

15. *The Renaissance*

(1400-1600)

THE most outstanding development in the history of music between 1400 and 1600 is the emancipation of instrumental from vocal music. Before 1400, players generally accompanied singing; after that time they slowly began to make themselves independent, at first by taking over dancing songs and adapting them to the particular technique of their instruments. Gradually, instruments took possession of all kinds of vocal forms, not restricting themselves to dance music; motets and madrigals were performed on instruments, and as late as the seventeenth century printed collections of pieces bore the subtitle, "to be sung or played." Along with the vocal style of these amphibious compositions, however, styles characteristic of certain instruments began to be developed. Keyboard instruments had evolved into polyphonic and chord instruments as early as the fourteenth century, and the lutes may have followed in the fifteenth century. Organists and lutanists using music written in several parts, each intended to be performed by an individual musician, adapted it to the special conditions of their hands and instruments and developed a style of their own; indeed, they invented particular *tablatures* to replace the common notation. Finally, composers created exclusively instrumental forms of composition entirely different from those used for voices. In the sixteenth century melodic instruments followed in the path of the polyphonic instruments. In 1532 the German Hans Gerle wrote a method for the fiddles, in 1535 the Italian Sylvestro di

Ganassi published a method for the flute, and in 1553 the Spaniard Diego Ortiz for the gamba, each of them with the aim of fostering a true instrumental style.

The final stage in the emancipation of instrumental music began in the second half of the sixteenth century when orchestration was first considered. Chroniclers began to enumerate in detail which instruments were used in playing certain compositions at certain occasions. The most minute indications are given in Massimo Trojano's account of the wedding ceremonies when Duke William V of Bavaria married Princess Renate of Lorraine in 1568. There we learn that, at table, the court orchestra performed a six part motet of Orlando di Lasso with five cornets and two trombones; that, during the seventh course, twelve musicians formed three groups—one of four gamba players, the second of four recorders, the third of a bassoon, a cross flute, a pipe and a cornet; and many other combinations. This testifies to an increasing interest in color, that is, the contrast and blend of timbres, as a vital part of music. Orchestration, which at first was at the discretion of the performers, at last became important enough to be indicated by the composer; about 1600, Giovanni Gabrieli in Venice first fixed the instrument required for each part in writing his scores.

The new delight in timbre acted as a strong stimulus in making instruments. Never before and never since has the palette of musical hues been as rich as in the sixteenth century; no potentiality was neglected. To confine ourselves to one example: double reed instruments, today represented by the two families of oboes and bassoons, existed in ten complete families essentially differentiated by the diameters and forms of their bores.

The new wealth of musical instruments and their increasing importance, which began to be obvious about 1400, resulted in the sudden emergence of popular treatises on the subject at the beginning of the sixteenth century.

In 1511 a German priest, Sebastian Virdung, published a small book entitled *Mvsica getutscht vnd außgezogē*, or 'Music Germanized and Abstracted.' It is written as a dialogue, the didactic form that the Renaissance had taken over from antiquity. A fictitious friend, Andreas Silvanus, is the pupil; ignorant but eager, he supplies the cues for Virdung's lecture with his questions. The cold and arid tone of medieval treatises is avoided, and also Latin is replaced by the native idiom. Besides, the book speaks to the eyes; it is illustrated by numerous woodcuts. Many of them show instruments

which do not belong to 'regular music,' but rather to the so-called *musica irregularis*, such as carnival implements, children's toys, hunters' horns, jaws' harp, cow bell and scraped pot. Although Virdung protests against being expected to speak of so inartistic a branch of his subject, he mentions all these popular and folkloristic instruments. His book is popular in form though scientific in approach. He begins by a classification, and in this point he is remarkably modern. His system comprises three classes: instruments blown by human or artificial wind; stringed instruments; and instead of the incorrect and unsatisfactory term "percussion" instruments, those *die vō de metallē oder ander clingendē materien werden gemacht*. Four hundred years later, English musicologists introduced the term *sonorous substances*, a translation of Victor-Charles Mahillon's *instruments autophones* and my own *idiophones*, unconsciously adopting Virdung's *clingende materien*.

The reader may be surprised to find that Virdung still refers to Boethius. Had not the time gone by when the last musicologist of antiquity was still the incontestable authority on music? Virdung speaks of Boethius, indeed, and he speaks of Guido of Arezzo, of *genus diatonicum* and *genus chromaticum*, of *diatessaron* and *quadrilatera*; but this is just a bow to classic erudition. On Virdung's pages the various *genera*, the *semitonia*, the *gsolreut* are illustrated by clear woodcuts of keyboards with white and black keys or of the fretted fingerboards of lutes. And Virdung does not forget that the strings of a lute must be carefully chosen before they produce the required *tonos* and *semitonia*. So he proposes the test well known by all violinists: stretch the string in your hand and pluck it with the thumb; the more you see the vibration of the string, the less good it is. A charming little woodcut illustrates his words. A new epoch begins with the matter-of-fact spirit of Virdung's practicality, a departure that cannot be too much admired.

It was significant of the uncertainty of those times that, in 1536, Othmar Nachtigall, who called himself Luscinius, took a step backward and translated Virdung's German book into Latin as *Musurgia, seu praxis musicae*.

In the same year, 1511, in which Virdung had printed his work, Arnold Schlick, the court organist at Heidelberg, published a small *Spiegel der Orgelmacher uñ Organisten*, or 'Mirror of Organ Makers and Players,' the first printed monograph on the construction of a special instrument.

Seventeen years after Virdung's and Schlick's treatises, another

book on musical instruments was published by the famous Georg Rhaw, printer at Wittenberg. Its author was Martin Sore (1486–1556), a cantor at Magdeburg in Saxony, who, in the scholarly style of the time, called himself *Martin Agricola*. The book came out as *Musica instrumentalis deudsch*; the full title, translated into English, is: “*Musica instrumentalis* in German, which comprises a method of learning to play on various wind instruments based on the art of singing, and how to play organs, harps, lutes, viols, and all instruments and strings according to the correct tablature.” The first edition was dated 1528, the fifth and last one came out in 1545.

Agricola’s book is based on Virdung’s treatise, but it is written in doggerel verse in order to be more easily memorized. For Agricola’s purpose is by no means scientific research; his object is merely educational. He says in the preface: “It must be, and in fact it is, highly necessary that the youths who begin to learn, be not overwhelmed and deterred with many superfluous words and rules, but rather taught by short and plain information and enticed and allured to study.”

A few years after Agricola’s last edition, a Franciscan friar from Andalusia, Juan Bermudo, published several editions of a book entitled *La declaración de instrumentos* (Ossuna 1549, Ossuna 1555, Granada 1555). But in spite of so promising a title, this ‘explanation’ is a general theory of music rather than a treatise on instruments.

Agricola had no successor before 1618, when Praetorius published his fundamental work. At first sight we have the impression of a step backward, away from educational purposes, when we see the frontispiece of the new book and read the scholarly title, *Syntagmatis Musici Michaelis Praetorii C. Tomus Secundus de Organographia*. But this, too, was nothing more than a bow to humanistic education. The few Latin words precede a long subtitle in German which promises the nomenclature, intonation and quality of all ancient, modern, barbarian, foreign, rustic, domestic, unknown and known instruments including their correct pictures, and so on. The last sentence of the elaborate title asserts that the book will be useful and necessary to organists, musicians and instrument makers, as well as to all those loving the Muses, and also entertaining, and pleasing to philosophers, philologists and historians. Though it is not certain whether this second promise has been fulfilled, the scientific and artistic part of the book is indeed more useful than any former book written on musical instruments.

Its author was Michel Schulz or, in scholarly Latin, Michael

Praetorius (1571-1621) from Creuzburg (hence C.), who had studied in Venice with Giovanni Gabrieli. He was *Kapellmeister* to the Brunswick court at Wolfenbüttel and one of the most fertile German composers at the beginning of the seventeenth century. The *Organographia* is the second of three volumes that treat exhaustively of all branches of music: volume I, the theory; volume II, the instruments; volume III, the practice.

The attitude of Praetorius is entirely different from that of Viridung and Agricola. In the preface he apologizes for having written this book in popularized form: please, do not believe that I wish to make music too vulgar and to put it at the disposal of bunglers and duffers by employing our German mother tongue. After all, music is no Rosicrucian mystery; most organ and instrument makers and players do not understand Latin, and it would be difficult to translate the innumerable technical terms into Latin. Praetorius wrote for musicians and makers, not for beginners.

Two parts, therefore, are particularly new and interesting. The first is a *tabella universalis*, a table showing the compass of all wind and stringed instruments. The second is a *Theatrum Instrumentorum seu Sciagraphia*, a woodcut supplement published two years later in 1620. In this the instruments in all their sizes and kinds are depicted on an exact scale; each page has a reduced scale in Brunswick feet, which can be compared with a foot in actual size cut on the first page.

Comprehensive and reliable, the *Syntagma* is the standard reference book on sixteenth century instruments.

The last treatise to be mentioned is the section on instruments in the gigantic *Harmonie Universelle* published in 1636 and 1637 by Father Marin Mersenne, a friend of the philosopher Descartes. The title is French and so is the text. But this does not mean vulgarization. "I know," he writes in his preface, "that you do not follow the opinion of some ancient who said that science is profaned when reduced to practice and use. . . ." *Harmonie Universelle* is the work of a scientist, a mathematician, a physicist. There are no chapters, but *propositions* and *corollaires*, just as in mathematical treatises. The chief concern is the construction of instruments rather than their outer shape. Detailed tables indicate the gauges of wire and gut strings; the exact thickness of a good soundboard and the best position of its ribs are discussed; and all items are thoroughly illustrated by excellent engravings and woodcuts. But this book, as well as its Latin counterpart, *Harmonicorum libri* (1635 and 1636),

correctly belongs in a later chapter, both in its date and in its attitude.

From these books one gathers an idea of the quantity and importance of musical instruments in the sixteenth century. Still, this picture is incomplete. The Renaissance, in its natural disposition to visual enjoyment, took a fancy to instruments as objects in themselves. A viol was more than an acoustical machine to the men of that epoch. Without hearing its sound they were delighted by the elegance of its curves, by the harmony of its proportions, by the bright transparence of its varnish; they would have been disgusted to listen to a voice of perfect beauty produced by an ugly piece of wood. Sabba da Castiglione was a true man of his time when, writing on instruments that "much delight the ears and animate the spirits," he added, "They also greatly please the eye." This idea is crystallized in a motto painted on one of the oldest preserved harpsichords, made in 1560 by Vitus de Trasuntinis: *Rendo lieti in vn tempo gli occhi el core*, "I give pleasure at once to the eyes and to the heart."

At that time the violin and most other instruments were given their classical shapes. Moreover, many instruments of that time were carefully joined, turned, carved and inlaid; precious material was used—exotic woods, ivory, tortoise shell, nacre, gems; harpsichords and spinets were decorated by first-rate painters. Marvelous specimens are preserved in the Victoria and Albert Museum in London and in the Kunsthistorische Museum, Vienna.

Instruments were again and again depicted in art works by painters and sculptors, and when Albrecht Dürer wrote his treatise on perspective, he chose a lute as the object of his demonstration. The beauty of musical instruments has never been so much appreciated before or since.

For the same reason instruments were collected by art lovers and preserved in special museums. Count Raymond Fugger in Augsburg, for example, had, in 1566, a *musiccammer* with about four hundred costly instruments, among which there were more than a hundred and forty lutes and a hundred and eleven flutes.

Inventories of such collections, or of the instruments owned for practical purposes by court orchestras, are highly significant. Dead and dusty as such enumerations might appear, they give us more information than any treatise.

King Henry VIII of England left, in 1547, a collection of three hundred and eighty-one instruments:

78 cross flutes	5 bagpipes
77 recorders	32 virginals
30 shawms	26 lutes
28 organs	25 viols
25 cromornes	21 guitars
21 horns	2 clavichords
5 cornets	
3 combinations of organ and virginal.	

This makes a total of 272 wind instruments (72%) and 109 stringed instruments (28%).

In 1582 the orchestra of the Berlin court possessed:

24 flutes	3 trombones
17 reed pipes	7 viols
9 cornets	4 virginals
7 organs	1 harp

or sixty wind instruments (85%) and twelve stringed instruments (15%).

The famous collection of the Dukes of Tyrol at the castle of Ambras near Innsbruck, preserved to this day and recently taken to Vienna to form the nucleus of the musical gallery in the Kunsthistorische Museum, comprised more than one hundred and eighty-six wind instruments (79%) and only fifty stringed instruments (21%).

We see that, in contrast to the following centuries, there was a strong prevalence of wind instruments. We also see that there was a surprising number of seemingly identical instruments. Musical instruments between 1400 and 1600 were made in families or *consorts*. They were often played in homogeneous groups, all parts of a composition being performed by instruments of the same family, gambas or trombones or recorders. This involved making all instruments in several sizes, which, when not used, were kept together in one case and therefore formed a *chest*.

In the fifteenth century three sizes sufficed, as most compositions had three parts only. The number of parts was greatly increased during the sixteenth century. In consequence, the lower limit of medieval music, *G*, did not allow a sufficient range, and the makers faced the difficult problem of constructing basses and contrabasses. Consorts became so large that Praetorius could record *ein Accort*

oder Stimmwerk of eight recorders, from a *gar klein exilent* to a *Groß Bass*.

THE ORGAN, the truest mirror of the new attitude towards musical instruments, may suitably be the first to be described in this chapter. The slow pace at which it had evolved in the earlier middle ages became tremendously accelerated between the years 1400 and 1600, possibly owing to the polyphonic playing on keyboard instruments that we can trace back to the fourteenth century. In 1441, the largest pipe at Salem in Southwest Germany was four spans wide (or ten inches in diameter), and twenty-eight feet high; its tone must have been underneath the lowest string of the modern piano. Ten years later the organ of the chapel in the castle at Blois in France had pipes wide enough to let a man crawl through. This organ, as well as the organ in the cathedral at Barcelona which was made at the same time, had no less than fourteen hundred pipes; even earlier, in 1429, the cathedral at Amiens in France had twenty-five hundred pipes.

An organ with *two* manuals (or hand keyboards) existed already in 1386 at Rouen in Normandy. The rule was from thirty-five to forty-seven keys in one manual, starting on *f*, *B*, *F*, or *B*₁. From the fifteenth century on both manuals could be coupled to be played together. The coupling device connected the two manuals so that pressure on a key in one board acted upon the corresponding key in the other board as well.

The *pedal* keyboard, too, seems to have been invented in the fourteenth century, either in Flanders or in Germany. At the same time, the *pipe work* underwent a decisive change.

