in advancing their designs; others, including Mozart, contented themselves with the best available new instruments but made no excessive demands on them that might have inspired further innovation.

Some craftsmen, among them the renowned piano and organ builder Johann Andreas Stein (1728–1792) and his children and successors Nannette (1769–1833) and Matthäus Andreas (1776–1842), were themselves serious performers who kept in close touch with new music; Mozart, who praised Stein's pianos, in 1777 played his three-clavier concerto, K.242, with Stein as another of the soloists. Stein's own perception of the shortcomings of conventional keyboard instruments led him to invent the *Melodica,* an organ of three-and-one-half-octave range, with loudness, pitch, and vibrato all governed by finger pressure. The shortlived *Melodica* (no example survives), which Stein intended only for playing melodies, is one example among many where eighteenth-century builders, carried away by technological prowess, mistook musical needs; practical composers, in contrast, never wrote for instruments that did not yet exist.[7]

Social Contexts

Fashions such as rococo and neoclassical taste in furniture design shaped eighteenth-century keyboard instruments no less than did strictly compositional demands and performers' preferences. Other forces that affected production and usage of these instruments include the growth of commerce and spread of wealth; development of new audiences and concert venues; changing patterns of artistic patronage; wartime disruption of manufacture and migration of craftsmen; and manufacturing and marketing innovations. In order to comprehend the effects of these factors on the development of different keyboard instruments, it will be necessary to define their essential structural and musical characteristics. First, however, some preliminary remarks should help clarify general issues of construction and distribution.

Because of their complexity and cost, throughout the eighteenth century keyboard instruments remained products of basically urban technology, destined for a limited clientele of individuals and institutions that also formed the core market for cultivated music. Evidently most stringed keyboards were purchased to be played by female amateurs and children in genteel domestic circumstances; this situation held true through the Victorian era and determined the nature of much keyboard repertoire intended for salon or private performance. The majority of professional keyboard players and virtually all church organists and carilloneurs before 1800 were male, though toward the end of the century a growing number of women such as Nannette Stein (who also built pianos) and Mozart's pupil Josepha von Auernhammer gained recognition as concert pianists.

The prevalent stereotype of stringed keyboards being particularly appropriate for women to play owes much to old iconographic and literary conventions wherein female

keyboard players, including St. Cecilia, metaphorically express social concord by virtue of their ability to play chords and polyphony and thus to reconcile differences harmoniously.[8] Eighteenth-century aesthetes perceived that a continuo player binds an ensemble much as a mother regulates her family. More to the point, stringed keyboards do not cause calluses or distort posture as many other instruments do, and they provide for entertainment and instruction in the home, where music was cultivated as an innocent pastime that enhanced a woman's attractiveness.

Keyboard instruments flaunted their owners' status even on colonial frontiers, but the most elegant examples came from cultural centers where musical life flourished. In the 1790s, Vienna alone counted scores of citizen *(bürgerlicher)* organ and piano builders, and many others worked without civic sanction in nearby suburbs. Dozens more were active in London and other northern cities, and innumerable individual builders inhabited towns all over western Europe and Britain. Despite cataclysms such as the Seven Years' War (1756–1763) and the French Revolution, as well as periods of economic depression, the ranks of these specialized craftsmen burgeoned during the century. A rough parallel can be drawn with the contemporaneous growth of music publishing.

The Industry

Workshops varied in size from small dynastic operations where one master employed several apprentices and journeymen who turned out a few instruments a year, to John Broadwood's pioneering London manufactory, which in 1784 alone sold thirty-eight harpsichords and 133 pianos, most of standardized design and some second-hand.[9] In 1790, Vienna's leading piano builder, Anton Walter (1752–1826), employed fourteen workers and claimed to have sold more than 350 instruments in the previous ten years. Studies of manufacturing methods suggest that while many makers, especially those with little schooling, worked empirically and intuitively, others who may have had some mathematical facility—chiefly organ builders and bell founders, who could not easily alter specifications once work began—calculated and planned on paper in advance of construction. For example, by 1758 Georg Andreas Sorge (1703–1778) had applied logarithms to the scaling of organ pipes.[10]

While tone quality was of course a major consideration for all instrument makers, mechanical reliability and efficiency particularly concerned makers and players of keyboards. That keyboard artisans regarded themselves on a par with mechanics, who enjoyed higher status than carpenters and joiners, is shown by their adopting the mechanic's practice of prominently displaying their names on their products. Probably as much imagination and effort went into perfecting key mechanisms as into tonal design; after all, tonal preferences are subjective whereas judging reliability of moving parts is not. At least at the beginning of the century an old belief persisted that in theory, an instrument's geometrically neat proportions should automatically ensure appealing tone; but as the Enlightenment grappled with irrational aspects of beauty, abstract proportional schemes based on local units of measurement gave way to scientific elucidation of timbre. This growing preoccupation with musical acoustics involved intellectuals such as Abbé Georg Joseph Vogler (1749–1814, teacher of Carl Maria von Weber and Giacomo

Meyerbeer) and Ernst Florens Friedrich Chladni (1756–1827), both of whom designed novel keyboard instruments.[11]

Carillon construction had few points of contact with other kinds of keyboard manufacture; bell-founding differed considerably from casting organ pipe metal, and carillon key mechanisms had little in common with other types. Organs and stringed keyboards, however, could be made in a single establishment, and many German-speaking builders signed themselves *Orgel-und Instrumentmacher (Instrument* was a generic German term for stringed keyboards). Bach's friend Gottfried Silbermann (1683–1753), for one, built church organs alongside clavichords, pianos, and other instruments. Such versatile builders sometimes combined pipes with strings in hybrid models that gave unusual tonal effects. Handel used a combined organ-harpsichord in *Saul* and for at least one concerto of 1739; in the same year his acquaintance in Hamburg, Johann Mattheson, recommended such an instrument for accompanying church sonatas. In 1770 Johann Andreas Stein built a two-manual instrument consisting of a grand piano atop an organ, and in 1784 Michael Arne performed a concerto on a piano with organ attachment. A later tangent piano combined with a three-stop organ, attributed to the Regensburg firm of Späth and Schmahl, shows that builders and buyers took such hybrids seriously throughout the century, though no music known today specifically requires their resources.

Keyboard-making requires mechanical ingenuity that is applicable to nonmusical devices as well. Jean Marius, a member of France's Académie Royale des Sciences, whose inventions include a water pump, seeder, tent, and umbrella, patented in 1700 a folding harpsichord *(clavecin brisé)* and devised a portable organ as well as bowing, hammer, and pedal mechanisms for stringed keyboards. Around mid-century, members of the Kintzing family of Neuwied, Germany, constructed fine clocks as well as pianos and clavichords, some in conjunction with the noted furniture maker David Roentgen. Joseph Merlin, who received a British patent in 1774 for a combined harpsichord-piano, invented roller skates, and in 1792, Tobias Schmidt, a piano builder in Paris, constructed a prototype guillotine.

Most keyboard craftsmen specialized in producing instruments of only a few types—though some builders listed more than a dozen models they could make to order. In 1802, Friedrich Carl Wilhelm Lemme of Brunswick (1747–1808) advertised eight models of pianos and fourteen of clavichords. Some peculiar designs were the exclusive products of individual workshops; for example, a portable piano resembling a harp lying on its side seems to have been a speciality of the Späth and Schmahl families, who were related by marriage.

Considering difficulties of travel and communication, a surprising amount of technical cross-fertilization occurred among geographically separated craftsmen. Technical treatises found their way even as far as America, where Georg Andreas Sorge's instructions for making pipes and bellows (1764) apparently influenced Moravian organ builders in Pennsylvania. The Benedictine monk François Bédos de Celles's exhaustive *L'Art du facteur d'orgues,* which appeared between 1766 and 1778 as part of the *Descriptions des arts et métiers* published by the Académie Royale des Sciences, circulated widely.[12] (Characteristically, Dom Bédos also wrote a treatise on sundials.)

