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The flute as imitator and as the most imitated of instruments

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BOSTON UNIVERSITY
SCHOOL OF FINE AND APPLIED ARTS

Thesis

THE FLUTE
AS IMITATOR AND AS THE MOST IMITATED OF INSTRUMENTS

by

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CHAPTER I
REFERENCES TO THE FLUTE IN POETIC LITERATURE

A. General:

It has often been asserted that the flute is the oldest of all musical instruments; whether or not this is true, is a matter of some debate. Literary references to it date back to the time of the Bible, and writers of all ages have recorded verbal descriptions of most all of the early flute forms. If any one poet or author were chosen as the most qualified to attest to the purity, expressiveness, and imitative capacities of the flute, the person most likely to be chosen would be Sidney Lanier.¹ Here is how he speaks of the instrument in his poem, "The Symphony":²

But presently
A velvet flute-note fell down pleasantly,
Upon the bosom of harmony,
And sailed and sailed incessantly,
As if a petal from a wild rose blown

¹Sidney Lanier: (1842-1881) A flute player of great skill and musicianship, also Professor of English at John Hopkins University and a writer of considerable merit. "In his hand the flute developed colors, warmth, and a low sweetness of unspeakable poetry," spoke the Director of the Peabody Orchestra in Baltimore. Lanier is said to have produced strange violin effects from his flute.

²H. Macaulay Fitzgibbon, The Story of the Flute (London: William Reeves Bookseller Limited, 1928) p. 243.

Had fluttered down upon that pool of tone.
 And boat-wise dropped o' the convex side
 And floated down the glassy tide,
 And clarified and glorified
 The solemn spaces where the shadows bide.
 From the warm concave of that fluted note
 Somewhat, half song, half odour, forth did float,
 As if a rose might somehow be a throat.
 When nature from her far-off glen
 Flutes her soft messages to men,
 The flute can say them o'er again;
 Yea, Nature, singing sweet and lone,
 Breathes through life's strident polyphone
 The flute-voice of the world in tone.

Among the prose references, Addison, in one of his most whimsical and charming papers, compares ladies to various musical instruments. Here is his description of the lady who resembled a flute:³

The person who pleased me most was a flute, an instrument that, without any great compass, has something exquisitely sweet and soft in its sound; it lulls and soothes the ear, and fills it with such a gentle kind of melody as keeps the mind awake without startling it, and raises a most agreeable passion between transport and indolence. In short, the music of the flute is the conversation of a mild and amiable woman, that has nothing in it very elevated, or at the same time anything mean or trivial.

Interesting, is the close of the paper, where Addison, suggests a marriage between the flute and the lute.

The earliest references to the flute are found in the Bible, where the original translation from the Aramaic into Greek causes the paramount problem. In this

³Ibid., P. 238.

edition, (dated soon after the birth of Christ) the word "pipe" was used as a general term to describe most all reed or wood wind instruments. Therefore, it must not be construed to imply a flute everytime a pipe is mentioned. John Stainer, in his book "The Music of the Bible", solves this problem to some extent, by translating from the original Aramaic. Hence, when Jeremiah in Chapter 48, Verse 36 relates,⁴ "Therefore my heart moans for Moab like a pipe.", Stainer translates the pipe, in this case, to be the double oboe or shawn. However, in the first book of Samuel, Chapter 10, Verse 15, "The flute and lyre before them prophecying", the flute is clearly stated to be of the Arabian "Nay " type, end-blown flute, even though it appears as "pipe" in the King James and other versions.

Of the early English writers, Chaucer appears to be the first to mention the instrument. In the Prologue to his "Canterbury Tales" (1386), he describes the squire,⁵ "syngynge he was, or floytynge al the day!"

⁴ John Stainer, The Music of the Bible (London: Cassell, Petter and Galpin, 1880), p. 68.

⁵ Geoffrey Chaucer, Canterbury Tales (London: N. Trubner and Co., 1879.)

Also, the same author, in "The House of Fame", speaks of the many thousand times twelve,⁶ "that craftily begunne to pipe/ Both in doucet (flute-douce)⁷ and in rede ..."

Later poets, such as Wordsworth, have constant references attesting to its ethereal quality.⁸ "The fairest, brightest hues of ether fade.../ Oh friend, thy flute has breathed a harmony."