In the middle ages large organs had had several pipes on each key in order to enrich the timbre. Sometimes as many as twenty pipes answered the pressure of a key; these were tuned in unison (8 foot), in the octave (4 foot), twelfth ($2\frac{2}{3}$ foot), double octave (2 foot) and so on. The pipes were arranged in cross-rows, one row comprising all octave, all twelfth, or all double octave pipes. (Organ builders designate the pitch of a set of pipes by the length in feet of the pipe answering the great *C* key; 8' is normal, that means, the answering note is *C*; 4' is an octave higher, the answering note being small *c*'; 16' an octave lower, the answering note being *C*₁.) The medieval organ was, in modern terminology, a *mixture* or *furniture*. Like the mixtures in our organs, the medieval organ invariably sounded as a compound which, when several chords were played,



Hans Memling, Altar for Najera, Museum in Antwerp (late 15th century), with zither, trumscheit, lute, trumpets, oboe, portative, harp and fiddle.

formed dissonances and frictions and gave the organ a jangling sound.

Apparently at the end of the fourteenth century, solo stops began to be added—that is, rows of pipes, each row imitating the timbre of a certain wind instrument and contrasting with the neutral color of the *principals* or *diapasons* which composed the mixture. The original compound part of the organ was then called by the names that we often find in ancient organ music, *plein jeu* in French, and *órgano lleno* in Spanish. It became necessary, with the addition of solo stops, to devise a contrivance connecting or disconnecting at will now one of the solo stops, now the old compound. It consisted in a slider projecting from the case which, when pulled out, admitted the wind to one complete row of pipes. Such a contrivance was called a *stop* in English, and the same name was also given to the row of pipes that it connected.

The first solo stop was the *flute*, which is wider or, as organ builders say, has a larger *scale* (diameter in relation to height) than the principals. As late as 1513 the organ of Saint-Sauveur at Aix-en-Provence, a very old-fashioned organ for its time, had only a single flute stop contrasted to a *plein jeu* of principal, octave, double octave, nineteenth and triple octave.

The great change in organ building at the time of the introduction of solo stops was due to a change in the style of music and in the role that the organ played in it. The new polyphony introduced by Okeghem and culminating in Palestrina needed more transparency. Solo stops had to be inserted to counterbalance the compound stops with their antipolyphonic fifths and even thirds. It was these new stops that gave the organ the quality which today seems to be its distinctive feature: the contrast and mixture of different timbres. As late as 1511, Arnold Schlick writes: "It is good to have the stops isolated, so that the organist may use them one after another, as he likes." (*Auch ist gut die register all ab zü ziehen, das der organist gleich register allein eins nach dem andern hörn mag lassen, wie ym oder andern geliept.*) "Besides it is rather pleasant to hear two stops together, as cymbals with diapasons." (*Dan fast lustig zü hörn etwan zwey register zü sammen, als die zymmeln zü den principaln.*) This combination and contrast of timbres which today we take for granted was a new discovery of the sixteenth century.

Two years before, in 1511, Arnold Schlick had published a plan of *viiij. oder ix gut register*, "of eight or nine good stops which would delight the ear, if well combined and alternated":

<i>Manual</i>	<i>Pedal</i>
Diapason 8'	Diapason
Octave 4'	Octave
Gemshorn 4'	Trumpet or Trombone
Cymbal	Hintersatz
Hintersatz	
Reed stop	
Xylophone	
(Flute)	

Hintersatz or 'rear set,' as opposed to *prestant* or 'front set,' was a furniture with sixteen or eighteen pipes on each key, which was penetrating but not too strident.

While, as late as 1475, the organ of the *Dom* at Bamberg had been given a compass from *A* to *f''* only, Schlick's organ had twenty-four keys from *F* to *a''* in the manual, and twelve keys from *F* to *c'* in the pedal, plus the semitonia. This must not be taken too literally, however. The organists distinguished between large and small organs. 'Large' organs were tuned a fifth lower. As Schlick says that the *F* pipe was six and a half Rhenish feet long (or 2041 millimeters), the corresponding *a'* pipe must have produced either 337 vibrations in a large organ, or 504 vibrations in a small organ. In the Halberstadt *Dom* organ, built in 1361, *a'* had 506 vibrations. Compared with modern pitch, *a'* corresponded to a note between *e'* and *f'* in a large organ, and between *b'* and *c''*, in a small organ. As organs were not equal-tempered (although Schlick attempted to make them so), the organists could not transpose at will according to the individual voices they had to accompany; 'large' and 'small' keyboards allowed them at least to transpose according to the general ranges of the singers' voices.

Flemish and German organ builders were the first to pass from the simple liturgical mixture organ to the new organ with solo stops. At the end of the fifteenth century they introduced *stopped diapasons* (the pipes having the upper ends closed by caps so that their timbre was soft and hollow), tapering pipes such as *Gemshorn*, reed stops (the French *trompes* of that time were flue pipes in spite of their name), the pulsating *Tremulant* (Hagenau 1491) and the pedal keyboard with stops of its own (1390–1400). The rich and sonorous pedal and the penetrating furnitures and cymbals constituted the main departures from the French organ of that time. (figs. 84, 85)

Spanish organs also had only flue stops; the pedal, which in most cases had no more than seven or eight keys in diatonic succession, was

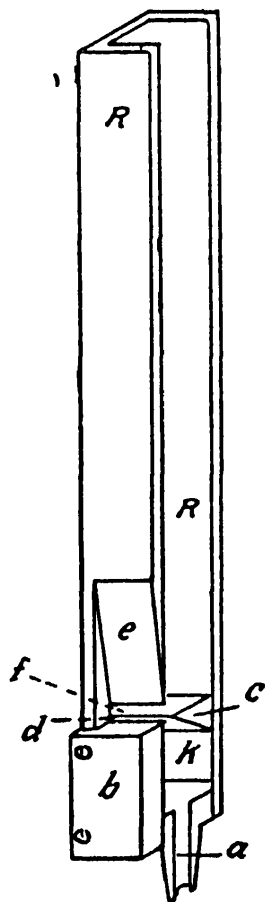


FIGURE 84. Wooden flue-pipe.

R body, *a* foot, *b* cap, *c* block, *d* flue, *e* toplip, *f* mouth, *k* wind way.

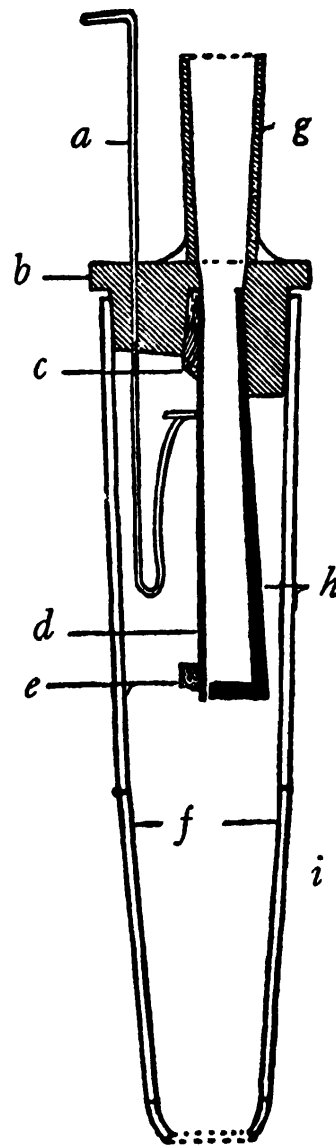


FIGURE 85. Reed pipe.

a tuning spring, *b* block, *c* wedge, *d* vibrating tongue, *e* weight, *f* boot or socket, *g* shank, *h* shalet, *i* section of a reed.

generally neglected. English and Italian organs remained in a fifteenth century style. They usually had no solo stop except for a flute and were entirely built on the basis of principal and mixture. Italians did not even care for inventing special names; they used principals—wider in size and softer in tone than the German ones—and above them, octave and fifth stops that they called 8a, 12a, 15a, 19a, 22a, 26a, 29a, 33a and 36a—that is, in our terminology, 8', 5 $\frac{1}{3}$ ', 4', 2 $\frac{2}{3}$ ', 2', 1 $\frac{1}{3}$ ', 1', $\frac{2}{3}$ ', $\frac{1}{2}$ '. Registers with stopped pipes were not used, and reeds only rarely.

All countries liked foolish contrivances, though serious organists disapproved of them. Bells and jingles on rotating wheels were the most acceptable of these humorous stops. As *Zymbelstern* in German and *cascabeles* in Spanish, they were used up to the nineteenth century. The organ at the *Dom* in Magdeburg, built in 1604, had no less than forty-two carved *Figuren*, such as a crowing cock, twelve of which moved by machines. In an organ erected at about 1500, so Schlick tells us, there was the figure of a monk in the lower part of the organ case, falling out of a window and jumping back again.

REGALS were small reed organs. Their pipes were shaped like cylindrical beaks of clarinets; the beating reeds were made of metal. In the inventories of the sixteenth century they were mentioned as *One paire of single Regalles* or as *A paire of double Regalles*. The word *paire* is misleading since it meant simply a whole set, in this case a set of individual pipes forming one organ. *Single* and *double* referred to the contemporaneous use of doubling the letter which indicated a certain note when the lower limit in medieval music, *gamma-ut* or *G*, was exceeded. Thus, a Single Regal did not descend beyond *G*, whereas the Double Regal ended in the octave of double letters. The name *regal* can be traced back through English *rigol* to French *rigole*, or 'trough,' on account of the shape of the pipe.

It seems, however, that *regal* was not yet applied exclusively to the reed organ. It must also have meant what later was called a *positive organ*. In a source like Henry VIII's inventory of 1547, this latter word does not occur; except for *one paire of portatives*, all chamber organs are designated as regals. On the other hand, one item of this inventory runs: *One paire of single Regalles with iiij Stoppes of pipes, of woode vernisshed yellowe and painted with blacke anticke woorke standinge uppon a foote of wainscott the Bellowes lieing in the same: it hathe but one Stoppe of pipes of woode a Cimball of Tinne and a Regall*.

In modern words this regal had a stop of wooden flue pipes, a cymbal stop of tin, which according to Praetorius was a furniture with two pipes on each key, and a 'regal.' This arrangement is corroborated by the preceding item: *One paire of single Regalles with two Stoppes of pipes of timbre and one Stoppe of pipes of Tinne . . . the same hathe but one Stoppe of pipes of woode the Regall of papire and hathe a Cimball*. Here again a regal is a stop within a regal; the word meant a reed stop, as well as a chamber organ with different stops.

The origin of the regal, or reed organ, is obscure. We know it existed in the time of the German Emperor Maximilian I, who died in 1519. The engraver Conrad Weiditz has depicted the famous composer Paulus Hoffhaimer accompanying the Emperor's choir on a special kind of regal, the pipes of which had globular resonating caps. A hundred years later, Michael Praetorius pictured the same instrument on one of the woodcuts in his *Syntagma musicum* and calls it *Köpfflin-Regal*; according to his words, the tone was *gut und lieblich*, 'good and lovable.'

Generally, however, the sound of a regal was rather reedy and

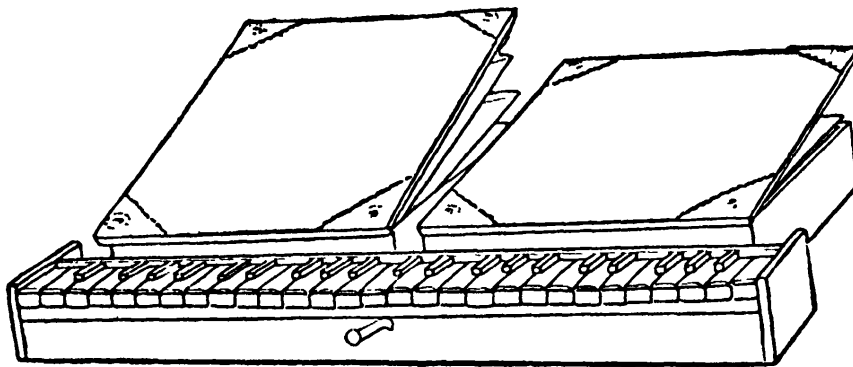


FIGURE 86. Bible regal.

harsh, so that musicians in Bach's time abandoned it because of its *eckelhafften*, 'loathsome,' tone as Bach's friend, Johann Mattheson, said.

The prevalent kind of regal was the Bavarian *bible-regal* which, when it was folded up and packed into the book-shaped bellows, looked like a large bible. (fig. 86)

THE RECORDERS formed the leading group among the flutes. The German name *Blockflöte* expressed its nature as a beaked whistle flute, the upper end of which was stopped by a block or plug that left only a narrow flue to lead the breath towards the sharp edge of a mouth-hole in the side. The bore tapered toward the lower end, the diameters at the upper and lower end being in the ratio 5:3. Because of this shape, as well as because of the absence of a bell, the recorder had a pale tone which is reflected in its names, Italian *flauto dolce*, French *flûte douce*; the English term *recorder*, from the obsolete *record*, 'warble,' compares it to a singing bird. An ensemble of recorders was unsurpassed in dignity and reserve.

We do not know where the recorder originated. Its first evidence is in a French miniature of the eleventh century. Up to the seven-

teenth century it was made in one piece and turned in a very simple profile; it had one high dorsal fingerhole and seven front holes, the lowest of which was duplicated to accommodate either right- or left-handed players; the unused hole was kept stopped with wax.

As early as the beginning of the sixteenth century the recorder was made in whole consorts; in King Henry's inventory of 1547, one item among others quotes *viii Recorders greate and smale in a Case couered with blacke Leather and lined with clothe*. That the family comprised already bass, if not double bass, recorders, is confirmed by the following item: *One greate base Recorder of woode in a case of woode*. (fig. 87)

It is, however, erroneous to conclude that those eight recorders, or even the *ix Recorders of woode* in a later item, all differed from each other. From Virdung (1511) we learn that, if a case held six recorders, two of them were trebles, two alto-tenors, two basses; and we are informed that the two instruments of each pair differed in pitch by one note as do our C and B $\flat$ clarinets and, like these, were alternately used according to the tonality of the composition. The ideal consort of recorders that Michael Praetorius outlines in his *Syntagma musicum* (1618), comprises twenty-one instruments, but only seven sizes, each of which has two different pitches. These seven sizes are:

<i>Size</i>	<i>Length</i>	<i>Lowest note</i>
Exilent	c. 9 in.	g''
Treble	c. 12 in.	c''
Alto	c. 17 in.	f'
Tenor	c. 24 in.	c'
Basset	c. 38 in.	f
Bass	c. 60 in.	$B\flat$
Double bass	c. 80 in.	F

Bass and double bass were blown through a brass crook like that used on a bassoon. Basset, bass and double bass had an open key for the lowest hole. (fig. 88)

The *open key*, first recorded in a Netherlandish source in 1413, was for the purpose of closing a fingerhole too distant from the others. In larger instruments it was impossible to reach the lowest fingerhole, as the little finger was too short. Therefore, a longitudinal brass lever with a padded cap at its lower end was so arranged that the upper end of the lever was within the reach of the little finger, and the cap stood above the hole without covering it. When the



FIGURE 87. Treble recorder.