Journalists also spread useful information; for example, Scipione Maffei's important account in the *Giornale dei letterati d'Italia* (Venice, 1711) of Bartolomeo Cristofori's

recently invented piano was translated in Mattheson's *Critica musica* (Hamburg, 1722) and reprinted several times.[13] Meanwhile, Italian musicians probably introduced grand pianos into Germany, where in the 1730s Cristofori's model was being copied by Gottfried Silbermann; his nephew Jean-Henri Silbermann took the model thence into Alsace. Other musicians carried Florentine pianos to Portugal and Spain; there they were copied by builders such as Henrique van Casteel, who may have brought Cristofori's design from Lisbon to Brussels.[14]

As apprentices and journeymen, many youthful builders traveled extensively. The journal of J.A.Stein, a native of Heidelsheim, records visits or periods of work in Strasbourg (where he was briefly employed by the organ builder Johann Daniel Silbermann), Regensburg (where he worked for Franz Jacob Späth), Augsburg, Gochsheim, Paris, and elsewhere; he settled finally in Augsburg, but his son and daughter carried on work in Vienna.[15] Organ builders sometimes relocated their households to follow commissions; a big job might take months to complete, and permanent emigration opened new opportunities. Johann Clemm (1690–1762), a pioneer in transmitting German organ-building practices to America, brought his family to Philadelphia in 1733; about 1745 he moved to New York to care for a large organ he had constructed, and in 1757 he resettled in Pennsylvania where he trained younger craftsmen. Through such movements, instrument development kept pace with dissemination of music.

Until the abolition of craft guilds, which took place in France only in 1791, many harpsichord makers throughout Europe still belonged to ancient cooperative brotherhoods such as the Guild of St. Luke. This guild also embraced painters whose collaboration was responsible for the gorgeous decoration of many baroque harpsichords. Some builders, among them Cristofori, worked under powerful patronage that might exempt them from strict guild regulation, which could inhibit innovation. Keyboard craftsmen in Britain, long free from guild control, and beneficiaries of industrialization, early applied factory methods to keep up with burgeoning demand for pianos. A concentration in London after 1756 of shrewd, competitive Saxon refugees from the Seven Years' War spurred production on a scale never seen before. About 1783, their leader, Johannes Zumpe, retired to Germany a rich man, having founded a major industry that was boosted in 1786 by a commercial treaty that bolstered piano exports to France.

Construction, Mechanisms, Ranges

The common operating feature of all three keyboard families is the keyboard itself, the row of levers upon which a player exerts direct effort. Keyboards, also called claviers, had achieved considerable mechanical sophistication since the Middle Ages. Keys were designed for feet, and fists on the carillon, as well as for fingers. The basic arrangement of naturals and interspersed, raised accidentals (the modern piano's white and black keys) was standardized long before 1700, though even until 1800 key colors varied according to regional custom and availability of suitable materials. In northern Europe, naturals were often black and accidentals white, but this reversal of modern coloration has no musical significance.

Carillon keys, being very large and widely spaced, require no coloring to help differentiate accidentals from naturals, but on smaller claviers such as the harpsichord's

or piano's, ivory, less costly bone, or, in Italy, honey-colored boxwood usually covers the light-colored keys and ebony or stained hardwood caps the dark ones. Except on the carillon and church organ, where the playing desk (console) is normally out of view, claviers rivet visual attention during performance; hence further decoration of keys and their surroundings is customary. Before 1800, carved arcades, molding, or embossing adorned the naturals' vertical fronts. Some luxurious keyboards sported geometric inlays or mother-of-pearl or tortoiseshell veneers.

Keys control intermediate devices such as valves, hammers, or jacks that activate more or less distant sonorous elements, sounding them individually or severally. Keys of instruments made before 1800 tend to be slightly narrower than modern piano keys, and hand stretches beyond an octave were rare; for the most part, then, hand size was not a limiting technical factor, as it was to become in some Romantic piano music. The relatively light "touch" of eighteenth-century keyboard instruments, excepting some large organs, fostered a relaxed, fleet, well-articulated technique that depended less on weight and strength than does modern piano technique. Indeed, proper performance practice—for example, correct fingering for crisp ornaments and audible inner voices—was premised on a delicate, responsive touch; a sluggish "action," as the whole clavier mechanism is called, would have been incompatible with textural clarity.

Fully chromatic manual keyboards of sixty-one notes (five octaves) were normal for large harpsichords and pianos of Mozart's day, and by the end of the century this compass was sometimes exceeded. About 1700, however, many keyboards covered only four octaves, and a range of four and one-half octaves was adequate for most music at least up to 1750 (carillons rarely exceeded two and one-half octaves). As late as the 1770s, many claviers were made with so-called short octaves, in which some little-used accidental notes in the extreme bass are omitted; instead, the normal order of pitches is rearranged so that those same keys sound still lower natural notes. For example, the keys that appear to sound BB, C, C#, D, D# actually sound GG, C, AA, D, BB, requiring some zigzag fingering. This economy of notes saved money and space and increased overall range at the cost of complete chromaticism.

Expansion of range from four to five octaves and beyond proceeded irregularly, and keyboard tessitura (average overall range) was never uniform all over Europe. The gamut might begin on C, F, or G, occasionally E (or an octave lower or higher); the top note, too, varied even among instruments built at the same time by a single maker. Because many instruments were made to order, customers' preferences could determine a particular instrument's complement of keys and ancillary devices.

Widening and exploitation of extremes of range involved builders and musicians in a race that neither consistently led, but that created a vigorous market for the latest instruments. Furthermore, during the century pitch levels and tuning systems were in flux. (Carillons and organs, however, were difficult to retune. A factor usually overlooked in explaining Classical composers' lack of interest in organ composition is that most existing organs were tuned in unequal temperaments that made certain intervals excruciating. The Brunswick organ and clavier maker Barthold Fritz advocated equal temperament as early as 1756; his advice was reiterated in treatises by Georg Joseph Vogler [1776], Johann Samuel Petri [1782], Daniel Gottlob Türk [1789], and others.) The net effect, in up-to-date musical circles at least, was that older instruments soon became obsolete. Although many existing harpsichords were modernized or even rebuilt as

pianos, more often they were consigned to the woodpile as pianos with stylish cases became all the rage. For this reason as well as through attrition due to wear and accidental loss, the surviving sample of unaltered eighteenth-century keyboard instruments is pitifully small and not fully representative.

The Harpsichord

Harpsichords typically have one or two keyboards, also called manuals, governing two or three sets of strings tuned either at unison pitch (designated "8-foot" pitch after after the nominal length of the CC string) or an octave higher ("4-foot" pitch, with strings half as long). The strings press upon a bridge that conveys their vibration to the amplifying soundboard. Each string is plucked by a short plectrum of crow quill protruding from a tongue pivoted in a jack, a wooden strip that rests vertically atop the back end of the key lever. As a finger depresses the head of a key, its tail ascends, lifting the jack and causing its quill to pluck; upon descent, the tongue tilts back to prevent a second pluck and a cloth damper silences the string.

An important characteristic of the typical harpsichord is its inability to produce gradual dynamic change; instead, loud and soft contrasts, if they occur, are abrupt, or "terraced." This inflexibility is due to the invariable force of the plucking action regardless of how forcefully or quickly a key is depressed. Though a percussive attack can overwhelm tonal beauty with noisy clatter, a fast or slow, hard or soft touch negligibly affects the instrument's loudness. Harpsichord music is therefore not premised on dynamic shading the way piano music is, but depends on other means, such as manipulation of texture and dissonance, to create an illusion of swelling and fading.

Often, in order to permit dynamic and tonal change, the row of jacks corresponding to each set, or choir, of strings can be disengaged so that choirs can sound alone or in combination. In two-manual harpsichords, upper-manual jacks can be mechanically coupled to the lower manual so that all choirs can be plucked at once. The material of the string, usually iron or brass, the point along its length where it is plucked, the stiffness of the quill, and acoustical characteristics of the soundboard chiefly determine tone quality, which can be artificially modified by devices such as mutes. In certain instruments, when one set of jacks is disengaged its dampers do not touch their strings, which vibrate sympathetically to enrich and prolong the sound of another choir. The artful selection of tonal effects, called registration, is usually left to a performer's discretion, though treatises discuss the subject. While French composers were more generous than others in indicating registral preferences, C.P.E.Bach's *Sonta per cembalo a due tastature* (Wq. 69, H. 53, 1747) may be unique in specifying registration throughout the piece.[16]

A harpsichord's strings run approximately parallel to the long straight side, or spine, of the case and perpendicular to the keyboard end, giving rise to a wing-shape case (hence the designation *Flügel*). In the compact form known as the bentside spinet, which was particularly popular in England, the keyboard lies at an acute angle to the spine. Having only one manual and one set of strings, the spinet offers no tonal variety (Ill. 1.1).