Others such as Tennyson, describe the invigorating and life-giving sound of the instrument:

Oh, nature first was fresh to men,
And wanton without measure;
So youthful and so flexile then,
You moved her at your pleasure.
Twang out my fiddle! Shake the twigs!
And make her dance attendance;
Blow, flute, and stir the stiff-set sprigs,
And scirrhus roots and tendons.

In another source, the same poet describes the flute's tenderness and power to deceive, as an almost hypnotic force:⁹

⁶Geoffrey Chaucer, (Wilbur Owen ed.) Studies in Chaucer's House of Fame (London: N. Trubner & Co., 1904)

⁷It is surprising that an English author uses the diminutive of the French (flute-douce) in referring to the recorder. However, the fact remains, he distinguishes among the pipe players, between the fipple-end recorders and the reed (rede) pipes, probably an early oboe.

⁸James T. Fields and Edwin P. Whipple, British Poetry, (New York: Houghton, Osgood and Company, 1881) p.236⁹

⁹Ibid., p. 103.

A mere love-poem! O for such, my friend,
 We hold them slight: they mind us of the time
 When we made bricks in Egypt. Knaves are men,
 That lute and flute fantastic tenderness,
 And dress the victim to the offering up.
 And paint the gates of Hell with Paradise.

The poetic references are almost countless, but as
 a final example, Keats mentions it as being among the
 softest, most delicate of sounds:¹⁰

Breathe softly, flutes;
 Be tender of your strings, ye soothing lutes;
 Nor be the trumpet heard! O vain, O vain;
 Not flowers budding in an April rain,
 Nor breath of sleeping dove, nor river's flow,
 No, nor the Aeolian twang of Love's own bow,
 Can mingle music fit for the soft ear
 Of goddess Cytherea!

¹⁰Tennyson, The Poetical Works of Alfred Tennyson,
 (New York: Houghton, Mifflin and Company), p. 312.

B. Reference to the Flute Sound as an Imitation.

The flute sound has constantly been referred to, as imitative of birds, of all sorts, as does Tennyson in "The Gardener's Daughter": "To left and right, the cuckoo told his name to all the hills; the mellow ouzel fluted in the elm."¹¹

Longfellow, in the "Masque of Pandora" calls birds: "feathered flute players", while the flute, with its light, refreshing quality is described as a meadow-brook in the rain in a poem, "The Flute".¹² It relates, in part:

Filled with soft laughter, all the air around.
Then gushed in glee a little tune.
She knew full well, but made so bright
With showers of liquid notes, t'was like a
meadow brook,
Whose face is kissed by sudden April rain.
After the flutist plays a few quiet measures, another
observation is made:

How sweet and low
Sang then the happy spirits in the flute.
Like some far distant chimes in some old tower,
Speaking of peace and calm serenity at sunset
hour.

¹¹Edward Newbolt, (ed), Poems of John Keats, (New York: Books Inc. 1948) p. 18.

¹²Tennyson, ibop. cit., p. 298.

Once again the flutist plays, this time a martial tune.

She listened, white to joy again
Changed the rich tones. So thrilling, strong
and free.
With such wild passions, power and energy
Leapt they forth from the slender instrument.

So it was that the earliest, as well as the latest poets and prose writers, were well aware that the flute had many moods and in the hands of a skilled, emotional player, could imitate a variety of the elements of nature as well as living beings.

The story of Pan hearing the wind over the "redes" and cutting a stalk himself to imitate it, thereby producing the first flute is a legend known to the ancient Greeks.

In the 20th Century, authors still choose the flute above all other instruments when in need of a simile.

CHAPTER II

HISTORICAL SKETCH OF THE FLUTE

A. General:

A history of the flute family, the origin of which preceeds recorded time, presents more than one serious problem. First, and perhaps the most serious of the nomenclature problems, is that virtually all of the wind instruments of early ages were, at one time or another, referred to as pipe or pipes. Perhaps the most common example of this is in the various translations of the Bible, wherein the reference to the pipe can almost always be retranslated to one or another of the double oboes, reed pipes, (single or double) or assorted other wind instruments, but almost never the flute as such.

John Stainer¹ has made an extensive study of the musical instruments referred to in the Bible, by translating from the original Aramaic roots and cross-checking them against the other scattered translations

¹ John Stainer, The Music of the Bible (London: Cassell, Petter and Galpin, 1880)

from Greek and Latin. Also, the Pictorial Art Works of the Egyptians, with the very helpful captions such as "he is playing a zither", etc. contribute, to some extent, to the solution of just what a flute was, and what it was not.