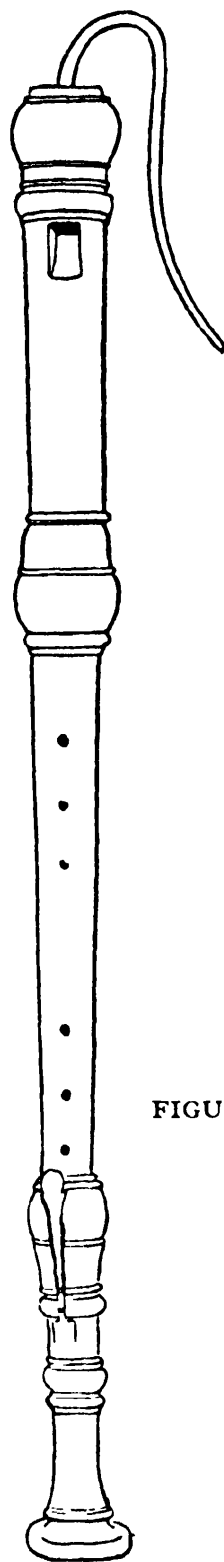


FIGURE 88. Bass recorder.



FIGURE 89. One-handed flute.

finger pressed the upper end of the lever, the cap went down and closed the hole; when the finger was lifted, a spring drew back the cap and the hole was again open. A bulging wooden cylinder slipped on over the top of the instrument, fitting over the key to protect it.

In the seventeenth century *closed keys* were used along with open keys, for a different purpose—that is, to add supplementary holes for chromatic notes without disordering the normal arrangement of holes and fingers. The padded cap at the end of a lever kept the hole closed; it was opened when the finger pressed the lever down.

THE ONE-HANDED FLUTE, best known under its French and Provençal names *flûtet* and *galoubet*, was a recorder with a bore so narrow that no fundamentals could be obtained; normal soft playing produced the higher octave, and overblowing the fifth above. Consequently, the fingerholes had to fill up the distance of only a fifth instead of the usual octave. Three holes sufficed—two in front and one behind—with cross-fingering and an occasional half-stopping of the open end. These few holes required only one hand. The player's other hand was free to play some second instrument: either a drum—the small *tabor* in England, or the large *tambourin* in Provence—or a longitudinal zither with thick gut strings tuned to tonic and dominant, such as the *tambourin du Béarn* in South France and the *altobasso* in North Italy. *Tabor and pipe*, as the English call the one-handed drum combined with a small drum, are depicted in miniatures beginning in the thirteenth century; the combination of a one-handed flute and a drone zither is figured on Filippino Lippi's fresco of the Ascension in Santa Maria sopra Minerva in Rome (1489).

As early as the end of the fifteenth century Italian painters depicted two different sizes of one-handed flutes, and at the end of the sixteenth century Germans and Italians also used larger basses with a bassoonlike crook. Michael Praetorius mentions the same three sizes and depicts them:

Treble	20 in.	<i>d''</i>
Tenor	26 in.	<i>g'</i>
Bass	30 in.	<i>c'</i>

The one-handed flute still exists in southern France and among the Basques of both Spain and France. It has been revived in England with the renaissance of the old folk dances. (fig. 89)

FLAGEOLET, a term derived from a late Latin word, was, in the middle ages, a French name for certain flutes; the poet Eustache Deschamps, in the fourteenth century, praised *les doux flajolez ressonans*. The old name was revived when, about 1581, JUVIGNY in Paris constructed a small, narrow recorder with six holes—four in front, and two in the back for the two thumbs. The instrument is seldom mentioned; yet, the great number of specimens preserved in museums proves its popularity. In the eighteenth century, at least,

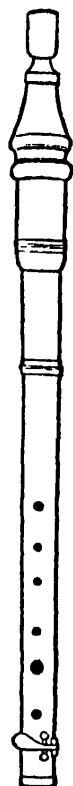


FIGURE 90. Large English flageolet.



FIGURE 91. English double flageolet.

it was important even in art music; called *flautino* or *flauto piccolo*, it performed the highest part in the orchestra, which later was given to the octave cross flute.

After about 1750, the recorderlike beak was replaced by a nozzle of bone as a mouthpiece leading into a bulging chamber which enclosed a sponge to absorb the saliva.

One must be careful to distinguish between this *French flageolet* and the so-called *English flageolet*. The latter, an amateur instrument of the first quarter of the nineteenth century, was likewise constructed with a nozzle and a sponge, but had the hole arrangement of the recorder. (fig. 90)

Both the French and the English flageolet were made either as single or as double instruments—that is, one mouthpiece leading to

two tubes to play chords. The English double flageolet had a shutter in order to deaden one of the tubes when required. (fig. 91)

THE TRANSVERSE FLUTE was one of the few cylindrical instruments, as it is today, although for two hundred years beginning in the seventeenth century its bore was conical. Since it was made in one piece, it could not be tuned by being pulled out like later flutes. Therefore it was made in different pitches, and this may explain the astonishing number of transverse flutes that we find in the inventories of some court orchestras—thirty-five, for example, in Stuttgart in 1576. This is the more probable as, according to Praetorius, a whole consort consisted only of:

two trebles	c. 20 in. long	(<i>d'</i>)
four alto-tenors	c. 30 in. long	(<i>d'</i>)
two basses	c. 45 in. long	(<i>g</i>)

The alto-tenor, in this set, corresponds to the normal modern flute; Praetorius already states that it can be used for playing a soprano part.

The first mention of a complete family of transverse flutes is in Agricola's *Musica deudsch*, while, in 1511, Virdung speaks of a military *fife* only, not of transverse flutes for artistic purposes. This fife is the *Schweizer Pfeiff*, or 'Swiss fife,' that a hundred years later Praetorius describes as having a length of two feet and a range of either *g'* to *c*³ or *c*[♯] to *a*[♯]". Its bore was cylindrical, too, but narrower, to produce the higher notes, and the tone was much coarser.

THE SHAWMS of the fifteenth and sixteenth centuries, called *bombard*es in French and *pommern* in German, had a bore that was narrow and very slightly conical and, like all reed pipes of that time, a double (oboe) reed. Six fingerholes formed two groups of three; a seventh one was provided with an open key which lay inside a protective cylinder. The family comprised:

Small discant	c. 21 in. long	(<i>b'</i>)
Discant	c. 24 in. long	(<i>d'</i>)
Small alto	c. 30 in. long	(<i>g</i>)
Big alto (<i>nicolo</i>)	c. 36 in. long	(<i>c</i>)
Tenor	c. 52 in. long	(<i>G</i>)
Bass	c. 75 in. long	(<i>C</i>)
Double Bass	c. 100 in. long	(<i>F</i> ₁)

In 1376, Jean Lefevre de Ressons designated the *grosses bombard*es as *nouvelles*. (pl. XVIII a, fig. 92)

The *bassanello* was a shawm with an even narrower, slightly conical bore. The instrument appeared to have a bell, but it was a false one as the small bore continued to the end of it. There were six front holes and an open key for the small finger under a protective cylinder; a brass crook held the reed. The timbre was a little softer than that of ordinary shawms. Bassanelli were built in three sizes:

Treble	c. 32 in. long	(<i>d</i>)
Alto-tenor	c. 45 in. long	(<i>G</i>)
Bass	c. 64 in. long	(<i>C</i>)

No specimen has been preserved.

The instrument is mentioned for the first time in 1577, when the estate of the deceased Archduke Karl of Austria was inventoried; the last evidence is in Michael Praetorius's *Syntagma* of 1618-1620. In speaking of the instrument, Praetorius affirms that its name is derived from the Venetian composer, Bassano. This is not likely. The first-known date in Bassano's life is only 1585—that is, eight years after the earliest mention of *bassanelli* outside Italy. Moreover, inventors' names were rarely given to instruments before the nineteenth century.

THE BASSOON is a slightly conical double-reed instrument, the tube of which is bent back on itself like a hairpin, first descending and then ascending. A brass crook containing the reed projects at right angles from the upper end of the tube.

In the sixteenth century both channels were bored out of the same long block of wood; only a brass crook containing the reed for one channel, and a narrow bell for the other channel, projected at the top. In the seventeenth century the long, thick piece shrank to what is called the *butt*, in which the U-shaped knee is bored; inserted into the butt, two separate tubes—the *wing* and the *long joint*—comprised the descending and the ascending channel, exactly as in the modern form of the bassoon. (figs. 93, 94, 95)

The compressed, narrow tone of the bassoon is derived from the prevalence of the third partial.

The earliest reliable reference to this instrument is in an English private inventory from 1574, where it is called *curtal*. But it was older; for, a famous bassoon maker, SIEGMUND SCHNITZER, died at Nürnberg in 1578, and in the same year Philip van Ranst, musician to the court of Brussels, was appointed player of the new instru-

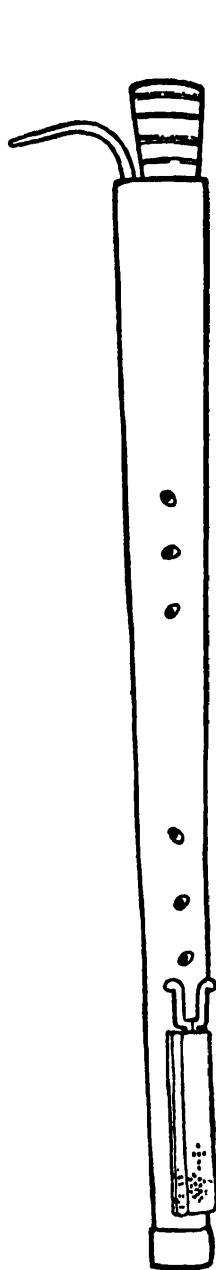


FIGURE 93. Dulcian.

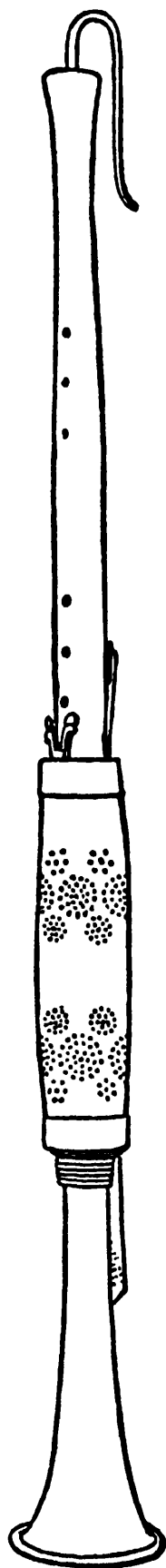
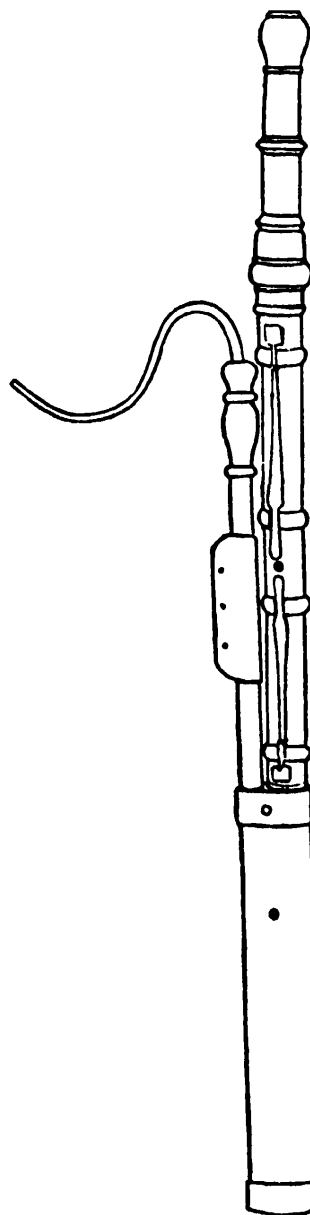


FIGURE 92. Bass shawm.

FIGURE 94. Bassoon
(18th century).

ment. Thus, it may have originated about the middle of the sixteenth century.

At about 1600 the family consisted of the following five sizes:

Treble	c. 1'3" high	
Alto	c. 1'6" high	
Tenor	c. 2'3" high	(G)
<i>Rechter</i> or <i>Choristfagott</i>	c. 3'3" high	(C)
Bass	c. 4'9" high	(F ₁)

Both tenor and chorist fagott were made either open or *gedackt*. But though this latter word meant 'stopped,' they were only covered with a kind of sieve, which was supposed to muffle the tone without lowering it.

According to Michael Praetorius, HANS SCHREIBER, musician to the electoral court in Berlin, was constructing a *fagotcontra* with C₁ as lowest note in 1618. "If he is successful, it will be a marvellous instrument never seen before." This was the earliest *double bassoon*. (fig. 96)

The bassoon had a different name in every language. The Italian *fagotto* or 'fagot' was translated into German as *fagott*; the Italian *bassone* or 'big bass' led to English *bassoon* and Spanish *bajón*. Praetorius mentions that the English call the tenor bassoon a *singel corthol*, and the ordinary bassoon a *doppel corthol*. In usual spelling this is the British word *curtall*, which derives from Low German *kortholt* or 'short wood' and signifies an instrument shortened because of its folded tube. A last family of names comprises such terms as *dolcian*, *doucine*, *dulzian*. This word occurs as early as the middle ages; apparently every soft-voiced instrument with a double reed could be given this name.

Smaller bassoons were built as late as the early nineteenth century. The older scores of Joseph Haydn's *Stabat Mater* (1771) demand (tenor) *fagotti* in E_♭ with B_♭ as the lowest note; HEINRICH GRENSER in Dresden made bassoons in the upper octave of the ordinary bassoon about 1810; and, by 1820, LAZARUS in London had constructed a similar model under the name *tenoroon*.

An A bassoon, a minor third under the normal bassoon, is included in Johann Sebastian Bach's cantata no. 150 (*Nach dir, Herr, verlangen mich*).

The *sordone* was a cylindrical bassoon, the channel of which ran down and up two or three times within the same piece of wood and ended in a lateral hole. The sound was soft and muffled; hence came

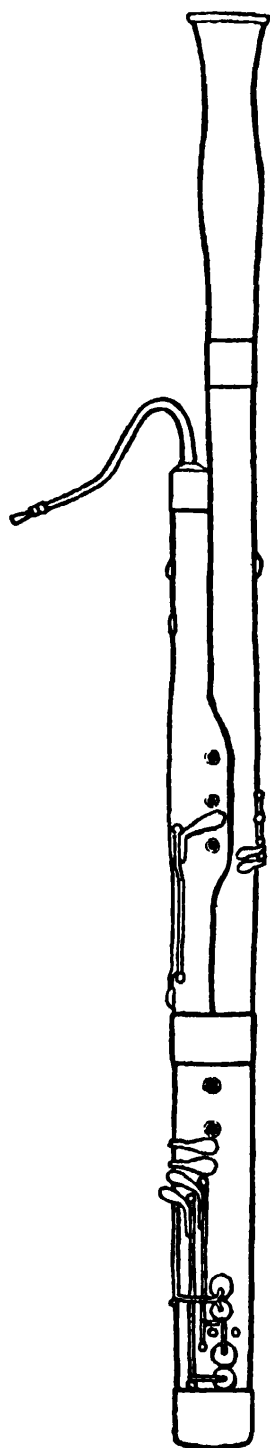


FIGURE 95. Bassoon
(19th century).