The standard French two-manual harpsichord of the period has 8-foot and 4-foot choirs on the lower manual, a single brighter-sounding 8-foot on the upper, a coupler connecting the manuals, and, often after mid-century, a stop controlling a row of soft

pads that partially mute the strings by pressing against them. For quiet solo effects a fourth set of jacks with soft leather plectra *(peau de buffle)* was employed occasionally after about 1768. Although with rare exceptions French harpsichord pieces fit within the compass GG–d^3, as early as 1707 the range FF–e^3 appears in a harpsichord by Nicholas Dumont, and one by Pierre Donzelague, dated 1711, has the oldest known FF–f^3 compass of any French harpsichord. Owing chiefly to their string scaling and plucking points, Parisian instruments by members of the illustrious Blanchet and Taskin families possess lush, colorful tones perfect for the genre pieces of Rameau and his followers, many of whose solos are in fact transcriptions of ensemble works. This characteristic rich sound harkens back to seventeenth-century Flemish harpsichords, which were enlarged and enjoyed great favor in France after 1700.

English harpsichords, like French, owe much to older Flemish models, although their styles diverged. The basic equipment of an En

ILLUSTRATION 1.1. Bentside spinet, John Crang, London, 1753; 1976.77a,b. The Metropolitan Museum of Art, New York.

glish double-manual harpsichord, defined by Hermann Tabel (fl. 1715–1738) early in the eighteenth century, resembles the French, but some English instruments have a further register known as the "lute," consisting of jacks that pluck quite near the ends of the strings to produce a nasal quality. Unlike French instruments, in which the tonally contrasting upper-manual and lower-manual unisons are of approximately equal loudness and therefore suitable for *pieces croisées,* English harpsichords have a quieter upper-

manual 8-foot choir effective mainly for echoes. The range FF–f^3, omitting FF#, was standard from the 1720s; Tabel's former apprentice Jacob Kirckman (1710–1792) expanded this to FF–c^4 in one known instrument, and after 1765 Burkat Shudi made numerous harpsichords encompassing CC–f^3. The FF# key was normally included after 1780. In that year John Joseph Merlin built the only extant English harpsichord with a 16-foot choir.

Eighteenth-century Italian harpsichords normally have one manual, typically with 50 to 56 notes beginning on C or GG (short octaves) but unusually up to FF–g^3, and two (rarely three) 8-foot choirs. Cristofori made one strange instrument with 8-foot, 4-foot, and 2-foot registers. These resonant instruments, commonly strung with brass wire, tend to be delicately constructed, with thin sides that need the protection of a separate outer case to which the lid is attached. Inner and outer cases are sometimes fused in a type known as the false inner-outer case. Italian harpsichords, while tonally less versatile than French and English, have a crisp, assertive quality well suited to contrapuntal clarity and to continuo-playing in orchestras. Often, these instruments were fitted with pedalboards of one to two octaves to facilitate performance of organ music or doubling of bass notes.

Spanish harpsichords resemble Italian ones, but too few survive to define many peculiarly Iberian qualities except for details of decoration. Three Spanish harpsichords owned by Queen Maria Barbara possessed five-octave compasses, either FF–f^3 or GG–g^3; Domenico Scarlatti and Antonio Soler both call for the top g, a note rare on Italian harpsichords. Another of Maria Barbara's harpsichords had an extraordinary complement of four choirs and five registers; its exact disposition and origin are unknown.[17]

Extant German harpsichords are scarce and only instruments of the Hamburg school are well known; extant examples by the Hass and Fleischer families have varied dispositions, sometimes including 2-foot and 16-foot choirs and three manuals. Recently, modern builders have attempted to replicate more modest Saxon types known to J.S.Bach. Modern copies of instruments by Michael Mietke (from whom, in Berlin, Bach bought a two-manual harpsichord in 1719) possess an aural warmth quite unlike the thick, hard brilliance of Hamburg instruments. (See chapter 3.) Bach's harpsichord music seldom requires a range greater than C–d^3, but several of Bach's late works descend to GG, a note more often called for by Handel. A fully chromatic five-octave compass, FF–f^3, is found in a Saxon harpsichord dated 1722, but became common only in the second half of the century.

Little if any music requires the resources of the largest Hamburg harpsichords; on the contrary, most keyboard music from before 1750 can be effectively performed on a simple Italian instrument. Changes of registration within a work are seldom needed to sustain interest, which is more effectively generated internally by manipulation of texture and tessitura and by imaginative embellishment. Indeed, one feature that helps distinguish harpsichord music from organ music is that while the latter, due partly to the organ's prolonged duration of notes, tends to maintain a fixed number of lines so as not to confuse voice-leading, harpsichord music more freely adds and omits voices and implies voiceleading in the manner of lute style.

Various mechanical "improvements" to the harpsichord were intended to provide greater expressive possibilities. Doubtless the piano's dramatically rising popularity after about 1770 motivated some of these efforts, but their origins predate the invention of the piano. It seems as though delight in gadgetry rather than musical necessity prompted

some inventors, and many patents were granted for devices that serious composers ignored despite their appeal among novelty-seeking amateurs.[18]

To facilitate changing registration, hand stops were generally arranged over the keyboard rather than at the side of the case as in many seventeenth-century instruments, but some harpsichords retained inconvenient side-drawn stops as late as about 1770. As early as the seventeenth century builders employed pedals to change registers while playing, but the system was not frequently adopted before the mid-eighteenth century. C.P.E.Bach credits Johann Hohlfeld (1711–1771), a former lace maker, with inventing a pedal mechanism that"…has made the harpsichord, particularly the single-manual kind, a much-improved instrument, and, fortunately, eliminated all the difficulties connected with the performance of a *piano.* If only all harpsichords were similarly constructed as a tribute to good taste!"[19] The "machine stop" found on some English harpsichords after about 1765 can provide a crescendo or diminuendo effect when its pedal, which controlled the 4-foot and one or two 8-foot choirs, is moved slowly; Haydn's harpsichord made by Burkat Shudi (now in the Kunsthistorisches Museum, Vienna) has this device. Knee levers, supposedly introduced by Pascal Taskin in 1768, likewise move plectra into play gradually, allowing limited dynamic gradation; this feature is required for the *Simphonie de clavecins* composed about 1773 by Armand-Louis Couperin.[20]

To broaden the harpsichordist's palette of timbres, jacks were sometimes fitted with plectra of material other than quill and soft leather.[21] String material, too, was subject to variation, and harpsichords strung with gut rather than metal wire were known all over Europe; they are particularly well documented in Germany, where they were known variously as *Lauten-clavessin, Lautenclavicymbel, Lautenwerck,* or *Theorbenflügel.* No example survives. At his death, J.S.Bach owned two gut-strung harpsichords, one of which reportedly had been made according to his own design by the Silesian organ builder Zacharias Hildebrandt; it was smaller than a normal harpsichord and had two gut 8-foot choirs and a brass-strung 4-foot.[22] Jakob Adlung says that "The *Lautenwerck* is the most beautiful of keyboard instruments after the organ…,"[23] To allow tonal and dynamic contrast, Johann Nikolaus Bach (a second cousin of J.S.Bach) made lute-harpsichords with two and three manuals; the jacks probably lacked dampers, leaving the strings free to vibrate sympathetically. A number of works of J.S.Bach, including the suite in E minor BWV 996, his arrangement of the violin partita in E major BWV 1006a, and even continuo parts in the St. John Passion, have been proposed as meant for the gut-strung harpsichord, but the composer never specifies its use in any extant manuscript.[24]

The *Bogenclavier,* a distinct kind of keyboard instrument with strings activated by bowing, is also recorded chiefly in German sources. The type existed since the sixteenth century, but like the *Lautenwerck,* no unquestionably authentic example survives from before 1800. It typically involved a moving loop of horsehair against which gut strings were drawn individually by hooks connected to the keys. Other versions utilized treadle-operated rotating wheels like the hurdy-gurdy's. The *Bogenclavier's* advantages over the harpsichord include its ability to sustain notes as long as the bow kept moving, and like the clavichord, to shade dynamics and yield a vibrato as well as a portato *(Tragen der Töne)* in response to finger pressure. Despite these useful qualities, bowed claviers attracted little attention from composers, perhaps because too few of these instruments were available to enable music composed specifically for them to become popular. Nevertheless, C.P.E.Bach composed a sonata (Wq. 65/48, H. 280, 1783) for one. Such

instruments must have been expensive to build, strenuous to play, and hard to maintain, judging from the specifications of Roger Plenius's lyrichord (patented in 1741), which used lead weights on levers to maintain string tension and involved fifteen wheels rotated by clockwork at different speeds.[25] Along with the *anémocorde* invented in 1789 by Johann Jacob Schnell, an isolated effort to sound strings with jets of wind from bellows, such experiments of the late eighteenth century exemplify a confidence in technology that was boundless, if often misplaced.