Next in the order of importance, is the problem of what comprises, or in an almost facetious sense, "when is a flute not a flute?" The handling of this problem is in the realm of Instrumental Geneology, in that a stand must be made on how far remote from the basic form an instrument can be, while still remaining a part of the family. In this chapter, for purposes of clarity, we will consider the Prehistoric instruments all together, whether their function be primarily musical or magical; or as is most common, a combination of the two. From the period of Antiquity to the end of the 16th century, each flute will be traced individually, thereby giving clarity to the progress and popularity of each, whether it be a whistle flute or a cross flute, and whether it appeared in only one area of the world or enjoyed world-wide popularity. This method is used, rather than the more common practice of treating all of the innovations on the instrument in relation to a certain

epoch. All of the types did not show a parallel progress, as some went out of style, only to reappear in another part of the globe during another time epoch. Hence, the chronological approach to the development of each type, on a global basis, seems more acceptable.

From 1600 on, however, the flute settles into two distinct types, and the movement toward the perfected musical instrument begins, so here we will revert to the method of considering them in the light of the music of the era, as is the more customary method.

The division of time referred to in this chapter, is the most common one, and is used by C. Sachs² and K. Geiringer³ in each of their respective Treatises on Musical Instruments. In brief they are as follows:

Primitive - approximately 3000 years B.C.
first recorded history.

²Curt Sachs, The History of Musical Instruments
(New York: W.W. Norton and Co. Inc., 1940)

³Karl Geiringer, Musical Instruments, Their History From The Stone Age To The Present Day (London: George Allen and Unwin Ltd. 1949)

Antiquity - The Egyptian-Roman culture, The Far East and the dawn of Christianity up to the fall of Rome.

The Middle Ages - (500 A.D. - 1400 A.D.)

The Renaissance - (1400 - 1600)

Baroque and Roccoco - (1600 - 1750)

Classicism - (1750 - 1820)

Romanticism - (1820 - 1910)

Modernism - (1910 -

The dates are, of course, arbitrary, and in no two sources will they coincide exactly. However, as is usually the case, these serve as a sort of framework within which it is possible to organize.

B. The Flute In The Prehistoric Period.

The legends and supposedly historical accounts of the origin of the flute are countless, in fact, to set an arbitrary date on the oldest bona-fide example of them, poses a major problem. The amazingly long period through which flutes of the "Nay" type⁴ can be traced, is almost enough supporting evidence to suggest that the instrument has, to the extent of man's investigation, always existed.

The oldest graphic account, to date, of any flute, is a carving of an animal playing one of the "Nay" type flutes. This is now in the Oxford Museum. Dr. W.M. Flinders Petrie⁵ has pronounced this carving to be 7000 years old, or dated approximately 5000 B.C. More abundant however, are the accounts depicted on the Egyptian tombs, some as far back as 2400 B.C.

Therefore, this is all a bit premature, in that we have not as yet established what the fundamental characteristic of the flute family is. The clearest prerequisite

⁴ A simple, vertical, end-blown flute-- 60-70 cm. long--5 or 6 fingerholes in two groups - scale starts on octave harmonics - some species have a back hole to facilitate overblowing.

⁵ Dr. W.M. Flinders Petrie, renowned archaiologist.

is brought out by Sach's book on musical instruments when it states:⁶

The vibrations in a flute are due to little eddies formed at regular intervals when the player blows obliquely across the sharp edge of the mouth hole. Thus a sharp edge mouth hole is characteristic of all flutes.

This sharp edge is formed differently in the various members of the flute group. For example, the mouth hole of the vertical flute is formed by the top of the tube, the cross flute;s upper end is stopped and a mouth hole is cut in the side, thus accounting for its transverse playing position. The whistle flute also has a hole in the side, but this is not to be blown into, as the air is admitted through a small channel in the otherwise stopped upper end, and directed at this flue from the inside. (An interesting detail of this will be dealt with in the music of the American Indian.)

Other criteria might be mentioned also, such as the air chamber. While usually in the form of a tube, it sometimes, as in the case of the globular flute, forms an air vessel in the shape of birds and various other

⁶Sachs, op. cit., p.44.

forms. The tubular type has been found to be either absolutely cylindrical, or slightly conical.⁷

The tube itself is usually, (except when the bore is extremely small) capable of sounding the fundamental and two or three partials without the aid of finger holes. Thus, finger holes could not be considered as an essential in the basic flute type.