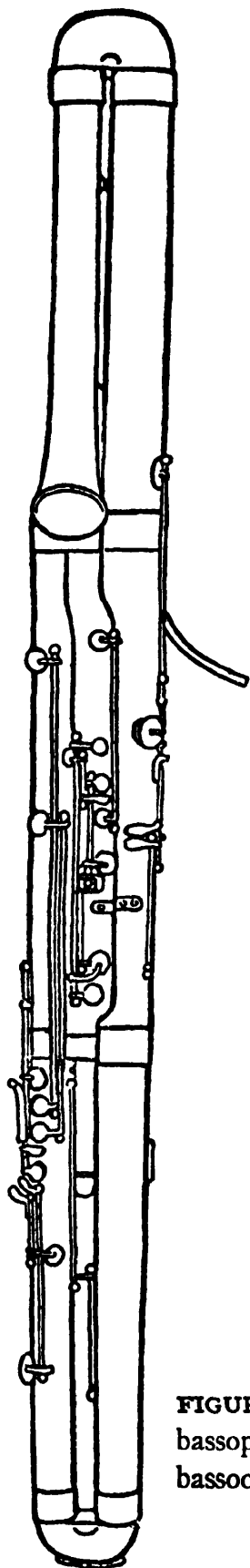


FIGURE 96. Contra-
bassophon (double
bassoon).

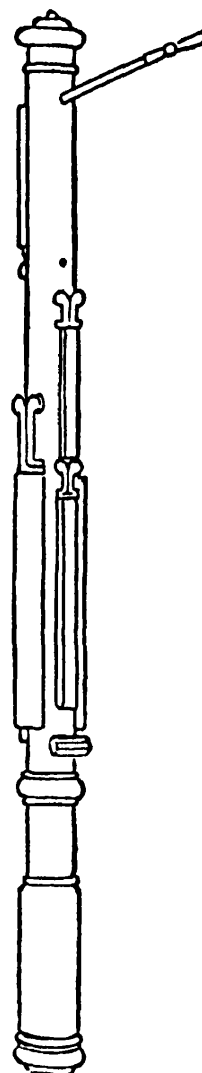


FIGURE 97. Sordun.

the names (mostly used in the plural forms): Italian *sordoni*, from *sordo* 'deaf,' German *sordune* (incorrectly *sordunen*), French *sourdines*. They were built in five sizes:

Treble		(<i>B$\flat$</i>)
Alto		(<i>E$\flat$</i>)
Tenor		(<i>C</i>)
Bass	87 cm high	(<i>B$\flat_1$</i>)
Double bass	90 cm high	(<i>F$_1$</i>)

The instrument must have been extremely rare; the only four preserved specimens, two basses and two double basses, the same which were mentioned in an inventory of the Archdukes of Tyrol in 1596, belong to the Kunsthistorische Museum in Vienna (no. 226–229). (fig. 97)

RANKETS or *rackets*, from Upper German *rank*, 'to and fro,' in French *cervelas*, 'sausages,' were short, thick cylinders of solid

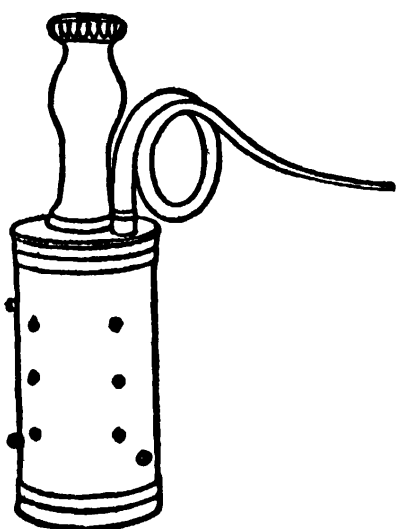


FIGURE 98. Ranket.

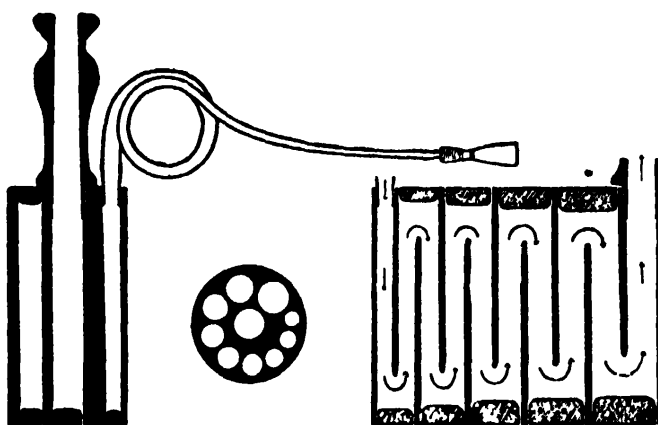


FIGURE 99. Ranket (del. C. Manger).

wood or ivory pierced lengthwise by many cylindrical channels all of the same size. The channels were arranged in a circle with one in the center, and each was connected with one neighbor at the top and another one at the bottom, so that they formed a continuous cylindrical tube. A cup called *pirouette* in French was inserted in the central channel, concealing the lower part of the reed and supporting the player's lips. Holes involving a complicated fingering were cut in the walls of the cylinder. The sound was muffled and reedy. Five sizes were built:

Treble	$\frac{1}{2}'$ high	(<i>c</i>)
Alto	$\frac{3}{4}'$ high	(<i>G</i>)
Tenor	1' high	(<i>C</i>)
Bass	$1\frac{1}{4}'$ high	(<i>F</i> ₁)
Double bass	$1\frac{3}{4}'$ high	(<i>C</i> ₁)

Rankets first were mentioned in Austria in the beginning of the sixteenth century, and the last evidence of this kind of rankets may be found in Mersenne's *Harmonie Universelle*, 1636.

A slightly different form was made in the seventeenth and in the first years of the eighteenth century. The diameters of the channels were unequal; the tube as a whole became conical. The narrowest channel formed the mouth end of the tube and was provided with a bassoon crook. The widest channel, which was in the center, wore the bell of a bassoon. Thus the term *ranket-bassoon* would be appropriate for this instrument. (figs. 98, 99)

CROMORNE. Besides the double-reed instruments already discussed, instruments existed in which the reed was concealed in a wooden cap put over the top of the pipe and acting as a windchest. The player was able to blow into it through a small opening in its top or side, but he could not touch the reed itself. Thus the reed, like the reed pipe of an organ, was set into vibration by indirect wind pressure, and the tone could not be modified either by the varying pressure of the lips or by the power of the lungs.

The notes persisted in uniform force and quality, and overblowing into higher octaves was not possible.

The reader met such wind caps on page 212 in combination with a family of oriental reed pipes, the two ends of which were covered with caps of ox horn, the one at the outer end serving as a bell and the other as a cap to conceal the reed. Members of this widely scattered family were found along the sea route from the Indian Ocean to the Atlantic.

There were similar folk instruments in southern and western Europe, the history of which is not clear. Apparently wind-cap instruments were first introduced to art music in the fifteenth century.

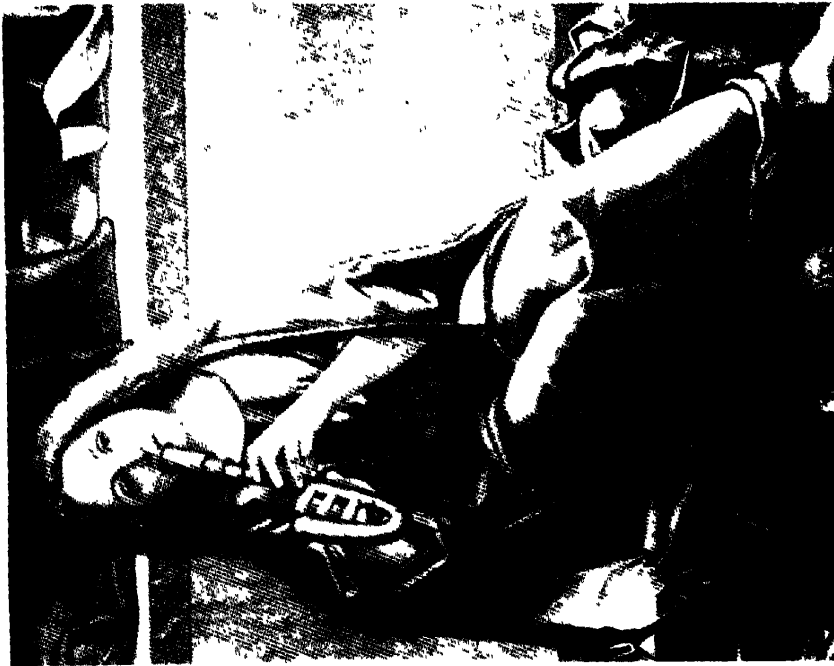
The cromorne was the oldest European instrument with a wind cap. It was a slender cylindrical oboe ending in a curve that was reminiscent of the folk instrument with an ox horn. This explains the original German name *krummhorn*, or 'curved horn,' which was adapted to English and French as *cromorne*. Since the bore was



Vittore Carpaccio, angels with lira da braccio and



*Hans Baldung, woman with viol,
in the Pinakothek, München.*



cromorne in the Academy, Venice (1510).

almost entirely cylindrical, the timbre was softer and darker than the tone of the oboe, and this was probably why the French were inclined to transform the name *cromorne* into *cor morne*, or 'mournful horn.' As no overblowing was possible, the range was limited by

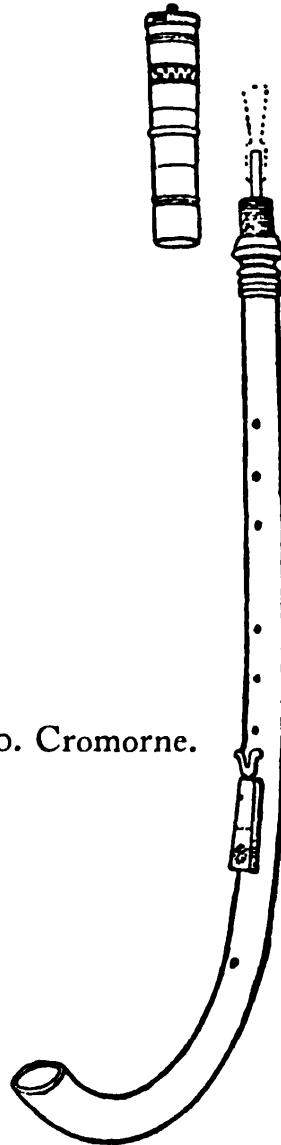


FIGURE 100. Cromorne.

the number of fingerholes, seven in front and one at the back. (fig. 100)

Five sizes were made:

Exilent	c. 13 inches long	(<i>c'</i>)
Treble	c. 16 inches long	(<i>g</i>)
Alto	c. 23 inches long	(<i>c</i>)
Tenor	c. 32 inches long	(<i>G</i>)
Bass	c. 39 inches long	(<i>C</i>)
Double bass	c. 48 inches long	(<i>F</i> ₁)

The term 'krummhorn' is first mentioned in Dresden in 1489 as an organ stop, indicating the prior existence of the instrument. In 1510 the Venetian painter Carpaccio depicted an angel with a cromorne in his "Presentation in the Temple" (now in the Academy in Venice). The instrument had a lifetime of about one hundred and fifty years only; it is last mentioned in 1617, when Johann Hermann Schein, the Saxon composer, published a pavan for four cromornes. (pl. XIX c)

Curiously enough, the history of the cromorne had a postlude in France. About 1650 it was included in the band of the *Grandes Ecuries* at Versailles, and the best makers competed in manufacturing it. This, however, was no longer the slim cromorne with its soft sound, but a heavy outdoor instrument with a bore as much as two inches wide, a leather cover and a bassoon crook without a reed-concealing cap. Its name was *tournebout* 'turned end.'

SCHRYARI were loud, shrill, double-reed instruments with a tapering bore and a reed-concealing cap; they had seven fingerholes in front and two in back for the two thumbs. Praetorius describes and depicts three sizes:

Treble	c. 9 in. long	(g)
Alto-tenor	c. 17 in. long	(c)
Bass	c. 26 in. long	(F)

Bass and alto-tenor had two keys at the same height above the regular fingerholes, one in the front and one in the back, to enlarge the range upward. Alto and tenor differed in the upper limits of their compasses: the first ended on *f'*, the second on *d'*. No specimens have been preserved.

The oldest evidence of schryari is in a 1540 inventory of the municipal band of Augsburg in Bavaria; the last reference to them is made in 1686 in an inventory of the court orchestra of Brandenburg-Ansbach. All mention of them is in German sources.

There is evidence, however, that the instrument came to Germany from the Mediterranean. The two upper keys of the schryari were the characteristic feature of the Italian folk oboe *calandrone*. Also in 1541 the trumpet maker JÖRG NEUSCHEL in Nürnberg wrote to Duke Albrecht of Prussia to offer him some *schreyende pfeiffen* that he had received from Lyons and Venice with other instruments. These two ports point to an oriental provenance. Following this indication we find that there was an oboe with a tapering bore and

seven front-holes in Turkey in the ninth century; also there is a modern Japanese oboe *hichiriki* which, like the treble schryari, is nine inches long, has a tapering bore and seven front-holes.

The etymology of the name seems to confirm the oriental origin of the instrument. Praetorius lists it as *schryari* (*auf deutsch Schreierpfeiffen*). Obviously schryari was not a German word, and probably it is not even an Italian word adapted into German. If this had been the case, Praetorius, who was familiar with Italian, would have written it in a correct Italian spelling and form. It is more likely to think of an originally oriental name based on the same root, *šr*, that we have found in other names for wind instruments, *mašrokīta* and *syrinx*.

RAUSCHPFEIFEN were a German family of oboes with a narrow bore, a hole in the back, seven front-holes with the lowest duplicated for the right or the left little finger, a small bell and a cap concealing the reed. The only six specimens preserved, made in the second half of the sixteenth century, are in the Berlin Museum of Musical Instruments. They form a consort of

two trebles	42 cm long	(<i>e'</i>)
two tenors	54 cm long	(<i>c'</i>)
two basses	86 cm long	(<i>g</i>).

Players of rauschpfeifen were depicted in Hans Burgkmair's engraving, *Triumphzug Kaiser Maximilian's* (1518).

The German name was a High German transformation of Middle Low German *rus*, 'reed.' It has survived in an organ stop *rauschquinte*, producing the twelfth and the double octave of the pressed key. A treble rauschpfeife was known in France in the seventeenth century and called *hautbois du Poitou*.