The Clavichord

Clavichords are mechanically the simplest but technically the most demanding of keyboard instruments. They are built in the shape of a rectangular box with the keyboard on one long side and strings stretched diagonally from the tuning pins at the player's right, over the soundboard and key levers to hitchpins along the back, opposite the player. From each key lever a thin brass wedge, the tangent, protrudes vertically beneath the strings and strikes them when the key is pressed. Remaining in contact with its strings—normally two per note—while a key is held, the tangent forms a temporary bridge that, together with the permanent bridge affixed to the soundboard, defines the strings' vibrating length and therefore the note's pitch. Volume drops off rapidly after impact, and on release of the key, cloth strips woven among the strings to the left of the tangents stop any remaining vibration. The distance a tangent travels is only a few millimeters, so its key needs to be only shallowly depressed.

Among all keyboards the clavichord is most responsive to touch and is therefore highly expressive under the hands of a skilled performer. By varying finger pressure while a note is held, the player can impart a subtle vibrato. Too strong a blow will distort pitch or even dislodge strings; therefore, a clavichord cannot sound very loud, though a good one can effectively accompany a voice or another single instrument. On the other hand, no other instrument can play more quietly than a clavichord, so its dynamic range, from virtual inaudibility to *mezzoforte,* is extensive. The clavichord's quiet, rapidly decaying notes can impose considerable strain on listeners especially in a noisy setting, hence the instrument is not suitable for long concerts.

Because of its simplicity and small size, the clavichord can be constructed inexpensively. During the eighteenth century countless ones were made, and many survive, usually looking rather plain and lacking legs, though some had their own stands. Some lavishly decorated examples are known, notably from Hamburg, where in the 1740s and later makers such as Johann Adolph Hass occasionally included additional strings at 4-foot pitch for the bottom octave or more to reinforce the sound. In such instruments each tangent might govern its own strings, but normally two or three tangents will strike one bichord at different points along its length, giving several successive pitches from the same strings. Clavichords with shared strings are called "fretted" while those with exclusively independent strings are called "unfretted." Many eighteenth-century clavichords are fretted in the bass and unfretted over the rest of their range.

Fretted clavichords are musically somewhat limited in that certain harmonic intervals cannot be sounded because a pair of strings can emit only one note at a time regardless of how many tangents strike those strings at once. In case two tangents should strike their

shared strings simultaneously, the tangent closest to the soundboard bridge will determine the sounding pitch. To minimize this limitation, only notes a halfstep apart and rarely sounded at once are fretted together. J.S.Bach's entire *Well-Tempered Clavier* presents very few intervals that cannot be played on a standard four-and-one-half-octave (C–f^3 or C–g^3) fretted clavichord.[26] The oldest known clavichord with a fully chromatic five-octave range (FF–f^3), by Hieronymus Albrecht Hass, is dated 1742; a lowest note of C, coinciding with the usual bottom note of German organ manuals, was more common before 1750, as befit the clavichord's important role as a practice instrument for organists. For this purpose, some clavichords were made with pedalboards.

The fretted *(gebunden)* clavichord is unsurpassed for refining a player's articulation and digital dexterity. Novices may experience difficulty playing two notes fretted on the same strings in quick succession, as in a trill, if one key is not released before the other is depressed. An offsetting advantage of fretted stringing is that the narrow width of the string band allows more uniform key lengths and more even touch from bass to treble than in unfretted *(bundfrei)* clavichords. Fewer strings simplify tuning and reduce stress on the case.

In German-speaking lands including German-settled North America, and in Iberia and Scandinavia, clavichords served as instructional instruments into the nineteenth century. Curiously, their presence is seldom documented after 1700 in Britain and France, but in Germany they inspired an important repertoire of household music in the *empfindsamer Stil,*[27] As a vehicle for sentiment the clavichord had no peer.

Jakob Adlung's *Anleitung zur musikalischen Gelahrtheit* (Erfurt, 1758) describes mechanical ways to alter the clavichord's timbre.[28] These methods include sliding the keyboard slightly forward, causing the tangents to strike only one of each pair of strings or engaging a leather-covered portion of the tangents in contrast to their bare brass surface. A particularly effective device was the so-called pantalon register, consisting of a separate set of tangents mounted on a hinged strip beneath the keyboard and passing between the keys. In operation, the pantalon's tan

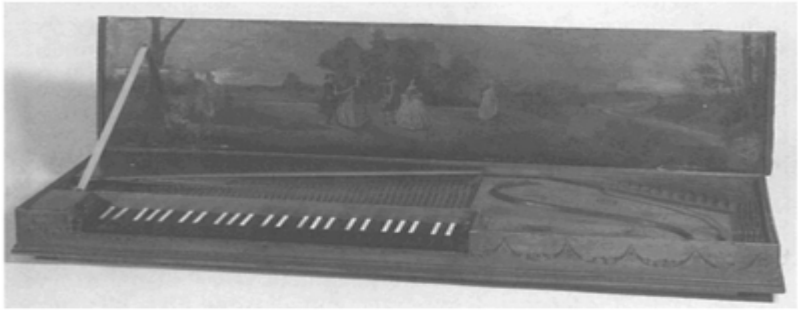

ILLUSTRATION 1.2. Clavichord with pantaleon stops, Christian Kintzing, Neuwied, Germany, 1763; 1986.239. The Metropolitan Museum of Art.

gents remain in contact with the strings and prolong their vibration after the keys are released; the resulting resonance is like that of a hammer dulcimer. The pantalon register (named for Pantaleon Hebenstreit's dulcimer; see below), which can be applied only to *bundfrei* clavichords, can be divided to affect bass and treble separately; it occurs only in Germany (Ill. 1.2).

The Piano

It is not always possible to ascertain just when the words *cembalo* and *clavecin,* which normally mean a harpsichord, refer instead to a clavichord or to a piano in eighteenth-century writings. Cristofori's piano was initially called by various names including *gravicembalo col piano e forte* ("harpsichord with soft and loud") or *cembalo con martelli* ("harpsichord with hammers"); it is still termed "A newly invented harpsichord called a *piano et forte"* in the earliest known French advertisement for a piano (1759).[29] Mozart's autographs of the piano concerti K.488 and K.491, both completed in 1786, specify *cembalo* for the solo, but here too the word is used generically; only in the concerti K.537 (1788) and K.595 (1791) does Mozart finally indicate *Fortepiano* or *Pianoforte* (the terms are synonymous). Compounding uncertainty, the German term *Flügel,* used in the nineteenth century to mean a grand (wing-shaped) piano, in Mozart's era commonly meant a harpsichord.

One essential mechanical feature distinguishes pianos from clavichords: while a clavichord tangent remains in contact with the strings so long as the key in which it is imbedded is depressed, a piano hammer is separate from its key and rebounds immediately upon striking. Therefore, unlike a clavichordist, a pianist cannot inflect pitch by varying finger pressure; but the piano mechanism's greater leverage multiplies hammer velocity, vastly increasing maximum loudness. After the hammer rebounds, the strings continue to sound until silenced by a damper that comes into play when the key is released. Material, mass, and striking point of the hammer greatly affect tone.

Mechanically, the simplest means to cause the hammer to rebound occurs in the confusingly named tangent piano, wherein the hammer (not a fixed tangent in the clavichord's sense) is simply a vertical shaft of wood or metal that rests on the end of the key and is held loosely in a rack beneath the strings. As the key is depressed, its motion is abruptly arrested by a stationary rail; momentum carries the hammer shaft onward to the strings. After impact, the hammer returns to rest on the key. This system, already applied in the seventeenth century and developed by Jean Marius in 1716, requires a certain minimum force of attack to throw the shaft clear of the key; insufficient speed will result in no impact, and therefore a tangent piano can be hard to play at low dynamic levels. At the other extreme, a violent attack can cause the shaft to jangle against the strings. Despite these difficulties, tangent pianos were built in small numbers throughout the eighteenth century, and some surviving examples are noteworthy for their tonal beauty.

Still better control over touch arises when a shorter, lighter hammerhead is attached to a hinged lever, or shank, that rises quite close to the strings before key descent is arrested and momentum takes over; this arrangement, in which the hammer moves in a small arc, is the basis of the fully developed piano action. An intermediate lever can be interposed

between key and hammer shank to cause greater acceleration. The hammerhead can be captured by a "back check" upon rebounding, to avoid extraneous motion.