Classical legend regarding the invention of the flute is plentiful. However, the best known is perhaps the myth of Pan and his quest for the beautiful maiden Syrinx. The legend relates how Pan pursued her until: "fair trembling Syrinx fled, Arcadian Pan, with such a fearful dread", and how when she reached the river bank, her prayers, that she be changed into the reeds of the river, were answered.⁸

Poor nymph - poor Pan - how he did weep to
find
Nought but a lovely sighing of the wind.
Along the reedy stream, a half heard strain
Full of sweet desolation - balmy pain.

⁷In modern times, an interesting combination of the two has been agreed to be the most satisfactory.

⁸Keats, op. cit., p.132.

Thinking that they were concealing the nymph, Pan cut the reeds and amorously sighed over them. They then gave forth musical sounds. He cut them into pipes of various lengths and played upon them, thus the Pan pipes.

Perhaps the most important factor of any music or musical instrument among the primitives was, and still is, in the primitive cultures existing today, the religious or magical significance. Flutes are most definitely, in historic origin, Phallic. Throughout the entire world of primitive cultures and customs, the inter-connecting ideas of flutes, phallos, fertility, life, rebirth etc., exists.

In his recent book, Bruno Nettl once again fortifies this belief:⁹

Love songs in many parts of the world are associated with flutes -- because primitive love songs are designed to be either sung or played on the flute, and because the use of the flute is restricted to the love-charm. The theory has evolved that the instrument is primarily a symbol of the male sex organ.

Most instruments in the primitive culture have a

⁹Bruno Nettl, Music in Primitive Culture
(Cambridge: Harvard University Press 1956) pp. 7-8.

sexual symbolism.¹⁰ However, few are as clear cut and generally agreed upon as in the case of the flute.

The most accurate account of flutes and their use during prehistoric time is wrought out of a combination of graphic description in caves etc., coupled with the firsthand knowledge of what we see in primitive societies of today. Hence, much of this account is based on examples that can still be seen and heard today.

True flutes, according to the "Kulturkreis" theory, hold the place as second to the oldest of instrumental groups. This is open to some question, in that the oldest group, the drum, in the prehistoric period was to include the motor impulses of primitive man beating on his chest, so in a melodic sense, the flute group is the oldest.¹¹

The types that were known to prehistoric man include the whistle flute, the simple, vertical, end-blown flute, the nose flute, the globular style in the shape of birds etc., the Pan pipes and the cross flute. Some

¹⁰ Curt Sachs goes into great length about this in "Geist und Werden der Musikinstrumente".

¹¹ Kulturkreis -- A method used by Dr. Sachs in the abovementioned book, by which he classifies instruments according to major culture groups.

of these instruments were fitted with finger holes for altering pitch, and some were only the pipe, capable of producing one or two sounds.¹²

The Recorder-Like Whistle Pipe is with little doubt, the first of the group. (Complication is therefore not a criterion of later invention.) Air passage from a flue to a side hole is the first formal flute. Made from reeds, wood, (the earliest, of bird bones), these instruments are characterized by a shrill, tiresome sound. Early examples of this type date from 3000 B.C., the most interesting example (still in use with the primitive tribes of North America) shown in the Mayan Codices¹³ consists of a whistle pipe with no holes, in which air is forced to leave the pipe and re-enter by means of a stopped pipe near the head, with an outlet just above the stopper, and a sharp edge hole just below. When the air leaves the pipe, it is channeled, (by means of a grooved piece of wood attached outside) over the sharp edged side hole and into the flute. This follows the

¹²Cross flute first discovered in China during the Chang dynasty. The culture being more advanced however, the dates roughly coincide with the period in question.

¹³From Codex Becker, Vienna.

principle of the whistle head, but in a sort of reverse variation.

The Vertical End-Blown Pipe is no doubt the simplest of all wind instruments, and as is the case with the other types, it is found with and without holes. If the legend of Pan were to be assumed truth, then his basic invention (or discovery) would have been a vertical, end-blown instrument. This is depicted in archaic art discoveries back as far as 5000 B.C., and, the many variations of finger hole patterns conform to one or another of most all civilized parts of the world. The mouth hole consists of the cut end of the pipe. In the history of the flute, this type can be traced as the "Nay" type from, as mentioned before, 5000 B.C., to the middle ages. The Egyptians, who have often been credited with the "invention of the flute", used this type, not only in a vertical position, but obliquely slanted back so that the free hand could be used to cover or damp the open end of the tube. It is this flute that Shakespeare refers to in "Antony and Cleopatra".