THE CORNET OR ZINK. A short animal horn with a few fingerholes occurs in medieval Persia at a time directly after the dynasty of the Sassanids—that is, about 700 A.D.; it is represented on a silver dish of that period. Even today shepherds use a similar primitive horn in Finland, Esthonia, Sweden, Norway and Jugoslavia and also among the Bongo in the eastern Sudan.

Later, in European art music, the rough horn of an animal was replaced by a wooden or ivory tube. This became the *curved cornet*, in French *cornet à bouquin*, in German *Krummer Zink*. Miniatures depict it as early as the tenth century; did it come from Byzantium? In the twelfth century the outside of the tube was already octagonal

in cross section as in its classical form. A smaller cornet was called *cornettino* or *Kleinzink*. On the other hand, the sixteenth century had a large cornet, *cornon* or *corno torto*, in German *Grosszink*, in the shape of a stretched out S:

cornettino	(e')
cornetto	(a)
cornone	(d)

The curved piece of wood of which the cornet was made was slit lengthwise; the two halves were hollowed and then again glued together and held in position with a leather coat, which often was nicely engraved. (figs. 101, 102)

A less frequent type of cornet was the *cornetto diritto* or *Gerader Zink*, 'straight cornet,' whose cup-shaped mouthpiece instead of being inserted in the upper end was hollowed out of it. This cornet had a softer sound; Italians, therefore, called it the *cornetto muto*, and Germans *Stiller Zink*. Since it was harder to blow, it did not survive the beginning of the seventeenth century and was not even mentioned by Mersenne in his *Harmonie Universelle* (1636). (fig. 103)

The sound of both cornets was less brilliant than the tone of the trumpet, as the tube was short, conical, relatively wide and more rigid than the thin metal of brass instruments. This lack of brassy brilliancy or, acoustically speaking, of high harmonics, gave the cornet a distinctness and precision which enabled it to support the human voice or to supplant it better than any other instrument. Mersenne tells us that good cornettists could blow eighty measures in one breath and adorned their melodies with all the graces in which singers excelled. A hornlike tone was despised.

Nevertheless "the labor of the lips is too great," as Roger North (1653-1734) says. The golden age of cornet playing came to an end when, after 1600, the thorough-bass style disposed of the old polyphony in which the cornet had often played the treble, and gave the first role to the violin. For some decades, German pieces were printed with the indication, "for violin or cornet," *ad libitum*. But in Johann Gottfried Walther's *Musicalisches Lexicon*, published in 1732, the instrument was nearly forgotten; an article *Cornetto* is entirely copied from Praetorius who had written more than one hundred years before, and there is no heading *Zink*. Still some German town bands kept it during the eighteenth century, and Johann Sebastian Bach had the municipal cornettists accompany the choral of

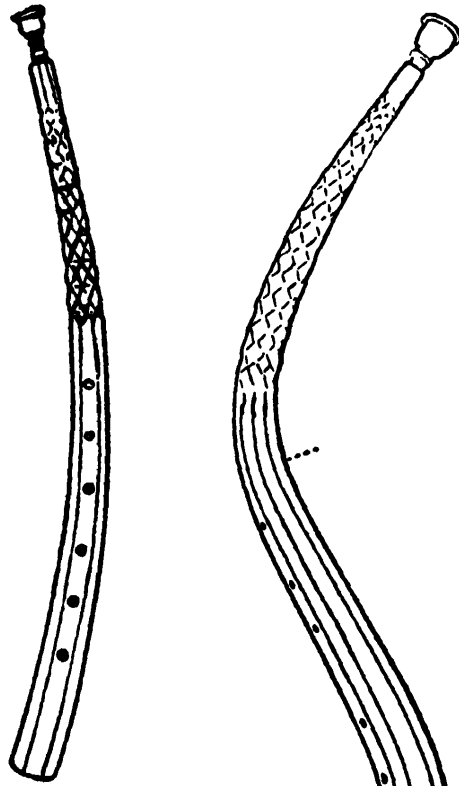


FIGURE 101. Curved cornet.

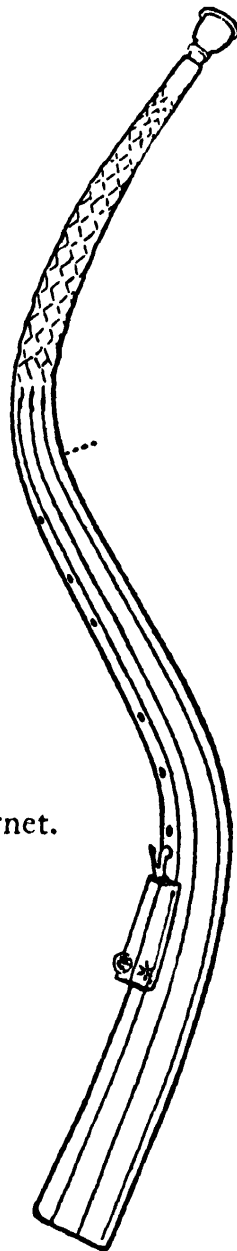


FIGURE 102. Tenor cornet.

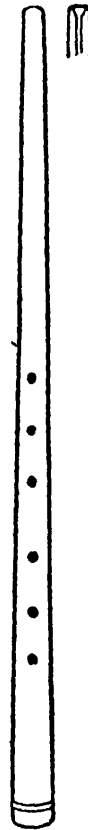


FIGURE 103. Straight cornet.

the boys in several of his cantatas. A few old-fashioned town musicians played the zink as late as the first years of the nineteenth century.

An offshoot of the cornet, the *serpent*, will be discussed in a later chapter.

THE TROMBONE is narrower and generally longer than the trumpet. Two parallel tubes are held several inches apart by a bridge. A third, U-shaped tube—the *slide*—connects the lower ends of the two parallel pieces, fitting over them for several feet, so that

it can be pulled out and in without being disconnected. The end of the second tube turns forward, spreading to form the bell.

By constant use of the slide, the player changes the actual length of the tube and alters the note as well as its overblown tones. He is able to play any note.

The trombone originated from the trumpet in the fifteenth century, as the names indicate; *trombone*, in Italian, is the augmentative form of *tromba*, and German *posaune*, the equivalent of Middle High German *busûne*, is the augmentative form of *busîne*. The English name *sackbut* is derived from a French word used in the fifteenth century: *sacqueboute*, 'pull-push.'

The first pictorial evidence of a trombone is on a painting of the Italian Matteo di Giovanni, who died in 1495, in the National Gallery, London.

The earlier trombone had thicker walls, and the bell expanded less than ours. Therefore, its sound was softer and more appropriate for playing in small ensembles together with stringed instruments or pipes.

At the end of the sixteenth century the family of trombones comprised:

Alto: lowest natural note *f*, with the slide drawn out, *B*

Tenor: lowest natural note *Bb*, with the slide drawn out, *E*

Bass: lowest natural note *Eb*, with the slide drawn out, *A*

A *toppelt pusaunen*, 'double trombone,' mentioned in a Bavarian document of 1581, was not an octave trombone; here, as well as in the case of the double bassoon, *double* means simply descending beyond *G*, as did the ordinary bass trombone. Trombones an octave below the tenor trombone were not mentioned before Praetorius, 1618. He speaks of a 'false' one, being merely a bass with additional crooks, and a real one, made "four years ago" by HANS SCHREIBER, the inventor of the contrafagotto, with a tube twice as long as the tube of the tenor trombone. (fig. 104)

A *treble trombone*, an octave above the tenor trombone, was only added in the latter part of the seventeenth century, but it was as rare as the octave trombone.

In the second half of the nineteenth century the alto also became rare and was given up, except in a few bands. On the other hand, new attempts towards a contrabass trombone were made in England, France and Germany. The successful model, proposed in 1816 by Gottfried Weber, was a double slide trombone. The tube was folded

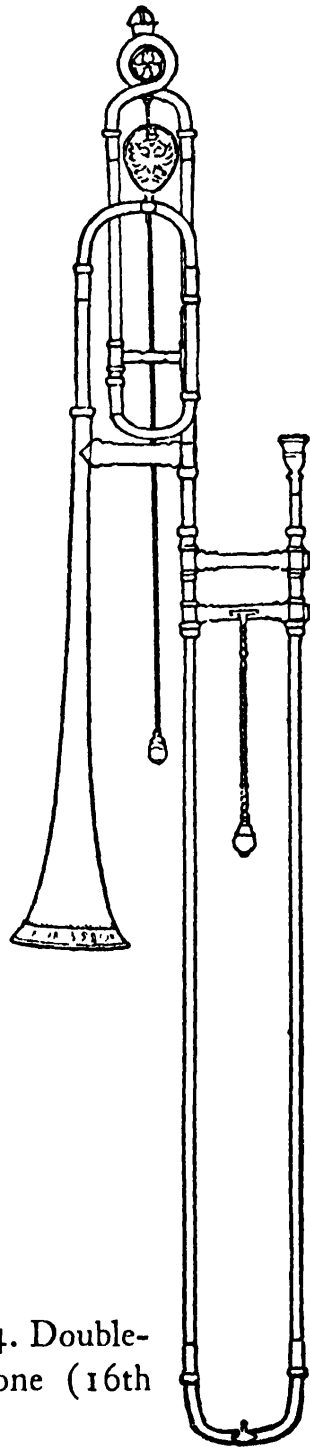


FIGURE 104. Double-bass trombone (16th century).

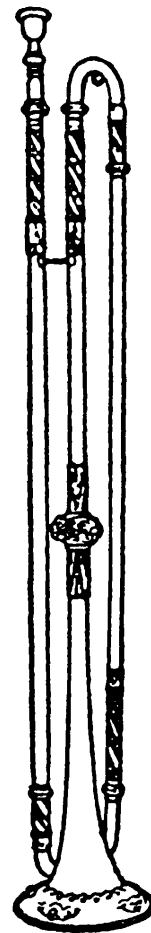


FIGURE 105. Trumpet (16th century).

to present a double tubing exactly the shape and size of the tenor trombone; pulling the slide to a normal position, the player extended four branches instead of two and lowered the tone twice as much.

Again, the true bass trombone, needing a rather long arm, is replaced by a *tenor-bass* in many bands—that is, by a tenor trombone with a valve to throw the instrument a fourth lower.

TRUMPETS. A figure on a carved choir seat in Worcester cathedral (c. 1400) is the earliest evidence of a trumpet folded into a narrow S form. The folded shape was more convenient for carrying. It was probably introduced from the Orient; it appeared in England at about the same time as on Persian miniatures. Not much later, in the first third of the fifteenth century, the two curves of the S were superposed in the modern fashion. The trumpet did not change much after about 1500; it resembled the modern trumpet except for the narrower bell, the thicker metal and the heavier mouthpiece, which all contributed to produce a considerably softer tone. This must be known to understand how the trumpet could play a role in the chamber music of the following centuries. Besides, there existed mutes; Monteverdi scored them as early as 1607 in his *Orfeo*. (pl. XVIII, fig. 105)

No player was supposed to draw all the possible notes from his instrument. As early as 1511, Sebastian Virdung's woodcuts depict two different instruments, a *Felttrumet* and a somewhat slimmer *Clareta*—that is, a military 'field trumpet' and a 'clear' trumpet. This corresponds to the later distinction between the *principal* and the *clarin* trumpets, the *Feldtrompeter* and the *Kammertrompeter*. The *Feldtrompeter* were not expected to read music; they played flourishes and sustained notes in the middle and lower register. The *Kammertrompeter*, on the contrary, were musicians and highly respected artists, who played melodies in the register in which the harmonics were close enough together to admit a coherent series of notes, that is, in the usual *D* pitch, from d'' upward, as the scale of a *D* trumpet was: (*D*) d a d' $f\sharp'$ a' (c'') d'' e'' $f\sharp''$ g'' a'' , etc. They played exclusively in this high register, as the "noble guild" to which they belonged forbade the principal trumpeters from using the register of clarin trumpeters, and the clarin trumpeters from going down to the register which was the prerogative of principal trumpeters. The player's lifelong restriction to the high register trained his lips and breath; he used an appropriate mouthpiece with a flat cup and a broad rim that gave good support to the overexerted lips. This is the "secret" that enabled the trumpeters of the Bach epoch to play such surprisingly high parts, up to d^3 , e^3 and even g^3 , in spite of the low pitch of their instruments (*D* alto, a minor third below our *F* trumpets, a minor sixth below our *B $\flat$* trumpets). But we should not forget that in those times solo parts were written expressly for one artist and his special skill. Modern artists, required to play the complete range, are not able to perform these parts in a

satisfactory style. Makers in the nineteenth and twentieth centuries have tried to facilitate blowing by constructing so-called *Bach trumpets* a third, a fifth or an octave above our *B_♭* trumpets—that is, an octave, a tenth or a thirteenth above the trumpets of Bach's time. Such trumpets have a poor tone without being much easier to play. Some outstanding swing trumpeters, however, are able to give us an idea of the brilliancy and ease of the high register.

KETTLEDRUMS. The history of the modern kettledrum began when large specimens were imported from West Asia, although the small kettledrums had been known in Europe since the thirteenth century. In 1457, King Ladislas Posthumus of Hungary sent envoys to France to solicit the hand of Princess Madeleine, daughter of King Charles VII, and they were accompanied by kettledrums. Father Benoît, describing this event, added: *On n'avoit ni mi oncques veu des tabourins comme de gros chaudrons qu'ils faisoient porter sur des chevaux*. "One had never before seen drums like big kettles, carried on horseback." From this we know that the large modern kettledrums were unknown in western Europe, though they existed in the east of the continent. About 1500 they were introduced in Germany. In his *Musica getutscht* (1511), Virdung writes that "now with us" the name *tympana* is given to the big army kettledrums of copper, which the princes have at court. "These are enormous rumbling barrels. They trouble honest old people, the ill and the sick, the devotees in monasteries who study, read and pray, and I think and believe that the devil has invented and made them. . . ."

Kettledrums had come to East Europe in the ancient Asiatic form, having laces to tighten the skin. As late as 1636, Mersenne depicts a Polish kettledrum of this kind. In Germany the kettledrums had already undergone an essential change in Virdung's time; instead of laces, such as were used in Asia and eastern Europe, some screws round about the head raised or lowered an iron hoop stretching the skin.

Germany had become a center of kettledrum playing even before the importation of the large instrument. As early as 1384, Duke Philip of Burgundy had sent one of his drummers to Germany to learn the art of playing. Later, the kettledrum was considered a specifically German instrument.

It was a symbol of aristocracy as well. The kettledrum was the inseparable companion of the trumpet, and kettledrummers were

included in the same "noble guild" and invested with the same rights as trumpeters. As late as 1683, the Scotch officer, Sir James Turner, states that "the Germans, Danes and Swedes permit none under the rank of baron to have them unless they are taken in battle from an enemy."