Documentary evidence strongly indicates that Bartolomeo Cristofori (1655–1731) was the first builder to develop a mechanism along these lines, which he initiated about 1698 (Ill. 1.3).[30] Cristofori's four

ILLUSTRATION 1.3. Grand piano, Bartolomeo Cristofori, Florence, 1720; 89.4.1219. The Metropolitan Museum of Art, Crosby Brown Collection.

extant piano mechanisms date from the 1720s (one mechanism survives without the rest of its instrument). All incorporate intermediate levers, and "escapements" that allow the hollow, cylindrical parchment hammerheads to drop far enough away from the strings to prevent jangling after impact. Because of the number and arrangement of moving parts (five per key, including the damper affixed to a vertical slip like a harpsichord jack), the touch is heavier than that of an Italian harpsichord and the mechanism is costly to construct. Cost and complexity may have inhibited the spread of Cristofori's idea outside circles of courtly patronage; in Germany, where pianos first reached a bourgeois market,

simpler actions having only two or three moving parts per key were more widely adopted.

The tone of the oldest extant Cristofori piano (1720), which originally had the fifty-four-note compass GG–c^3, is clear and colorful though not especially incisive. Probably in the eighteenth century its lightweight, hollow hammerheads (like those later used by Silbermann and even Stein) were replaced with solid wood-core heads to strengthen the sound. Timbre-altering stops are absent, as they are from most Italian harpsichords. Early Florentine "harpsichords with hammers" are suitable for accompanying a singer or several other instruments, but are less apt for playing in a large ensemble where the conventional harpsichord's louder, brighter tone proves more effective. Cristofori's piano was, however, principally intended for solo playing, according to Maffei.[31] Some of Scarlatti's sonatas were undoubtedly played on Florentine pianos in Iberia, where Scarlatti's student Queen Maria Barbara owned five, kept at several palaces.[32] Significantly, Giustini's seminal piano sonatas were dedicated to Scarlatti's patron, Don Antonio of Portugal. Elsewhere, also in a courtly context, J.S.Bach intended the keyboard part in the trio sonata of his *Musical Offering* for one of the Cristoforian pianos Gottfried Silbermann made for Frederick the Great.[33]

Cristofori's principles were embodied initially in harpsichord-like horizontal and upright forms—the latter derived from the clavicytherium and employed in a piano dated 1739, by Cristofori's follower Domenico del Mela—though Cristofori may also have experimented with rectangular or polygonal shapes. Cristofori's innovations were not limited to his hammer mechanism; he also employed a special double-wall case to isolate the soundboard from the pull of the strings. To withstand hammer blows with minimal deflection and to produce optimum sound, piano strings are normally thicker and tauter than harpsichord strings. Heavier stringing under greater tension, and consequently stronger cases, were quickly recognized as central to the piano's development; more heavily constructed and louder pianos, such as Anton Walter's, were increasingly favored for concert use in the late eighteenth century. However, Cristofori's complicated structural solution was not generally adopted; later builders preferred instead to thicken and reinforce the simpler single-wall case. Builders, especially in England, even employed iron reinforcing elements toward the end of the century, as the desire for greater power, rising pitch, and expanding keyboard range imposed more stress on piano cases.

Unlike modern pianos, which ideally maintain tonal consistency from bottom to top note, eighteenth-century pianos typically vary in timbre from bass to treble; the top notes are dry and short-sustaining, the middle register more vocal, and basses reedy. Further, tone color changes according to the dynamic level. Whether or not built-in timbre gradation was intentional, it tickles the ear, infusing music with color even in the absence of muting and other artificial effects. Tone-altering devices may first have been applied to pianos in Germany, where builders of ubiquitous "square" (actually clavichord-shaped) pianos sought to imitate the spectrum of sounds that the virtuoso Pantaleon Hebenstreit (1667–1750) coaxed from his extraordinary dulcimers (themselves called by his name as early as 1705) by using hard and soft beaters on their metal and gut strings. In the 1790s German squares were still sometimes called *pantalon* in tribute to Hebenstreit's dulcimers, several of which were built by Gottfried Silbermann.

The dulcimer's characteristic prolonged resonance was mimicked in pianos by temporarily disengaging the dampers by means of a hand stop or, in the cheapest types, omitting dampers altogether. The oldest dated square piano (1742), by Johann Socher of Sonthofen in Bavaria, already has a damper stop, as do Silbermann grands. C.P.E.Bach refers to the piano's undamped resonance as particularly suited to free improvisation.[34] This dramatic effect is particularly appropriate in slow-moving, arpeggiated, homophonic pieces. Lifting dampers intermittently by means of pedals or knee levers, which superseded less convenient hand stops, was to become an important expressive means, although it was not indicated in published scores before about 1793, when Daniel Steibelt included pedal markings for both dampers *("les étouffoirs")* and mute *("la sourdine")* in his *6me Pot Pourri* (Paris: Naderman).[35]

Most Cristofori and Silbermann grand piano actions can be shifted sideways so their hammers strike only one of each pair of strings, a procedure that corresponds to inactivating one register of a typical Italian harpsichord. Silencing half the strings simplifies tuning and also alters timbre and reduces overall loudness. The *una corda* (one string) shift came to be used for expressive purposes in English grand pianos, which evolved from the Cristofori-Silbermann model. It does not occur in eighteenth-century Viennese-type grands, where a mute or "moderator" stop has a similar tonal function, nor is it readily applicable to square pianos because of their diagonal alignment of hammers with respect to the strings.

A few pianos reportedly reached England from Italy and Germany before 1760, and Frederic Neubauer advertised pianos for sale in Lon-don in 1763. The decade of the 1760s saw the piano finally emerge identifiably in public concerts. Johann Baptist Schmid played die piano in concerts in Vienna on March 6 and May 13, 1763; what works he performed is unknown.[36] Charles Dibdin accompanied a singer on a piano at the Theatre Royal, Covent Garden, London, in 1767. Henry Walsh played a piano solo in Dublin on May 19, 1768, and Queen Christina's music master, J.C.Bach, who purchased a square by Johann Zumpe, played a solo in a public benefit concert in London on June 2, 1768; in the same year, on September 8, one Mme. Lechantre introduced the piano, perhaps an imported Zumpe-model square, at the *Concert Spirituel* in Paris.[37]

Responding to a mild craze for *pianos anglais,* in 1777 Sebastian Erard (1752–1831) began building square pianos in Paris under the patronage of the Duchesse de Villeroy. Perhaps fearing deadly consequences of his association with the nobility, Erard went to London during the Revolution; there in 1792 he opened a branch of his Parisian firm, which also manufactured harps. Learning from competitors, Erard improved standard English piano actions and brought his designs back to Paris in 1794; two years later he built his first grand piano, using a developed form of English grand action.

John Broadwood (1732–1812), a former apprentice of the harpsichord builder Burkat Shudi, began making square pianos about 1773 (the year Muzio Clementi's Opus 2 sonatas, often called the first "real" piano music, were published), producing his first grand piano about 1781. One of the first builders to employ scientific methods in piano design, Broadwood sought to equalize string tension in order to stabilize the piano case and generate a more uniform tone quality. He attempted to rationalize the piano's geometry and introduced important innovations; these included extending the range to five and one-half octaves, FF–c^4, supposedly at the suggestion of Dussek in 1789 (Dussek briefly lent his Broadwood grand to Haydn in 1791). The optional additional

notes had become common on grands by 1793 and were also applied to squares (Ill. 1.4). The next step in enlargement, taken by Broadwood in 1794, was downward to CC, giving a six-octave range increasingly demanded by virtuosi and in popular arrangements and duets.

In Brunswick by 1802, F.C.W.Lemme was prepared to build five-and-one-half-octave grands "in the style of the great English masters," and English-action pianos were also being constructed in Vienna. However, typical Austrian and German grand pianos of the late eighteenth century, exemplified by products of Stein and Walter, differ mechanically, structurally, and tonally from English and derivative French instruments. The typical Viennese-style piano familiar to Mozart, Haydn, and the young Beethoven has a lighter, shallower touch, quieter but clearer sound, especially in the bass, and more efficient damping than contemporary English grands, which often have three strings per note

ILLUSTRATION 1.4. Square piano, John Broadwood and Son, London, 1797; 1982.76. The Metropolitan Museum of Art.

over most of the compass while Viennese counterparts typically retain double-stringing except for the highest octave or two. Austrian and German builders usually employ dampers throughout the compass to guarantee clarity; English pianos often omit dampers in the top octave or so to promote a lingering resonance. English grands also have

somewhat more massive hammers than, say, Stein's pianos, which sometimes still have hollow hammers like Cristofori's and Silbermann's. The loudness of Viennese-style pianos diminishes rapidly after a strong attack, giving an effect of sudden diminuendo impossible to achieve on modern instruments having a less marked decay.