Eno speaks:¹⁴

¹⁴William Shakespeare, The Works of William Shakespeare, (New York: Hamilton Book Company, 1911) Vol. 9.

I will tell you.
 The barge she sat in, like a burnished throne,
 Gurn'd on the water: the poop was beaten gold;
 Purple the sails, and so perfumed that
 The winds were love sick with them; the oars
 were silver,
 Which to the tune of flutes kept stroke and
 made
 The water which they beat to follow faster,
 As amorous of their strokes.

The Pan Pipes - The combination of a group of single, vertical, end-blown flutes; each sounding a different pitch into a bundle or raft, with the even ends fixed to a mouth trough of sorts, gives the instrument known as the Pan Pipes. Played by sliding the mouth along the trough until the desired pipe was reached, the instrument was potentially, (from a pitch standpoint) one of the more musical; in that the pipes which sounded only one note could be cut and recut until they produced the correct sound.

Civilization being what it is however, the Pan Pipe got little farther than the role of a shepherd's instrument and exists today as the favorite instrument of Punch in the Punch and Judy show.

Known to the Greeks as Syrinx, the Pan Pipe has sustained an existence among the Primitives of practically all of the Eastern Hemisphere. In South America they have played a fairly important role in the

controversy of the possibility of contact between the Polynesians and the South American Indians,¹⁵ in that their tunings are the same.

The Nose Flute has been known from the oldest recorded time, on all five continents. In most cases, these flutes still exist among the various primitive tribes of these continents. In terms of dates, they appear around the beginning of the early metal age.

The nose flute comes in tubular, globular, cross and vertical forms; indicating that the important part of its function is the utilization of the nose breath. Primitives all over the world are extremely superstitious about, and attach a great deal of significance to the nose breath. In early times the same word was used for wind, spirit and life. This breath is supposed to contain, in primitive belief, the soul; hence, music or ceremonies performed on this instrument would be far more profound. Hundreds of examples of the special power of the nose breath exist, especially through the Hindu world, but one of the more interesting of these is that of the

¹⁵Nettl, op. cit., p. 101.

medicine men in Polynesia. They are supposed to have pinched off the nose of the dying patient, in order that the soul might not escape prematurely.

The special power of nose breath gives it an importance in an old Brahmanic formula for setting the priest into a semihypnotic state. It prescribes:¹⁶

Aspire through the right nostril,
Aum Am, red of color.
Expire through the left nostril,
Aum Am, black of color.

If the priest turns towards the sunrise, his aspiring right nostril faces the south, his expiring left nostril faces the north. So he receives air from the life-giving south and blows it to the sterile north.

This belief also appeared as late as the middle ages, in that the European Astrologists still grouped together, the right nostril, the color red, blood, circumcision, the cardinal point south, and the planet Mars. In our own civilization, we are constantly reminded of this very same belief. The modern "Gesundheidt", uttered following the sneeze of someone, is founded on the conception that the expulsion of

¹⁶Sachs, op. cit., p. 464.

breath may force the soul out of the body.

Globular Flutes replace the tube with an air vessel made of pottery, shell, or even hollowed wood. The earliest of the forms are again, not easy to date; but certainly, in the form of single face masks through which to whistle, they must have their origin before the time of recorded history.

The primitive form of the globular flute, with a fipple or flue head, is found among the tribes today in the shape of birds and also in the form of multiple whistles to accompany the religious rites with chords.

The Cross Flute is first mentioned in the ode of the 9th century B.C. with reference to the Ch ' ih.¹⁷

Heaven enlightens the people
When the bamboo flute responds to the porcelain
whistle
As two half maces form a whole one.

The Porcelain Whistle was a globular flute, and the Ch ' ih was a bamboo cross flute with five and one fingering and a stopped ti with a blow hole, hence it¹⁸ must have been a cross flute, indeed, the oldest in history.

¹⁷ Shih Ching, The Chinese Classics (Hong Kong-London: translated by John Legge, 1871 (1937)) Vol. IV, p. 457.

¹⁸ Sachs, op. cit., p. 179.