As symbols of wealth and nobility, kettledrummers were expected to show a certain extravagance. The classic monographer of the "Heroic and musical art of the trumpet and the kettledrum," Johann Ernst Altenburg, emphasizes in 1795 "the affected figures, turns and movements of the body" of German kettledrummers, and Zedler's gigantic *Universallexikon* (1735) calls a kettledrummer the one "who knows how to strike the drum elegantly. This is done with certain movements of the body which elsewhere would be ridiculous." Sometimes, to make the appearance more spectacular, Negroes were employed as kettledrummers. Cavalry regiments delighted in the same extravagant parading of their kettledrums, which they used more and more as a special privilege. As late as the twentieth century such a cavalry drummer would wear a full beard, ride on a black horse and throw up and catch the sticks while playing. When, about the middle of the sixteenth century, a German, Baron von Dohna, came to France, his ostentatious entrance annoyed the French so much that the Duke de Guise ordered his kettledrums to be dashed to pieces "to his great abashment."

CLAVICHORDS were stringed keyboard instruments of a simple construction. In a small, shallow box without a stand or legs, the strings were stretched from the tuning pegs at the right end around the hitch pins inserted in the left end. A plank of hard wood (*wrest plank*) into which the tuning pegs were screwed, was squeezed into the right end of the box; a small soundboard made of tender fir wood was supported by the wrest plank at the right end, but extended leftward beyond it to the position of the highest key. There were one or more bridges on the soundboard. A vertical metal *tangent* on the rear end of each key gently touched the corresponding string and produced a remarkably soft, indeed meager, tone. While in the modern piano, the hammer, falling back after the strike, releases the string and causes a vibration belly at the point of contact, the tangent of the clavichord did not fall back and set the string free unless the key was released and therefore caused a vibration node at the point of contact. The superfluous section of the string, at the left of the point of contact, was deadened by a strip of

felt woven between the strings; the vibrating section was bounded by the bridge on the soundboard at the right, and the point of contact of the tangent at the left. As the length of the vibrating section did not depend on the whole length of the string, but on the distance between the bridge and the stopping tangent, several neighboring tangents could use the same string to produce different notes. Thus, the clavichord had fewer strings than keys. One of the oldest sources, Henry Arnault's treatise, gives the clavichord nine double strings and thirty-five keys—that is, with an average of four notes to each string. (pl. XXI a)

The clavichord evolved from the polychordic monochord (cf. page 271). The link between them is missing. But we can easily reconstruct it. Such a polychord needed the strings tuned a third apart, as the third was the smallest consonance of that time. The intermediate notes could be produced in the usual manner by shifting the stopping bridge. It would have been difficult, however, to shift bridges to and fro under so many strings without endangering the accuracy of the intervals. When the right places were found and fixed, musicians gave individual bridges to each note, which could stop or release the string without difficulty or loss of time. The required contrivance already existed in other instruments; the hurdy-gurdy had the shortening bridges or tangents, and the organ provided both levers and keys.

The date of this transformation is not certain; but the keyboard doubtless existed in 1323 when the Frenchman Johannes de Muris, in his *Musica speculativa*, mentioned a monochord with nineteen (diatonic) strings, covering two octaves and a fifth, besides the real monochord with from one to four strings.

Following the principle of polychordic monochords, an older type of keyboard instrument, still existing at the beginning of the sixteenth century, had strings of equal length, thickness and tension. A more recent type, already made in the fifteenth century, had strings of different length, thickness and tension. According to a passage in Ramis de Pareja's *Musica pratica*, in 1482, the first one continued to bear the old name 'monochord' while the second one was called clavichord. Eberhard Cersne's poem *Der Minne Regel* (1404), the earliest source that mentions the name 'clavichord,' includes the term 'monochord' as well. Still the name 'monochord' was less and less used; in 1511, Virdung depicts a *clavicordium* as an instrument with strings of equal length.

Clavichords were first depicted more than a hundred years after

Johannes de Muris: in a woodcut of the *Weimarer Wunderbuch*, in a design in Henry Arnault's treatise and in a wood carving in St. Mary's Church, Shrewsbury, all of them dating about 1440. A few years later a clavichord was carved on a Dutch wood sculpture now in the Rijksmuseum at Amsterdam. These early evidences came from England, France and Holland, indicating that the clavichord probably originated in the northwestern section of Europe.

One of the most striking features of all older clavichords was the shortness of the keys. They projected only three centimeters beyond the semitones, while the keys of modern pianos project five centimeters. This seems to have been due to the mechanical action required, the weight of the front of the key needing to balance exactly the weight of the rear. A player using modern fingering would stumble against the semitones on such a keyboard. The shortness of the keys necessitated the awkward fingering of the sixteenth and seventeenth centuries; the players used the second and third fingers when they ascended, and the first and second fingers when they went down, while the thumb and the fourth finger were seldom engaged. This fingering was already familiar to players of the portative organ, in which the keyboard was situated at right angles to the player.

Keyboards depicted by German artists between 1440 and 1462 have only three semitones in the octave instead of the five that the organ had acquired long before: *B* flat as the Dorian changing note, *C* sharp as the Dorian leading note, *F* sharp as the Mixolydian leading note.

Though the Italo-Spanish theoretician, Bartolommeo Ramis de Pareja, had outlined the idea of an equal temperament in his *Musica practica* (1482), all instruments were tuned to an unequal temperament. The notes *E* and *B* were slightly lower than in the modern scale, and all tuning rules of the sixteenth century agreed in prescribing that the fifths producing the accidentals should be either a bit too low or a bit too high, but never exact. An accurate standard did not exist.

Up to the first third of the sixteenth century the lower limit of the keyboard was *F*, while the highest note was *g''*, *a''* or *c'''*. After the musical range in the fifteenth century had been extended below *G*, keyboards had to be enlarged as well. But only the diatonic notes were important; composers and players did not think it necessary to have the lowest octave chromatic, as no leading or changing note was required in the bass. Still, virginal and clavichord makers probably would have added chromatic strings and keys in spite of their use-

lessness. But to organ makers and consigners four superfluous keys meant a hundred or more superfluous pipes of the largest size, the omission of which made an organ considerably cheaper. Instead of leaving out the black keys from the octave *C* to *c*, they arranged a *short octave* which looked like *E* to *c*, in which the apparent *E* was a *C*, while the *F*♯ key produced a *D* and the *G*♯ key an *E*:



As organs, clavichords and virginals were built by the same makers and played by the same artists, this arrangement was adapted to the stringed keyboard instruments as well. Our graphic symbol for this short octave is *C/E*.

Players became so used to the short octave that, when the semitones *F*♯ and *G*♯ could no longer be dispensed with, the previous arrangement was not given up. The expedient was to add the required strings without adding special keys; both the *F*♯ and *G*♯ keys were cut into two sections, an anterior and a posterior part; the anterior parts played *F*♯ and *G*♯, and the posterior parts *D* and *E*.

This division of some semitone keys must not be confused with another short octave which enabled the player to distinguish between *F*♯ and *G*♭, between *G*♯ and *A*♭. In about the middle of the seventeenth century, a new short octave was introduced. An apparent *B*₁ was added which produced a *G*₁. It may be designated by the symbol *G*₁/*B*₁.

Short octaves were not completely abandoned by makers until the middle of the eighteenth century. It was the new 'long' octave that, in one of his sonatas, Scarlatti designated as *ottava stesa*, or 'stretched octave.'

In about 1720, the clavichord had been perfected in another way. Certain neighboring notes had to be played on the same string, and when they formed a chord the lower of them did not sound. According to tradition, a certain TOBIAS FABER at Crailsheim in Württemberg constructed the first *bundfrei* or 'unfretted' clavichord with as many strings as keys. Dr. Francis W. Galpin, however, saw such an instrument dated 1700 in Dr. Henry Watson's collection at Manchester. But in spite of this improvement the unfretted clavichord was not able to oust the earlier model. Having more strings, it was larger, heavier, more expensive, and it took longer to tune.

The clavichord revived with a redoubled vigor in the eighteenth century as the leading house instrument of the German *Empfindsame Zeitalter*. To the generations between 1720 and 1780 its small tone reflected the current aversion to grossness and ostentation, and its meagerness stood for noble simplicity. The finger was not supposed to *strike* the key, but to touch it "caressingly," as Karl Philipp Emanuel Bach said. As only one mechanical link acted between the finger and the string, the slightest feeling of the finger communicated itself to the vibrating string. Consequently, we owe the delicacy in modern piano playing to the clavichord. The *manieren* or graces could be played with greater transparency, stress and tenderness than on any other keyboard instrument. The strings *sang* the melody, and even a single tone was animated. In the same manner that the violinist removes the rigidity of his tone by a *vibrato*, the clavichordist gave warmth and passion to the note by the *Bebung*, the trembling pressure given to the key without letting it go. "Who dislikes noise, raging and fuming, whose heart bursts in sweet feelings, neglects both the harpsichord and the piano and chooses the clavichord," said Christian Friedrich Daniel Schubart (1739-1791).



SPINETS AND HARPSICHORDS were keyboard instruments in which the strings were plucked by quills instead of touched by tangents as in clavichords. On the rear end of each key stood a *jack*, that is, a small upright piece of wood, from which projected a small quill or a leather tongue. These jacks were not fastened to the keys, but stood free, and were held in an upright position by a kind of *rack* inserted in the soundboard (which in these instruments ran the entire length of the box). When the key was pressed the jack jumped up, making the quill pluck the string, and then, owing to a springing device, fell back without plucking the string again. (fig. 106)

Quill instruments were made in three principal shapes; namely, winglike *grand*, *upright grand* and *square*. In the upright grand the strings were stretched vertically, in the two other forms horizontally. In the grand form they ran from front to back, and both the wrest plank with the tuning pegs and the set of jacks were in the front, taking up the width of the instrument. In the square form, on the

FIGURE 106. contrary, the strings ran from the right to the left at right angles to the keys, the lowest string being in Jack.

the front. The wrest plank was at the right end, while the rack that supported the set of jacks pierced the soundboard, describing a diagonal line from the left anterior to the right posterior corner.

Whatever the particular form, the case was loosely set on a stand—that is, a horizontal frame with legs; legs fastened to the instrument itself did not appear earlier than 1750.

The whole structure was much lighter than that of modern pianos. No metal was used, and soundboards were not thicker than four millimeters (in modern pianos they are from eight to ten millimeters). The gauge of the strings was considerably inferior to that of modern strings (.325 millimeters for *c'* as against one millimeter of modern), and overspun strings did not exist. Consequently, the tone was much more delicate.

The names varied according to the epoch and the country. The most important were:

GRAND FORM	SQUARE FORM
English: <i>harpsichord</i>	<i>virginal</i> or <i>spinet</i>
French: <i>clavecin</i>	<i>épinette</i>
Italian: <i>clavicembalo</i>	<i>spinetta</i>

Up to the seventeenth century, the term “virginal” in English designated both the grand and the square form; the Inventory of the Guarderobes of King Henry VIII, for example, lists in 1547 *Twoo faire paire of newe longe Virginalles made harpe fasshion*. In the same way the famous collection of pieces for a keyboard instrument in the Fitzwilliam Museum at Cambridge, the *Fitzwilliam Virginal Book*, was not exclusively intended for square instruments. And even within the square type, the term ‘virginal’ was not reserved to a special form; the use of the words *spinet* and *virginal* was not only vague but contradictory. In this book all plucked grand forms with quills will be called harpsichords; and all square forms spinets.

The name *virginal* has mistakenly been connected with virginity and, as a result, with the maiden queen, Elizabeth; this princess was born in 1533, twenty-two years after Virdung’s mention and description of a virginal. The term goes back to the fifteenth century. It occurs in a poem of the epoch of Henry VII (1485-1509), and even in a manuscript in the university at Cracow written between 1459 and 1463, the *Liber viginti artium* of the Bohemian Paulus Paulirinus. The word probably is related to medieval Latin *virga*, ‘rod, jack.’

The history of plucked keyboard instruments seems to begin in the second half of the fourteenth century. At that time English, French and Spanish sources mention an instrument variously spelled as *chekker*, *eschequier* and *exaquier*, all meaning chessboard. The first specimen of which we hear was made by a Frenchman, JEHAN PERROT, and given in 1360 by King Edward III of England to his prisoner, King John of France. Between 1370 and 1380 two French poets mentioned it—Eustache Deschamps and Guillaume de Machault—and the latter, in his poem *Li temps pastour*, called it the *eschaqueil d'Angleterre*, 'the chekker from England.' In 1385 such an instrument was made in Tournay and bought by the Burgundian court, and a few years later King John I of Aragon tried to obtain from Duke Philip the Bold of Burgundy an *exaquier*, being an *isturment semblant d'orguens*, *qui sona ab cordes*, and an organist *abte de tocar exaquier* [e] *los petits orguens*.

Twice in the Aragonese letters the *exaquier* is expected to be played by an organist able to handle the *petits orguens*, that is, the portative organ. Consequently, Dr. Hans Hickmann, in his book on the portative, suggested that the *exaquier* might have been a stringed instrument closely related to the portative in size, construction, playing position and musical means. The only stringed instrument sufficiently like a portative organ would be a small upright harpsichord, of which we have two representations. Edmond Vander Straeten depicts a small upright harpsichord (that he mistakenly calls a clavichord) from a manuscript of about 1450. It has a socle, white and black keys and eight strings; the upper side is broken to form a step. A more reliable evidence is on a sculpture of about 1480 on the altar at Kefermarkt in Upper Austria; it represents an upright harpsichord, shaped and carried like a portative organ, with eleven double strings.

Instruments of this kind should be mentioned in a Burgundian source of the first half of the fifteenth century; in other words, the tractate written by Henry Arnault of Zwolle, quoted several times in this chapter, ought to describe them. Unfortunately, the descriptions in this and other medieval treatises do not tell us what we most need to know; the shapes of instruments are left unmentioned. But there is at least one kind of stringed instrument which may have been related to the portative; its action contains little chains and "the keys must be long and bitumed as they are in portatives, for their length." Again there is a connection, indeed a combination of



Christoph Paudiss, lutanist, Pinakothek München (17 century).



Frans van Mieris, drummer, Pinakothek München (17th century).



Pieter Codde, Music with violin and gamba, in the Liechtenstein Gallery, Vienna (c. 1625)

the portative and an upright harpsichord described about 1460 in Paulirinus's tractate (cp. page 293).

These evidences corroborate the hypothesis that the *exaquier* or *échiquier* was a portative upright harpsichord. Besides, it is probable that in plucked keyboard instruments the vertical portative form preceded the horizontal one laid on the lap, a table or a stand. The keyboard, taken from the portative, must have been given first to that form of psaltery which had its strings in a similar position to that of the pipes of a portative.