The normal Viennese compass of five octaves, FF–f^3, was sometimes extended up to g^3 after about 1790. Certain Viennese-style grands, notably several built in Salzburg by Johann Schmidt about 1785, incorporate extra bass strings and a short-octave pedalboard that allows performance of notes below FF (Ill. 1.5). Separate pedal pianos could also be placed beneath standard grands. In 1785 Mozart purchased a pedal piano that he used principally for improvisation, though a passage in his D-minor Concerto K.466 requires pedals for notes out of reach of the left hand.[38]

ILLUSTRATION 1.5. Grand piano with pedalboard, attributed to Johann Schmidt, Salzburg, about 1785; 89.4.3182. The Metropolitan Museum of Art, Crosby Brown Collection.

Tonal devices on typical Viennese pianos are usually limited to a damper lifter (often divided for separate bass and treble control), moderator (sometimes offering two stages of muting), and "bassoon" stop (a roll of parchment that buzzed against the bass strings when lowered onto them); the vogue for Turkish music led to addition of percussion devices after 1800. These effects were operated by a combination of hand stops and knee levers until about 1810, when pedals were adopted. English grands, which usually have only damper and *una corda* controls, already had pedals (taken over from the harpsichord) by 1772. At first, pedals were attached to the front legs; later they were centered under the key-board as expansion of range and consequent widening of the case made use of leg-mounted pedals inelegant.[39]

Certain stylistic developments in Viennese Classical piano music, such as extended range and greater sonority, have been posited to the influence of distinctive pianos. Alec Cobbe states, "The markedly different and more massive style of writing in Mozart's sonata in A minor (K.310), composed after his arrival in Paris in 1778, could be ascribed to what must have been his first experience of English instruments…."[40] (In fact, the child Mozart might already have heard pianos in London in 1764–1765.) Mozart grew increasingly devoted to the piano after he moved to Vienna in 1781, where piano manufacture advanced markedly after the death of Empress Maria Theresa, a musical conservative who reportedly disliked the instrument.[41] Joseph II, on the other hand, promoted the piano; he sits at one in a painting by Joseph Hauzinger (Vienna, Kunsthistorisches Museum), a rare eighteenth-century view of a male amateur pianist. Once settled in Vienna, Mozart acquired a grand piano by Walter that has both hand stops and knee levers (the latter seemingly added after the piano's construction) and embarked upon writing his most characteristic keyboard concertos.

Haydn encountered English pianos, including Broadwoods, in London and took back to Vienna a FF–c^4 grand by Longman & Broderip, a firm that also published his music; Haydn composed his last three piano sonatas mindful of the imposing capabilities of that piano. At various times Haydn owned pianos by other prominent makers including Wenzel Schanz in Vienna (purchased in 1788) and Erard. Haydn's sensitivity to the qualities of different pianos is evident from his correspondence with Maria Anna von Genzinger, to whom he recommended purchasing a new Schanz piano and disparaged Walter's.[42]

The Organ

Organ pipes stand in ranks, each of a different timbre, on a windchest to which pressurized air is supplied by bellows, in the eighteenth century usually pumped by hand or foot (Ill. 1.6). In all but the smallest organs, a weighted reservoir connected to the bellows maintains constant air pressure. Pumping required a usually reluctant assistant, so organists often practiced at home on more convenient stringed claviers. Day-to-day upkeep such as touching up tuning was an organist's responsibility; the builder came for major overhauls, perhaps annually or less often.

The shape and, to a lesser extent, material of a pipe chiefly affect its tone, while length and presence or absence of a stopper at the top end determine pitch (stopped cylindrical and rectangular pipes sound an octave lower than unstopped pipes of the same length).

Wind enters a pipe through a hole in its toe. Typically, a slider controlled by a knob at the console admits or cuts off wind to each rank, and individual notes

ILLUSTRATION 1.6. Chamber organ, German, 1700; 89.4.3516. The Metropolitan Museum of Art, Crosby Brown Collection.

sound when keys open their respective valves in the windchest; mechanical linkages that can span long distances connect keys and valves.

In organs having more than one manual, ranks are grouped into divisions, each controlled by a separate keyboard (including the pedalboard) and having its own windchest. Divisions complement one another tonally but may have distinct functions: one for reinforcing hymns, one to accompany the choir, another for echoes or solo effects, and so on. Different manuals can be played simultaneously or in alternation for contrast, or coupled together for greater power.

The most characteristic organ tone is produced by so-called principal ranks, which are supplemented by colorful flute- and string-toned ranks; all these pipes are flues of different designs, flute pipes being wider and string pipes more slender than principals. Reed ranks may also be present but less numerous; they are more expensive and harder to maintain than flues and tend to yield more pungent tone. North German organs known to Bach might employ reeds for one-quarter or slightly more of their ranks. A higher proportion of reeds is often encountered in Spanish organs; the French Baroque organ registration, too, depends on a goodly number of characteristic reed ranks.

In addition to fundamental ranks at 8-foot pitch and one or more octaves higher or lower, eighteenth-century organs ordinarily have "mutation" ranks at 2–2/3-foot, 1–3/5-foot, and other pitches that color the fundamental. Further, "mixtures" of very high-pitched mutation and super-octave ranks operating together as a unit add brilliance. Each division is commonly based upon a chorus of principal ranks at various pitches including mutations and mixtures, plus other ranks of contrasting timbre. A secondary flute chorus is not unusual, and even reeds may be present at several octaves though not as mutations or mixtures. In large organs, manual choruses may be based on 16-foot ranks and the pedal division may descend to 32-foot pitch; ranks of such size are very costly and require considerable space and volume of wind.

Up to the mid-eighteenth century, a normal manual compass was C–c^3, though Italian organs, which usually have one manual, might have more notes, and certain divisions of French organs might have fewer. Range increased gradually during the century, but fully chromatic five-octave manuals remained exceptional. Rarely did pedalboards exceed twenty-nine notes; Gottfried Silbermann normally kept to a C–c^1 pedalboard, omitting C-sharp. In Germany and the Lowlands, where contrapuntal music was highly cultivated, pedal divisions equaled manuals in scope and tonal variety. French pedal divisions were small—being used mainly for holding long notes—and English organs seldom had pedals at all; the earliest known independent pedal division in England dates from 1778.

While most organs had one or two manuals and fewer than twenty ranks, organs having four or even five manuals and more than eighty ranks might be found in great churches; some edifices had two organs that could be played antiphonally. Church organists led congregational singing, provided continuo in concerted works, supplied interludes during the liturgy, and sometimes gave public recitals in which all the resources of the organ might be tested; much of the great Baroque organ repertoire was intended for such recitals, not for liturgical use. As their stately cases indicate, organs symbolized civic pride; their construction involved close scrutiny and much debate, and selection of a builder and organist was highly politicized.

Because organs were custom-built, specifications varied greatly, and textbook rules for registration were of questionable value except in regions where some standardization

occurred. English organ-building, much injured by Cromwell and thereafter after not very adventurous, tended toward uniformity by 1800. English organs generally eschewed reeds and mixtures and left players a limited choice of colors; on the other hand, as early as 1712 Abraham Jordan achieved dynamic control by enclosing several ranks in a box with adjustable louvres, and this so-called Swell division was a common feature of London's organs after 1730. Parisian organs about 1700 were sufficiently standardized that composers such as François Couperin could give quite specific directions for registration; Bach gave virtually no such indications.[43]

Fine eighteenth-century organs of whatever nationality and size are characterized by tonal clarity and interest. Separate voices stand out distinctly in counterpoint, and even in full chords the tone is not turgid. Individual ranks have sharply delineated personalities that nevertheless blend into a cohesive ensemble. Both grandeur and intimacy arise from these instruments.

It may be a striking commentary on the organ's diminishing role in secular musical life after the death of Bach that although Mozart considered it "the king of instruments," a sentiment widely voiced in his day, he composed no significant solo works for the instrument, nor did Haydn or Beethoven. Much if not most organ music was still improvised; but that composers of great stature who were familiar with fine organs should no longer have cared to notate organ works indicates that they perceived limited interest in the medium. No doubt this lack arose both from the organ's indelible association with a church in decline (for example, due to liturgical reforms of Joseph II, or French anticlericalism), and from its inability to convey satisfactorily a chief element of Classical style—its dynamic flexibility.

Carillons and Other Keyboard Instruments

Like the organ, the carillon was both a reassuring civic symbol and an object of some mystery, being huge, remote, and mostly invisible. In the eighteenth century the name "carillon" was not applied exclusively to immense sets of tower bells; other meanings were common outside the Lowlands, though all embraced the sense of struck metallic components. In England "carillon" also meant a portable keyboard instrument having two or more octaves of chromatically tuned metal bars or, less likely, small bells. Handel employed this carillon's magical aura in *Saul* and other staged works. The *stromento d'acciaio* (steel instrument) that simulates Papageno's bells in Mozart's *Die Zauberflöte* (1791) evokes the same charming effect, though whether that instrument was keyed is uncertain.