Although the civilization from which this emanated was more advanced than the rest of the world, at this period, the existence of this type in the prehistoric world is important to note, in that this form was the one type of all to attain final form and outshine all others. Other than this example, the cross flute does not show up, to a great extent, until around 2000 B.C. This, however, will be dealt with in the next chapter.

The existence of the primitive flutes today is apparent, with many available recordings made on reservations and locations of early cultures. The flute melodies often differ from the racial style of the group to the extent of almost always having an undulating melodic line, where the racial style changes from group to group.¹⁹ Hence, from early time, vocal and instrumental music were easily distinguishable, one from the other.

The following is a flute song of the Papago Indians of Arizona, as played on a typical primitive instrument.

¹⁹Nettl, op. cit., p. 94.

C. Instruments of the Flute Family From Antiquity to the Baroque.

Although most all of the members of the flute family made their appearance during the prehistoric period, lack of recorded information prohibits an account of development over the vast time span. However, this section is to be devoted to the growth and changes that came into the history of each type, from the early days before the birth of Christ, up to the 16th century.

Recorder or Whistle Flute

The whistle flute, as was explained before, gets its name from the fipple arrangement of the head. This fipple head employs a flue, cut through the otherwise stopped head, which directs the stream of air against the sharp edge hole in the front. In general, performance on this style is easier, in that the embouchure need not be developed to vary the sound or dynamics to any appreciable degree. This very same factor was the largest single cause of the recorder's loss of favor in the years to come.

The origin of the word "Recorder" probably comes from the obsolete English verb, "to record", that is, to

sing as a bird does. "They longed to see the day, to hear the lark/ Record her hymns and cant her carols blest."²⁰

The date of the fipple head has not been ascertained, it was known, however, before the Greeks in prehistoric civilization. It has also been found in ancient Hindu sculptures. The Abyssinians had a recorder type called "Kwetz", much used in war.²¹ The finger holes, from the very beginning, vary from two or three, up to the specimen now in the museum at Naples, with no less than fifteen. This particular specimen, made of ivory, and fitted with silver and bronze rings for the finger holes, had a particular arrangement whereby these rings could be rotated so as to close off or leave open, any one tone hole. They were rotated by means of loops or buttons, and hence, could be opened or closed readily. This arrangement formed a complete chromatic instrument and thus, the germ of the clavis or key for covering finger holes. This may very well have been the flute of

²⁰ Proceedings of the Musical Association, 1907 Southgate.

²¹ Macaulay, op. cit., p. 78.

which Pausanais (170 A.D.) spoke when he relates:²²

"Pronorus, the Theban, invented a pipe to be set to different modes." Double flutes of the recorder type were known to the Ancients.

Perhaps the most extensive use of the fipple flute in the early days, was in Central America where this instrument was the only one capable of playing a single melody. Made of bone or baked clay, and with three to five finger holes, it had a false bell, imitative of the Spanish oboes.²³ Earlier than this, however, was a model without finger holes, in which the back and side holes were shifted to the middle of the flute

Known to the Chinese in the middle ages, was the Tai Ping-hsiao, a whistle flute with six holes plus one above, covered with membrane to give sort of an eerie vibrato or tremolo effect. The Indians of this time had whistle flutes, with and without a beak-like upper end.

²² Christopher Welch, M A, OXON, History of the Boehm Flute (London: Rudall, Carte and Co. 1883)

²³ False bells were formed by the tube itself ending without expansion.

The variations in name, from country to country, are almost always accounted for in its fipple head. In that sound is produced through a flue, the organ pipes sounding in this manner, were called flute pipes. The beak-like end suggested the French "flute a bec", this end also stops or blocks the upper end of the tube, thereby promoting the German "Blockflote." In England, the fipple through which the air flows has produced the label, "fipple " flute.

The Tabor Pipe

a small, one-handed fipple flute; first came to light in the early middle ages. This instrument with bore so small that the fundamental note would not sound, requires only three holes to bridge the gap between the second and third partial, giving it a total range of a fifth. The important thing, however, is that it leaves one hand free to play another instrument; usually the tabor or small drum, which the performer hangs from his unused little finger. The tabor is then beaten with the right hand, or, when fixed to his shoulder, the performer used his head for drum beats.²⁴

²⁴ Geiringer, op. cit.,

The practice of performing simultaneously on the tabor and pipe was first used by the jugglers. Since the late Roman Empire, up even until today, it is, in the form of fife and drum corps, the traditional accompaniment for marching soldiers.