Etymology is not helpful in this problem. An old suggestion, based on one specimen two hundred years more recent than the first evidence of the name '*échiquier*,' that it might have been the combination of a spinet and a chessboard, is farfetched. The author of this book pointed out many years ago that a musical instrument *schachtbret*, in a German poem of the time, literally signified 'quill-board,' not 'chessboard'; but the earlier evidences of the Romance forms weaken this argument. Some portative organs had keyboards in two rows of alternating black and white square keys. But if this arrangement accounted for the term, one would hardly understand why the name was given only to the stringed instrument and not to the portative organ as well. Another possibility is suggested by Low Latin *scacherium*, similar to *scacharium*, 'chess board,' and equivalent to *abacus*, a term which was used by some theorists of the Renaissance to designate the keyboard. But this etymology is not convincing either. Recently Dr. Henry George Farmer has proposed an Arabic etymology, *al-šaqira*—this name, allegedly a musical instrument, being mentioned by an Arabian writer who died in 1231. This derivation, too, is weak. The Arabian writer does not describe the instrument; the mention is too early to be connected with *exaquier*; keyboards are not in the Arabian line; an Arabian origin would suggest that the instrument came to Europe through Spain, not from northwestern Europe to Spain; other Arabists deny the existence of such a word as the name of a musical instrument in Arabic literature.

Thus, the name remains unexplained.

The oldest pictorial evidences of the grand form were a miniature in the *Très belles heures* of the Duke of Berry, 1409, which depicts a harpsichord in a celestial concert; the woodcut of a harpsichord in the *Weimarer Wunderbuch*, about 1440; and, at about the same date, a drawing in Henry Arnault's treatise.

A reference to the grand form occurred much earlier, in 1323, in Johannes de Muris's *Musica speculativa*. The passage indicates that the 'monochord' with nineteen strings (and keys) could be made in various shapes; one of them, a rectangular triangle with one concave side, seems to be the wing form of the harpsichord. At first sight, this is a confusing contradiction between the term 'monochord,' which suggests a (square) clavichord, and the wing form of a harpsichord. The explanation is that the term 'monochord' indicated a keyboard instrument in any form and type. This is confirmed by a further statement of de Muris that the monochord combines practically (*in virtute*) all instruments. The word 'monochord' occurring in the Munich manuscript of this tractate is changed to *instrument* in the eighteenth century Gerbert edition which was probably based on another manuscript. 'Monochord' as well as 'instrument' apparently meant keyboard instrument in general. Similarly, Henry Arnault's treatise states: "It can be made that the clavichord sounds like a harpsichord" (*potest fieri quod clavicordium sonaret ut clavicembalum*); further, "With a certain action one can make both a clavisimbalum or a clavicordium or a dulce melos." What were these actions?

Previously it has been taken for granted that the early instruments had the jack action of later harpsichords. This now appears more than doubtful. Henry Arnault's treatise on instruments gives the descriptions and diagrams of four kinds of *forpices* or 'tongs' which serve to stir the strings of keyboard instruments; stirring is called *percutere* and *ictus*. The descriptions are poor and the diagrams almost undecipherable; we cannot even be sure that they mean plucking devices. The words *ictus* and *percutere* designate 'striking'; they do not seem to indicate plucking. Only the fourth kind of *forpex* is a jack, but it is unmistakably described as a striking contrivance.

Yet, on a fragmentary page, Arnault refers to a monochord with quills, obviously a plucked instrument in the shape of a clavichord. This passage throws light on a sentence written about one hundred years later by the Italian doctor Julius Caesar Scaliger, who lived from 1484 to 1558: "This was the origin of those that people call monochords today, in which slim *plectra*, arranged in orderly fashion, produce sounds. Points of raven quills, afterwards (*deinde*) added to the plectra, elicit a more expressive harmony out of the wires. [The instrument called] clavicymbalum and harpichordum

when I was a boy, is now called spineta after these points." It was incorrect to conclude from Scaliger's statement that the use of quills was started during his boyhood. Not only Arnault's statement contradicts such interpretation; also Paulirinus, whom we mentioned above, defines, about 1460, the *clavicimbalum* as an instrument played *per pennam introrsus coannexam*. It was also a mistake to deduce from Scaliger that the quills replaced plucking points of metal, as he speaks of quills added to the plectra of monochords.

The change of name that Scaliger indicates adds to the confusion in the vocabulary of early keyboard instruments. In Arnault's treatise, *clavicymbalum* designates the grand harpsichord, as in later times. But Scaliger identifies it with *spineta* and *arpicordo*, which were both square instruments. The same is true of Virdung (1511); he depicts the same square instrument twice with two different titles, *Virginal* and *Clauicimbalum*, and describes the latter as follows: "This is like the virginal, but it has other strings of sheep gut and nails which make it harp; it also has quills like the virginal; it was recently invented, and I have seen only one." All previous writers have associated this definition with the *Clauiciterium*, because of the peculiar arrangement of the page in Virdung's book. But this was a mistake, as an upright harpsichord is not "like the virginal."

To sum up, the grand harpsichord can be traced back to 1409, and the square spinet to about 1440. The latter was a clavichord onto which the quill mechanism was grafted, a *clavicordo da spinetta* or 'thorn' clavichord.

It seems, though it cannot be proved, that the customary form in the fifteenth century was the grand, whereas in the sixteenth century the square form prevailed. The grand form not only developed sooner, but also survived the square form.

Two main square types existed: the Italian and the Flemish spinet.

The Italian spinet had a pentagonal case varying in length from four to six feet, and a soundboard of the same shape, both made of cypress or cedarwood; the characteristic smell of cedar is a charm of these tasteful instruments up to this day. The walls were extremely thin in order to vibrate with the strings. Therefore, the instrument was inserted into a strong outer case from which it had to be removed for playing. The keyboard generally projected like a balcony; it had the compass *E/C* to *c*³ or *f*³; the keys were boxwood or ivory, the semitones darker box or ebony.

The Flemish spinet, on the contrary, was made of a cheap pine-wood in a large, and rather clumsy, rectangular form. Scattered flowers were painted on the soundboard in water colors, and instead of the intricate rose generally carved in the soundboard of Italian spinets the Flemish rose was made of unchased pewterware. The keyboard was recessive and placed at the right or left, not in the center; its keys were usually made of bone, seldom of ivory, never of box; the semitones were of ebony or stained black. A further difference was in the interior arrangement; the tuning pegs were no longer arranged in a straight but in a broken line, and the bridge was also angular instead of being curved, as in Italian spinets.

Spinets were made in two sizes: the normal 8' instruments (*double virginals* or, in Italian, *spinette*), and small 4' instruments (*single virginals* or *spinettini*). In about 1600, the masters of Antwerp made a few combined virginals; the case of such an instrument was wide enough to house a smaller octave instrument as a kind of drawer beside the keyboard of the larger one. When used, the small instrument was pulled out and set upon the large virginal so that the player was able to play both of them either together or alternately. Two fine specimens are in the Metropolitan Museum of Art in New York and one is in the Belle Skinner Collection at Holyoke, Massachusetts.

To save space, certain octave spinets were built in a different model. The wrest plank with the tuning pegs, instead of being at the right end, were arranged in front like those of the harpsichord, and the strings were stretched diagonally across the box.

English makers at the end of the seventeenth century enlarged this small spinet with its wrest plank in front and its diagonal strings to form a normal 8' instrument, and it was in this form, an intermediate one between the spinet and the harpsichord, that the spinet, at least in England, survived the seventeenth century. Everywhere else its existence came to an end before 1700.

Harpsichords, that is, plucked instruments in grand form, in the sixteenth century were almost exclusively made in Italy; Venice was the center. All preserved specimens are made in splendid style; precious materials, inlaid work, careful carving and an excellent painting of the outer case.

At the beginning of the sixteenth century some harpsichords still had single strings; an example is the beautiful instrument of DOMINICUS PISAURIENSIS (1533) in the Leipzig Museum. Double-stringed harpsichords already existed when Henry Arnault wrote

his treatise, but then the two strings of a set were arranged above one another so that one jack sufficed to make them both vibrate. A harpsichord made by HIERONYMUS PISAURIENSIS in 1521, now in the Victoria and Albert Museum in London, already has strings stretched in pairs and played in unison by two jacks each. Since the jacks necessarily plucked the unison strings in slightly different places, the second set of jacks being inserted behind the first one, the two notes had a different timbre due to the favoring of different partials.

The idea of making use of these contrasting timbres by a device like a stop, allowing one set of jacks to function while the other was disconnected, was brought forth in the sixteenth century. Extensions of the racks pierced the right side wall of the harpsichord and could be shifted like the stops of an older organ.

It is not possible to give an exact date to this improvement. In 1514, a Venetian organ builder made a *clavicembalo grande con do registri* for Pope Leo V; but we are not certain whether *registri* meant stops or only a double set of strings.

The stops could provide the player either with different timbres or else with different degrees of loudness. The alternation of a meager and a full tone obtained in this way is probably the meaning of the mysterious *Instrumento Piano e forte*, listed in an undated Este inventory of the sixteenth century.

As early as 1538, we have evidence of the combination of an 8' and a 4' stop; the hitch pins of the 4' strings, which were about half as long as the strings of the 8', were inserted in the soundboard. Italian sources call this 8' 4' arrangement *strumento in ottava*.

The earliest evidence of three stops is in the inventory of the Fugger collection in Augsburg, dated 1576: "A beautiful long instrument of fine black ebony with ivory busts in relief inside a skillfully painted case, and three stops, ivory keys and gilt nails, and a powerful tone. Has been made by Franco Ungaro in Venice." Very probably these stops were 8' 8' 4'. Six years later, the inventory of the instruments at the Brandenburg court records *eine Symphonei* with four stops, probably 8' 8' 8' 4'.

A Dresden inventory of 1593 lists three harpsichords, with two keyboards each. But also the undated Este inventory includes a *clavicembalo cromatico con due tastadure*. The two keyboards were a step forward in facilitating the use of different timbres and dynamic degrees.

The upright grand harpsichord had the usual horizontal keyboard; but the wing-shaped body stood vertical.

Early portable uprights and their possible connection with the *échiquier* have already been discussed. The first evidence of a non-portable upright is a woodcut in Virdung's *Musica getutscht* (1511) with the caption *clavicyterium*. We find this name up to the seventeenth century, but as it was rather rare, and not generally used, we had better avoid it.

In an upright harpsichord the jacks jut horizontally forward instead of standing perpendicularly on the keys, and they must be pulled back by a special device instead of falling back by their own weight. Owing to this complicated action, upright instruments were not frequent. However, the vertical arrangement saved space and projected the sound directly to the listener. Therefore, it never was entirely given up as long as harpsichords were made. At the end of the eighteenth century, upright harpsichords were replaced by upright pianos.

Claviorgan is the name generally given to a combination in one instrument of a small organ with a stringed keyboard instrument—either a spinet, a harpsichord, a clavichord or, later, a piano. One should be skeptical, however, when this term occurs in old sources. The two *clabiórganos* owned by the Spanish chamberlain, Sancho de Paredes, in 1480 (the earliest known mention of the name) were probably not combinations. In an inventory of the Este collections, dated 1612, we find an item, *Cinque organi grandi, detti claviorgani*, 'five large organs, called claviorgani.' The name obviously was given to larger chamber organs. In another Este inventory, dated 1625, there is an item reading *8 Arpicordi grandi computatovi uno che è sopra un claviorgano*, 'eight large harpsichords including one which is upon a claviorgano.' Consequently, a claviorgan was not a combination, but could be paired with a harpsichord or another stringed keyboard instrument.

Still permanent combinations existed as early as the middle of the fifteenth century. Paulus Paulirinus describes, about 1460, an instrument [?] *nnportile* in the shape of a *media ala* (that later on he defines as semitriangular), being a positive organ on one side and an upright harpsichord with wire strings on the other side. The keyboard of a portative connects both of them so that their sounds mingle with marvelous sweetness.

In the oldest preserved specimen of a horizontal claviorgan, however, made by the Fleming LODOWICUS THEEWES, dated 1579 and kept in the Victoria and Albert Museum, a harpsichord is simply laid on the organ, and in an instrument in the Viennese Kunsthis-

torische Museum, made in 1587 at Augsburg, a regal is contained in one half, and a spinet in the other half, of a chess box.

In 1618, when Praetorius was writing his *Syntagma*, pipes were mingled (“*mit eingemenget*”) with the strings. He is probably referring to the later type, in which one keyboard ruled both the organ and the stringed instrument with a device that allowed the player to couple or uncouple them.

THE DULCE MELOS. In a Latin manuscript of the fifteenth century at the Bibliothèque Nationale in Paris, a French student, Bottée de Toulmon, found the description, as well as several designs, of a keyboard instrument—dulce melos—and, realizing its importance, he published a short extract of the text in his *Dissertation sur les instruments de musique au moyen-âge*, Paris, 1844. There he called it a piano. A piano, described in a treatise of the fifteenth century and forgotten for three hundred years before the invention was made anew—this was an exciting and almost unbelievable discovery.

The manuscript has since been published in an excellent facsimile, and the dulce melos can be studied as far as the obscurity of the text and the designs admit. This is what we find.

The dulce melos, according to the manuscript, was derived from the zither struck with two sticks that the English call *dulcimer*. It was a stringed keyboard instrument in square form with a range from *B* to *a''*. The arrangement was peculiar, indeed unique. There were four bridges extending from the front to the back of the box, one at either end and the other two dividing the strings in the proportion, 4: 2: 1. The three sections acted like three separate strings, producing a ground tone, its octave and its double octave. In other words, the same string provided *c* in its first section, *c'* in its second section, and *c''* in its third section; the instrument had twelve strings only for a range of thirty-five chromatic notes. The keyboard extended from the middle of the first section beyond the last section; while the anterior parts of the keys were of equal size, the rear parts had to diverge in the first section and converge in the third to meet the three sections of the strings.

The action consisted of jacks loaded with lead standing upright on the rear ends of the keys. A U-shaped, brass staple projected sideways from the upper end of each jack. When a key was pressed, and its action checked (*obviat obstaculo superius prope cordas*), the jack jumped up vertically to touch the string.

To this passage the editors of the facsimile add a footnote in bold

type saying that one could not better describe the action of a piano, thus following Bottée de Toulmon's suggestion.

This is a mistake. The action of a piano is also checked (and that of a harpsichord as well!), but it consists of a hammer performing a rotary movement. In the dulce melos, on the contrary, the jack made a plain vertical movement; it was a kind of struck spinet and closely related to the Bavarian *Tangentenflügel* of the late eighteenth century, in which the jacks struck the strings instead of plucking them.

THE LUTE. The harmonic and polyphonic style of the fifteenth and sixteenth centuries assigned a privileged role to all instruments capable of playing several notes at once. This explains the increase of keyboard instruments after 1400. There was another instrument that successfully competed with keyboard instruments—the lute. Handier, and with the advantage of being traditional, it became the universal instrument. It could replace in an ensemble any other instrument, high or low; it accompanied singers, indeed it could reproduce all parts of an instrumental or choral composition at once; lute arrangements of all kinds of instrumental and vocal ensemble music were published in the sixteenth century as piano scores are published in our time. The importance given to the lute is indicated by the fact that violin makers are called *luthiers* in France to this day.