A hammer-action instrument having three octaves of thin glass bars was confusingly called *fortepiano à cordes de verre,* or "glass-cord" in Benjamin Franklin's terminology, when presented by its Parisian inventor, Beyer, to the Académie des Sciences in 1785; it was judged suitable to accompany a singer. A related type incorporating musical glasses rubbed by a keyed mechanism dates from about the same time; Dussek toured Germany in 1784–1785 with such a "keyed armonica," to use yet another current name. A few years later, in 1788, the English musician and mechanic Charles Claggett introduced an instrument in which keyed hammers struck tuning forks or tuned metal rods fixed to a soundboard or box. More extraordinary was the *claveçin électrique* (1759) designed in

Rouen by the Jesuit scientist Jean-Baptiste de La Borde; in it, a clapper, hung between two electrically charged, unison-pitched bells, repeatedly struck both bells so long as their key, which cut off current to one bell, was depressed. An engraving of the instrument published in 1761 shows it as having a two-octave compass.[44]

Instruments like this, or like Louis-Bertrand Castel's synesthetic *clavecin oculaire* (1734), indicate intense effort that stemmed not so much from musical necessity as from acoustical experiments by scientists such as La Borde and Chladni; the latter developed various friction idiophones including one with keys ("clavicylinder"). Such activity was fostered by the many academies and Masonic lodges where musicians and natural philosophers met.

In conclusion, it is clear that eighteenth-century keyboard instruments fulfilled many vital social functions. As articles of commerce, vehicles for scientific inquiry and technological innovation, and status symbols, as well as by making music, they kept pace with trends that shaped the century and embody the spirit of the Enlightenment.

Notes

1. See under "Clavier" in Don Michael Randel, *The New Harvard Dictionary of Music* (Cambridge, MA, 1986), and note 11, below.
2. Facsimile edited by Rosamond E.M.Harding (Cambridge, 1933). Sonatas of Guistini have been recorded on the 1720 Bartolomeo Cristofori piano at the Metropolitan Museum of Art by James Bonn (Pleiades Records, P105, 1977) and by Mieczyslaw Horszowski (Titanic Records, Ti-79, vols. 1 and 2, 1980).
3. Georg Kinsky, *"Mozart-Instrumente"* in *Acta Musicologica* 12 (1940): 15; Mary Sue Morrow, *Concert Life in Haydn's Vienna: Aspects of a Developing Musical and Social Institution* (Stuyvesant, NY, 1989), 166.
4. See under "Kirkman" in Boalch 1974; for Sodi see *"Clavicembali e spinette dal XVI al XIX secolo"* catalogue of an exhibition at the Chiesa di San Georgio in Poggiale, Bologna, 1 November–21 December 1986, 121.
5. Modern edition by X.V.Elewick (Brussels, 1877).
6. François Couperin earlier admitted that the harpsichord was perceived as dynamically inflexible *(L'art de toucher le clavecin,* Paris, 2nd ed. 1717, 15–16; facsimile ed., New York, 1969). C.P.E.Bach, in his *Versuch…,* remarks that "…the clavichord and pianoforte enjoy great advantages over the harpsichord and organ because of the many ways in which their volume can be gradually changed." (English translation by William J.Mitchell, *Essay on the True Art of Playing Keyboard Instruments* [New York, 1949], 369.)
7. Mozart's rare use of notes outside the normal keyboard compass or out of reach of the player's hands can be explained by his access to exceptional instruments such as the pedal piano; see note 37, below. The apparently impossible crescendodecrescendo marking <> over a held note in piano works of Beethoven, Schubert, and Brahms is not meant literally but indicates that the note should be played *as though* the effect could be achieved—a typically Romantic idea. See Konrad Wolff, "Accent? Decrescendo?" in *American Music Teacher* (1989): 14–17, 63. Pianos with a pedal-operated lid flap can, of course, produce this effect, as can the *Bogenclavier,* but performance on these instruments was not intended.
8. See Laurence Libin, "An Eighteenth-Century View of the Harpsichord" in *Early Music* 4 (1976): 16–18.
9. See David Wainwright, *Broadwood by Appointment; A History* (London, 1982), 60.
10. *Georg A.Sorgens…zuverlaessig Anweisung Claviere und Orgeln behoerig zu temperiren und zu stimmen* (Leipzig and Lobenstein, 1758); see Carl O.Bleyle, "Georg Andreas Sorge:

an 18th-century Proponent of logarithmic Scaling for Organ-pipes" in *Organ Yearbook* 6 (1975): 53–63.

11. For descriptions and references, see under "Chladni, Ernst" and "Vogler, Georg Joseph" in Stanley Sadie, ed., *The New Grove Dictionary of Music and Musicians* (London, 1980).
12. Trans. Charles Ferguson (Raleigh, NC, 1977).
13. Maffei's account is reprinted and translated in Edward F.Rimbault, *The Pianoforte, Its Origin, Progress, and Construction* (London, 1860), 95–102.
14. Stewart Pollens, "The early Portuguese piano" in *Early Music* 13 (1985): 18–27.
15. Stein's diary is privately owned by a Streicher descendant in Austria.
16. Modern edition for organ by Jean Langlais (Chicago, 1957).
17. For more detailed descriptions of Spanish harpsichords see chapter 5, pp. 168–170.
18. One device that permits limited dynamic nuance in the harpsichord is the so-called nag's head swell, a hinged lid flap lifted by a pedal; it was employed by Jacob Kirckman in London as early as 1754. Fifteen years later Kirckman's competitor Shudi patented the "Venetian swell," a panel of pedal-operated louvers like Venetian blinds above the soundboard.
19. Mitchell, *op. cit.,* 368–369.
20. Modern edition in David Fuller, ed., *Armand-Louis Couperin. Selected Works for Keyboard, Part I: Music for Two Keyboard Instruments,* in *Recent Researches in the Music of the Pre-classical, Classical, and Early Romantic Eras,* vol. I (Madison, WI, 1975), 1–37.
21. The Philadelphia statesman, mechanic, and musician Francis Hopkinson (1737–1791), fed up with unreliable crow quills, experimented with hard leather, leather-covered cork, and wood plectra; his methods, communicated to the American Philosophical Society between 1783 and 1787, interested Thomas Jefferson and illustrate the serious attraction keyboard technology held for cultured gentlemen even in distant colonies.
22. Hildebrandt's *Lautenclavicymbel* was described by Johann Friedrich Agricola; see Hans T.David and Arthur Mendel, eds., *The Bach Reader* (New York, 1966), 259.
23. Adlung 1768, 133.
24. See Nicholas Goluses, "J.S.Bach and the Transcription Process" in *Guitar Review* 77 (1989): 16–17; and Uta Henning, "The Most Beautiful among the Claviers" in *Early Music* 10 (1982): 477–86.
25. See Eric Halfpenny, "The Lyrichord" in *Galpin Society Journal* 3 (1950): 46–49.
26. Edwin M.Ripin, "A Reassessment of the Fretted Clavichord" in *Galpin Society Journal* 23 (1970): 43.
27. Because of terminological ambiguities noted elsewhere it is impossible to identify the earliest music specifically intended for clavichord, but C.P.E.Bach "was almost certainly the earliest important composer to conceive his music in terms of the clavichord" (Edwin M.Ripin, "Clavichord" in *The New Grove Dictionary of Music and Musicians* 4:466). His rondo entitled *Abschied von meinem Silbermann'schen Clavier* (Wq. 66, H. 272, 1781) exemplifies the clavichord's fullblown *Strum und Drang* idiom.
28. Jakob Adlung, *Anleitung zur musikalischen Gelahrtheit* (Erfurt, 1758), 568–72.
29. The original language is quoted in Eugène de Bricqueville, *Les ventes d'instruments de musique au XVIIIe siècle* (Paris, 1908), 11. According to Eva BaduraSkoda (see chapter 2, p. 59), the noun "pianofort(e)" was coined by Gottfried Silbermann.
30. Mario Fabbri, *"Il primo 'pianoforte' di Bartolomeo Cristofori"* in *Chigiana* n.s. 21 (1964): 162–72 (the authenticity of Fabbri's evidence is questionable); Stewart Pollens, "The Pianos of Bartolomeo Cristofori" in *Journal of the American Musical Instrument Society* 10 (1984): 32–68.
31. Cited in Rimbault, *op. cit.,* 96–97.
32. Ralph Kirkpatrick, *Domenico Scarlatti* (New York, 1968), 175–78, 183–84. See also chapter 5.