Around the time of the late middle ages, the recorder came more and more to be the fundamental form of the flute. Most popular was the type with the reverse conical bore and seven finger holes, the lowest duplicated to accommodate the right or left-handed player. The tabor pipe became longer now, still however, for the same use.²⁵ Later, this is completely replaced by the fife.

Now the double recorder completely supercedes the double shawn, illustrating the growing popularity of this type of flute. This age, in its search for classical antiquity, was imitating the Tibib or the Greek Aulos; as it tied two recorders together, one to be played with the right and the other with the left hand.

The portative was an instrument of the middle ages

²⁵In a painting of the time, "Battle of Sinalung", the infantry is preceded by three tabor pipes and drums. The cavalry is preceded by trumpets.

that used a series of flute type pipes. These pipes were arranged on a rack fitted with bellows, the air was admitted to the desired pipe by means of a keyboard arrangement. This was a very soft spoken instrument and failed to sustain its popularity because one hand was required to operate the bellows, and this naturally restricted the player to single line melodies.

In the Renaissance, the Recorder formed the leading group among the flutes. The ratio of taper in bore, from upper to lower end, was standardized at five to three. (An example of the basic theory of dynamic symmetry).²⁶ Because of its shape and the absence of a bell, the recorder had a pale tone which is shown in its Italian name, "Flauto dolce." An ensemble of recorders was unsurpassed in dignity and reserve.

The Recorder family now had four members of its own group (in the next hundred years, five more appeared) and the question of whether the back hole was an innovation of this period or not, is one which has never validly been answered.

King Henry's inventory of 1547 shows: "viii

²⁶Gove Jay Hambidge The Elements of Dynamic Symmetry (New York: Bretano's Inc. 1926) p. 126.

Recorders greate and smale in a case covered with blacke leather and lined with clothe." Also in confirmation of the fact that already in existance was the Bass Recorder, is this notation: "one greate base recorder of woode in a case of woode."

In this period, Recorders were fitted in cases or sets. However, it is interesting to note that, for example, if nine were found in a case, only three or four distinctly different sizes existed, the others duplicated in pairs as in sets of A and B^d clarinets. In 1618, Michael Praetorius outlines in his "Syntagma Musicum", an ideal consort of recorders as having twenty one, but only in seven sizes, each of these having two pitches. The seven sizes were:

	<u>Length</u>	<u>Lowest Note</u>
Exilant	C. 9 in.	g
Treble	C. 12 in.	C ¹¹
Alto	C. 17 in.	f ¹
Tenor	C. 24 in.	c ¹
Basset	C. 38 in.	f
Bass	C. 60 in.	B
Double Bass	C. 80 in.	F

The larger sizes were blown through a brass crook, and the lowest notes had keys to cover the holes.

The Vertical End-Blown Flute

--as explained before, provided the sharp edge blow hole simply by the cut of the upper end of the tube or reed. Later versions of these were notched across the top to facilitate playing, hence are called notch flutes. Nevertheless, they belong to this type, in that basically nothing is changed. The Sumerian name for these was Ti-gi, meaning cane. Although the Mesopotamians preferred strings, flutes are recorded as late as 2600 B.C. on one of the Seal Cylinders of the age.²⁷ It reads: "Enlulim, the shepherd of the Lulimkids, for the lord Ningirso, was given a share in his cult to cultivate diligently flute (playing) to fill the fore-court of Ennino with joy."

Egyptian culture predates this, however, in that a slate from Hircopolis (4000 B.C.) shows a disguised hunter playing a flute to allure game.²⁸ The Egyptian flute was a simple, vertical, flute; slanting obliquely downward (and sometimes depicted as slanting backward) and blown across the open upper end. Cut from simple

²⁷ Sachs, Op. cit., p. 71.

²⁸ Ibid, p. 90.

cane, a yard long, and one half inch wide, it had from two to six finger holes in the lower end, and on some species, a back hole. Its simplicity would make one think of it as the forerunner of all flutes, but this is not historically true.