The lute of the fifteenth century still had many specific features of the Arabian lute *al'ūd*, the name of which it carried. In many cases the neck was not distinct from the body; it was unfretted and relatively narrow. Certain players still used the oriental plectron as late as the seventeenth century. Plucking with the bare fingers, however, was more and more necessary as the lutanists developed a technique for playing chords. (pls. XVIII a, XX a)

The new tasks necessitated a further development of the musical means of the lute. Between 1400 and 1520 the neck was fretted, first with four, gradually increasing to eight frets. The number of strings was six, seven or eight in 1400, and reached the classic number of eleven at about 1450. Eleven did not mean eleven single strings. Ten of them formed five double strings, only the highest string being single to facilitate producing delicate grace notes. Occasionally the number of frets and strings was increased.

The usual accordatura was, in the sixteenth century, *A/a d/d' g/g' b/b e'/e' a'*. The pitch, however, was relative.

The outer shape acquired its definitive outline at about 1500;

since then it has had the elegant almond form and the shallower shell. The slender staves, from nine to thirty-three, which composed the shell were sometimes made of exotic woods, ebony, brazil, sandal, cypress or of ivory and even of whalebone, and often separated from each other by delicate purflings.

The lutanists of the seventeenth century scorned the inaccuracy of this kind of lute. Thomas Mace is typical of that generation when he writes, in 1676, in his *Musick's Monument*, p. 41:

There is found by Experience a Better manner of Laying our Lutes, (as we term it) which is done, by causing the Fingerboard, 1. to lye a little Round, or Up in the middle; as also that the Bridge (answerably) rise a little Round to it. Then 2dly. to lay the strings so close to the Fingerboard, that the Strings may almost seem to touch the first Fret. This is call'd Laying of a Lute Fine, when all the Strings lye near the Frets. 3dly. Laying the Ranks of Strings so carefully, that the Pairs may be conveniently Near, and the Ranks pritty wide. By which means we have a more ready and certain Command over them, for neat and clean Play.

Modern lutanists are anxious to revive that ancient art, but with a few exceptions their style is stiff and wooden; it does not resemble the delicate sound of "the warbling lute," to use Dryden's word. One cannot understand the dominant position of the lute between 1500 and 1700 without knowing from the style of oriental lutanists, and even outstanding Spanish guitarists, how expressive and varied the plucking can be.

Though a favorite instrument all over Europe, the lute was never popular in Spain, in spite of its having come through that country. Spanish folk music was played on the guitar, and aristocratic music was performed on a compromise instrument, the *vihuela* or, more exactly, the *vihuela de mano*, in contrast with the *vihuela de arco* or fiddle. It had the flat and waisted body of the guitar, but the size and accordatura resembled those of the lute. Six or seven double strings were tuned to *G c f a d' g'*, or *G c f g c' f' g'*. Some different accordaturas are indicated in the fourth book of Fray Juan Bermudo's *Declaración de instrumentos* (1555). The outstanding music for the instrument is to be found in Luys Milan's *Libro de Musica de vihuela de mano, intitulado El Maestro*, 1535-36.

CITTERNS in their classical form had shallow bodies, flat on the front and back surfaces, and fretted necks; wire strings were stretched between inferior stringholders and lateral pegs and were plucked with the bare fingers.

The origin of this instrument is obscure. It probably originated in southern Europe as a plucked fiddle; the Mediterranean peoples have always preferred plucking to bowing, as testified by many medieval sculptures of plucked fiddles in Spain and Italy. The rear

FIGURE 107.
Lute.

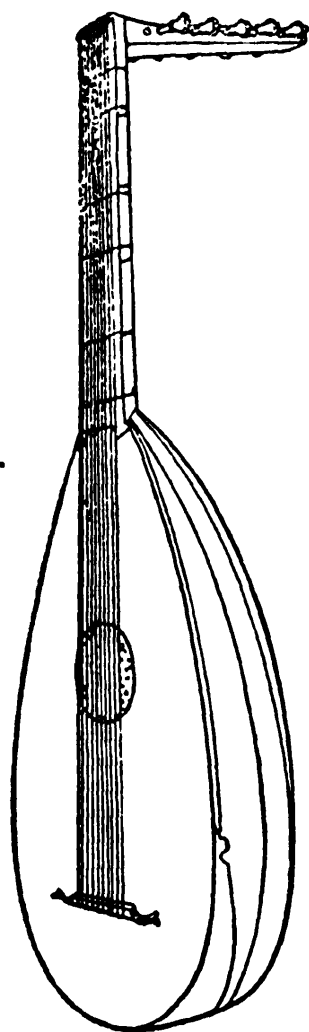
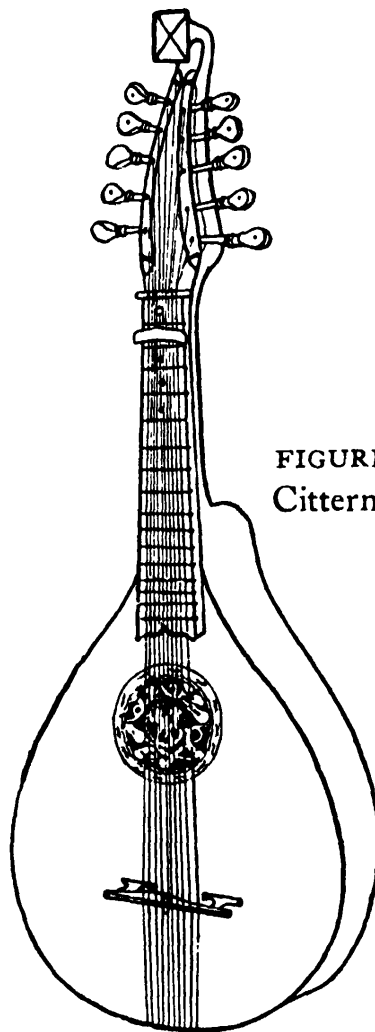


FIGURE 108.
Cittern.



pegs of the fiddle existed with citterns as late as the fifteenth century. In the sixteenth, citterns sometimes had a combination of front and lateral pegs; in their later form they had lateral pegs exclusively.

The usual cittern, between 1500 and 1750, had an elegant, pear-shaped body shallower at the lower end, and a characteristic neck in which the bass side was thinner than the treble side so that the thumb could easily reach around. Nine strings in four groups were the standard, though the number varied. They were tuned in different ways; the most common accordaturas were *d b g d' e'* and *F e c g a*. In several specimens the outer string on the bass side was a high treble.

The later cittern, after 1750, had a less elegant form; the body was the same depth throughout, or else was slightly deeper at the lower end, and the neck was equally thick on the bass and the treble sides. (fig. 108)

Finally, a certain CHRISTIAN CLAUSS obtained a British patent on October 2, 1783, for giving the cittern a piano action to replace the plucking right hand, though it left stopping on the fingerboard to the fingers. One piano key for each set of strings was arranged on the soundboard; these keys acted on piano hammers striking from inside. The instrument was misnamed *keyed guitar*.

VIOLS, in the sixteenth century, belonged to two distinct families: 'leg viols' or *viole da gamba*, and 'arm viols' or *viole da braccio*. The first of them comprised those obsolete instruments that the modern musician calls *viols* or *gambas*; the second family corresponded to the bowed instruments of our days, violin, viola, cello and double bass. This seems surprising, as cellos and double basses are not held in the arm. The family names refer to the playing position of the oldest members of both families, and the names were retained for all the members regardless of their sizes and playing positions.

A comparison of their distinctive characteristics follows:

<i>Viola da gamba</i>	<i>Viola da braccio</i>	
flat back	bulging back	
back sloped off at the upper end	back not sloped off	
deep ribs	shallow ribs	
sloping shoulders	round shoulders	
edges of soundboard and back not projecting	projecting edges	
reinforcing crossbars inside	a reinforcing longitudinal bassbar inside	
C or flame holes	f holes	
broad neck	narrow neck	
gut frets	no frets	
six or seven thin strings	four thick strings	
sound pale and flat	sound round and full	

The viola da gamba became a distinct type in the fifteenth century, earlier than the viola da braccio, when musical evolution made large fiddles necessary. In large fiddles the stops on the fingerboard were much farther apart than those to which the artists were accustomed. The natural expedient was to simplify the action of the fingers by

shortening the tonal distances between the strings—that is, by tuning them, lutelike, in fourths with a major third in the middle, instead of in fifths. To avoid reducing of the range, the players increased the number of strings to six and, in the seventeenth century, to seven.

In a few decades we find a whole family modeled after the original bass viol. Even double basses were constructed; for, in 1493, Spanish musicians came from Rome to Mantua with viols tall “like myself,” as one chronicler said. But they did not belong in the family in a narrower sense. According to Thomas Mace’s *Musick’s Monument* (1676), a *Good Chest of Viols* consisted of six instruments, viz. 2 Basses 2 Tenors and 2 Trebles: All Truly, and Proportionably Suited. The bass was from sixty-one to seventy-six centimeters high and was tuned to *D G c e a d'*; the tenor, from fifty to fifty-eight centimeters high, to *A d g b e' a'*; the treble, from thirty-two to forty-five centimeters high, to *d g c' e' a' d''*.

The differences in sizes within the same category are remarkable. They are explained in John Playford’s *Introduction to the Skill of Musick*, which was printed in nineteen editions from 1658 to 1730: *A Bass Viol for Consort must be one of the largest size, and the Strings proportionable. A Bass-Viol for Divisions must be of less size, and the strings according. A Bass-Viol to Play Lyraway, that is, by Tablature, must be somewhat less than the two former, and strung proportionably.* In other words, the large bass viols were made for ensembles, the medium size served for ordinary solo music, and the small bass viols were supposed to be played “lyra-way.”

This term needs explanation. At the end of the sixteenth century, the English favored full chords on the bass viol. This was facilitated by tuning it “lyra-way,” that is, following the principle of the lira da gamba and superposing fifths and fourths—accordaturas like the three following:

A_1	<i>E</i>	<i>A</i>	<i>e</i>	<i>a</i>	<i>d'</i>
A_1	<i>D</i>	<i>A</i>	<i>d</i>	<i>a</i>	<i>d'</i>
A_1	<i>D</i>	<i>G</i>	<i>d</i>	<i>g</i>	<i>d'</i>

As more stretching of the fingers was required on bass viols in which the open strings were tuned a fifth apart, playing was easier on a smaller instrument. Such an instrument, therefore, was called a *lyro-viol* or, as it was small enough to be confused with a tenor viol, a *viola bastarda*.

Playford, in his *Musick’s Recreation on the Lyra Viol*, London

1661, relates that DANIEL FARRANT, who was a violist in the king's band between 1606 or 1607 and 1625, *invented a Lyra Viol, to be strung with Lute Strings and Wire Strings, the one above the other; the Wire Strings were conveyed through a hollow passage made in the Neck of the Viol, and so brought to the Tail thereof, and raised a little above the Belly of the Viol, by a Bridge of about $\frac{1}{2}$ an inch: These were so laid that they were Equivalent to those above, and were Tun'd Unisons to those above, so that by the striking of those Strings above with the Bow, a Sound was drawn from those of Wire underneath, which made it very Harmonious. Of this sort of Viols, I have seen many, but Time and Disuse has set them aside.*

The discussion of the strings and their accordatura should not be concluded without a general remark on what we call absolute pitch. In earlier times no such thing existed, and uniformity of pitch was a consideration only in ensemble music. As late an author as Jean Rousseau, in his *Traité de la viole* (1687), tells the player to begin with tuning the middle string *c'* and to stretch it to a *raisonable* note!

All gambas, even the treble, were played in a vertical position on, or between, the legs. The bow, which Rousseau calls the "soul" of the viol, was slightly shorter than ours and held palm upward with the thumb above and the middlefinger on the hair, about two inches from the nut; its position on the strings was three or four fingers from the bridge. In playing, the accents were given by pushing the bow forward, beginning with the outermost point—not, as with the violin, by pulling it back. The delicate, fine-pointed sound resulting from this peculiar manner of bowing is the most characteristic feature in viol music, and modern gambists who handle the bow in cello fashion produce entirely the wrong effect. It is also incorrect to undo the frets, to lengthen and round the fingerboard and to raise the bridge.

The outer shape of the viol has undergone many changes. Throughout the fifteenth and sixteenth centuries the outline varied. Sometimes the waist was almost indistinguishable and sometimes so deep that it touched the fingerboard; the soundholes were cut, now above, now beneath, now beside the bridge. Every maker had his own shapes, and artists unaccustomed to instrument making tried to design the forms. A well-known case is Leonardo da Vinci's "invention" of a bowed instrument in the form of a horse's head, mentioned by his biographer, Giorgio Vasari. Many a writer has racked his brains over the existence of such an awkward instrument. The author believes this must have been a form of fiddle, occurring at

the beginning of the sixteenth century, the elongated body of which was wide at the top and narrower below, like a horse's head seen from the front. (pls. XIX b, XX c, XXI a)

The viol did not adopt a definite form earlier than the seventeenth century. The soundholes were placed a little below the middle of the soundboard. As to the position of the bridge, Thomas Mace asserts in his *Musick's Monument*, London 1676, that it is to stand just in 3 quarter dividing of the Open Cuts Below; though Most, most Erroneously suffer them much to stand too High, which is a Fault. In other words, the bridge should be placed at one quarter of the height of the soundholes.

With the holes and the bridge correctly placed, the viol achieved a perfection of appearance that could even surpass the pattern of the violin. Though less 'classic,' according to the standards of a violin enthusiast, its curves have a more appealing diversity.

THE LIRA DA GAMBA, or *lirone*, was a late bass modeled on the lira da braccio—in other words, a hybrid of various instruments. The body was copied from the viola da braccio, the rear pegs and two drone strings from the medieval fiddle (called lira da braccio at that time), a small rose above the two ordinary holes from the lute. Besides the drones, the instrument had from nine to fourteen gut strings, tuned in fourths and fifths as well as in octaves. Cerreto, Praetorius and Mersenne indicated various accordaturas; only that given by Scipione Cerreto in his book *Della prattica musica* (1601) will be reproduced: *G g c c' g d' a e' b f# c#'*. With a rather flat bridge, such an accordatura allowed the lrist to play full chords, and only chords. Their effect was increased by sympathetic vibrations, as all notes played had partials coinciding with some open strings. Unknown in modern instruments, sympathetic vibrations were possible because the strings were extremely thin, so thin that the highest of them could be tuned an octave above the highest string of the modern violoncello in spite of its equal length.

The lira was too unemotional to be successful. As a mixture of several kinds of stringed instruments, it was the typical product of an epoch in which every possibility was explored. But it came too late. Between 1584 when its name first appeared, and the middle of the seventeenth century when it dropped out of use, the reserved style of the Italian Renaissance already had begun to change.