33. Christoph Wolff, "New Research on Bach's *Musical Offering"* in *The Musical Quarterly* 57 (1971): 403; Stewart Pollens, "Gottfried Silbermann's Pianos" in *The Organ Yearbook* 17 (1986): 103–21. Bach's *Sonata sopr'il Soggetto Reale* from BWV 1079 has been recorded using the 1746 Silbermann piano preserved in Potsdam (VEB Deutsche Schallplatten Berlin, Eterna Edition 8–27–844, 1983).
34. Mitchell, *op. cit.,* 431.
35. For further discussion and musical examples see David E.Rowland, "Pianoforte Pedalling in the Eighteenth and Nineteenth Centuries" (Ph.D. dissertation, University of Cambridge, 1985).
36. Vienna, Hofkammerarchiv, Hofzahlamtsbücher 367, 368; information courtesy of Dexter Edge.
37. For references see Howard Schott, "From Harpsichord to Pianoforte: A Chronology and Commentary" in *Early Music* 13 (February, 1985): 28–38; Virginia Pleasants, "The early Piano in Britain (c 1760–1800)" in *Early Music* 13 (1985): 39–44.
38. Mozart's use of $f\#^3$ (which implies the presence of g3) in the two-clavier sonata, K.375a, written in 1781 for Josepha von Auernhammer, suggests a remarkably early instance of upward extension of the piano's range. Mozart's autograph of the pedal passage from K.466 (first movement, mm. 88–90) is reproduced in facsimile in the *Neue Mozart-Ausgabe* V/15, Bd. 6 (1961), xiv.
39. One amusing device encountered in some English squares is a pedal-operated lever that allows a separately hinged section of the lid to slam closed, a startlingly effective way to punctuate battle pieces. The same lever can gradually open the flap to create a crescendo and a subtle change of timbre, or even a crescendo and decrescendo (or the reverse) on a held note or chord. The device was inspired by Kirckman's nag's head swell (see note 18 above).
40. Alec Cobbe, *A Century of Keyboard Instruments 1760–1860;* catalogue of an exhibition at the Fitzwilliam Museum, Cambridge, 5 July–31 August 1983, 10.
41. Few Viennese pianos predate 1780, but the Kunsthistorisches Museum owns a square piano believed to be Viennese that could have been made as early as the 1760s. Eva Badura-Skoda (personal communication, 17 June 1992), citing research by Helga Michelitsch-Scholz, states that "Empress Maria Theresa must have played a piano in her 'student days' under the supervision of her teacher Wagenseil…."
42. Haydn's letters to Maria Anna von Genzinger, 20 June and 4 July 1790, translated in H.C.Robbins Landon, *Haydn: Chronicle and Works,* vol. 2, *Haydn at Eszterháza 1766–1790* (London, 1978), 743–46. On Haydn's keyboard instruments and the piano's role in Viennese music, see A.Peter *Brown, Joseph Haydn's Keyboard Music: Sources and Style* (Bloomington, IN, 1986), 136–44. See also Eva Badura-Skoda's remarks on this subject, chapter 2 (p. 60).
43. Peter Williams, *A New History of the Organ From the Greeks to the Present Day* (Bloomington, IN, 1980), 106–17.
44. The engraving, from La Borde's *Le clavessin électrique, avec une nouvelle théorie du méchanisme et des phénomènes de lélectricité* (Paris, 1761), is reproduced in the article "Clavecin électrique" in *The New Grove Dictionary of Musical Instruments* 1:415.

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CHAPTER TWO
Aspects of Performance Practice

Eva Badura-Skoda

The quest for a performance that is as authentic as it can possibly be has come to be a genuine concern for many instrumentalists in our century. Indeed, a work impresses us most deeply when it is rendered in a manner that comes closest to what the composer envisaged. At present only opera directors, it seems, feel free to pay no attention whatever to the notion of original intent—much to the dismay of connoisseurs and lovers of operas of the past. Fortunately, however, nearly all keyboard players nowadays sense a need to ferret out the composer's intentions residing behind the notation of works they want to perform.

The notion that a masterwork of the past should be played "in style" and with the musical means its composer had in mind did not originate in our century. In 1739 Johann Mattheson concluded his celebrated book *Der Vollkommene Capellmeister* with these words: "The greatest difficulty associated with the performance of someone else's work is probably the fact that keen discernment is necessary in order to understand the real sense and meaning of unfamiliar thoughts. For those who have never discovered how the composer himself wished to have the work performed will hardly be able to play it well. Indeed, he will often rob the thing of its true vigor and grace, so much so, in fact, that the composer, should he himself be among the listeners, would find it difficult to recognize his own work."[1]

Problems of Text and Notation

At some point every serious musician feels uneasy about a previously trusted edition. He is disturbed, perhaps, by an incongruous ornament or an articulation mark, or by a *forte* sign in a passage that he thinks should be played softly. In consulting other editions he soon makes a depressing discovery: printed editions of the same work often contradict each other not only with respect to details but even the most fundamental matters. Carl Czerny's famous edition of Bach's *Well-Tempered Clavier* prints an extra bar at the end of the B-flat-major prelude from the first book; and in Hans von Bülow's equally well-known edition of the *Chromatic Fantasy and Fugue* the editor arbitrarily changed Bach's tonal answer (starting on d) to a real answer (starting on e). But we find such distortions not only in old editions prepared by famous pianists of the past. Many modern editions, too, although proudly labelled "Urtext," unfortunately do not measure up to the demands made on them by the earnest musician. In the recent past music publishers, for purely commercial purposes, have frequently made improper use of such fashionable terms and concepts as "Urtext," "authenticity," and "historical performance." In fact, the term

"Urtext," if we take it literally, is a misnomer.[2] In only a handful of cases does a musical artwork exist in a single autograph version that is notated so faultlessly that the composer found it unnecessary to make any subsequent changes either in later manuscript copies or in a printed edition. In such rare instances a facsimile edition of the autograph may be properly called an "Urtext" edition. In all other cases, however, a printed edition is inevitably a transcription and represents the interpretative reading of an editor who cannot possibly follow the handwritten copy in every detail.

If we take the term "Ur-text" even more literally ("ur"=original, first), then we confront additional problems. Audiences in the concert hall do not normally wish to hear the "Ur"-text, or first version, of a work—for example, Bach's French Suites in their very first autograph version—but rather the revised and more beautiful later versions prepared by Bach and transmitted in copies written out by his pupils. Similarly, few would prefer to listen to Beethoven's "Ur"-text of a sonata played with all the missing flats and sharps of the autograph version, instead of the corrected, emended version Beethoven took care to have published in the first printed edition. First versions of famous works are unquestionably of scholarly interest, but they include, by definition, readings that were rejected and invalidated by the composer himself. They should be replaced in the concert halls by final versions, wherever such versions exist.[3]

The music editor faces a threefold task. First he must try to determine: What did the composer *actually* write? This involves the collection and investigation of sources—the task of "source criticism." He must then ask: What did the composer *intend* to write? Not infrequently a composer's notation is unclear, incorrect, or incomplete. Moreover, a slip of the pen may actually obscure his intentions. The editor's second task—the task of "text criticism"—is to correct such errors. Finally, the editor must consider: How ought the composer to have notated his composition, in order to be correctly *understood* today? This is the task of text "elucidation." The answer here, though sometimes difficult, is usually easier to find than for the two previous questions. Modern editors agree that elucidations are welcome, provided they do not obscure the appearance of the original text and are clearly identified as editorial interpolations. A good "Urtext," or "critical," edition will always indicate which markings are the composer's and which are editorial additions. They are usually printed in italics or parentheses; further explanations normally appear as footnotes. A preface should inform the musician about the editor's procedure.

Editors differ, however, about the extent to which performance hints are necessary in a modern edition; nor do they always agree about the details of a stylistically proper performance. How should or could a particular ornament be interpreted? Did not nearly every composer entertain different notions in this respect? Should the editor help the performer find the proper solution—assuming there is indeed only one (in his opinion); and should he indicate the existence of an option wherever there was more than one "correct" solution? Are there not various ways to interpret an arpeggio or an appoggiatura? Short or long, accented or unaccented, anticipated or on the beat? Which one sounds best? A good edition should certainly point out alternative solutions.

To return to text problems: In the second movement of his last piano sonata, the sonata in E-flat major Hob. XVI/52 Joseph Haydn wrote the following in mm. 40 and 48 (Ill. 2.1). Something is clearly wrong in m. 40: Haydn wrote one eighth-note more in the upper staff than in the lower. And there is a surplus of eight thirty-second-notes (i.e., one quarter-note) in m. 48. That is, there is a change of meter from 3/4 to 4/4.