The fact that these instruments had greater musical possibilities than the whistle type flute, was due in the most part, to the fact that the player was able to vary the angle of blowing against the edge, thereby: "giving more interesting expression to the tone, no instrument had a more incorporeal sound, a sweeter sostenuto, a more heartfelt vibrato."²⁹

Many customs and uses of the flute appear in every phase of Greek and Roman life, public or private. The flute accompanied the chariot race in the olympic game, the Etrurians boxed to the sound of flutes. Famous Roman orators stationed flutes behind them so that when they raised their voices to too high a pitch, the flutest might sound a lower note. Among the Jews, the flutes were played at the death bed, hence the saying, "now

²⁹ Ibid., p. 20.

your may send for the flute players," when one is about to die.³⁰

The flute called the "Nay" by the Arab speaking people, can be traced from, as was mentioned before, approximately 5000 B.C., and still exists today in the Arab nations. The difficulty in producing a sound on this instrument, even with the notch, rendered it more and more useless, in view of the continuing demands of Art Music. Therefore, its use from the middle ages until the present time, has been necessarily confined to the primitive cultures into which it was born. Its imprint in the graphic and literate history of the world, however, is indellible, and from a classical standpoint, it holds the place of the most prolonged importance.

Pan Pipes are best considered here, in that there lies a principle, identical with the last type. This instrument, simply a group of vertical, end-blown flutes fashioned in such a way as to enable the player to select the desired pipe to sound,³¹ has also been in existance

³⁰Fitzgibbon, op. cit., p. 10.

³¹Geiringer, op. cit., p. 110.

since prehistoric time. An idea of its great age can be realized in an explanation that the "modern" version of the Pan Pipes, i.e. the flat case from which the canes project, was an innovation of the Mongol dynasty around 1300.

The most important function of this instrument for the Chinese, (called "P'ai hsiao"³² or Pan Pipes) is that the individual canes are each tuned to one of the 12 Lu or pitch standards. Hence, it serves as sort of an early set of tuning forks.

The Lu was carefully fixed in ancient and medieval times, by the ministry of norms. Starting with the middle F# and progressing in ascending fifths or descending fourths, the Chinese assign six Lu to the male, and six to the female principle. In that this culture conceived the cosmos as the harmony of male and female, and accepted music as a substitute and representative of the universe, the system works out evenly:

Male	F#	--	G#	--	A#	--	C	--	D	--	E
Female	G	--	A	--	B	--	C#	--	D#	--	F

³²Sachs, op. cit., p. 178.

This is not the tempered chromatic scale, even though the pipes are in a ratio of 2:3 or 3:4, as this is only theoretical. In practice, the Chinese needed two more notes to fill an octave.

All of the flutes in the Pan Pipes were notched to facilitate playing,³³ and the set of 12 retained its importance as the "keeper of the pitch standard", long before it was a musical instrument in its own right. The arrangement of pipes was, in the Far East, according to the Male-Female.

M F M F M

Although the name of Pan was attached to types of this sort, the Pan Pipes were, in the Greek and Roman antiquity, only a shepherd's instrument. Quotes Homer: "Behind the sheep, piping on their reeds, they go."³⁴

Early Greek Pan Pipes, in their rectangular shape, resembled the Chinese pipes of the Han dynasty. The individual tubes graduated in length internally, while

³³Fitzgibbon, op. cit., p. 7.

³⁴Sachs, op. cit., p. 142.

later forms had one corner cut off the rectangle, leaving a wing shape that followed the real length of the tube. The name Syrinx,³⁵ given to these by the Greco-Roman kingdom, was taken from the root "to whistle" and was always connected with the love charm.

This instrument has survived the years, and, as mentioned in the section on the primitives, is in use in many primitive cultures today; especially in Central America.

The Pan Pipes have been made of bone, wood, clay, stone or metal; the latter three with the channels hollowed out in them. Some of the later types are in double sets, an octave apart; also in sets with corresponding chromatics. American Archaeologist, Charles W. Mead, mentions the playing of two pipes connected by a long cord, each instrument having only half the notes, the others being supplied by the other players. No doubt, this originated in the West, in that the American Indians did not, and to this day, do not, use the semi-tone scale.³⁶ In spite of its age and persistence

³⁵ Ibid.

³⁶ Nettl, op. cit., p. 104.

against extinction, it has never changed, nor developed to any extent.

Nose Flutes

--are in somewhat the same category as the Pan Pipes. That is, in spite of their ancient origin, and their continued use even till today, their development for artistic, musical purposes is not tangibly traceable.

Globular Flutes

--Have been traced to the Mesopotamian civilization, but earlier in the Shang dynasty of China (1400-1200 B.C.) The oldest example recovered was made of bone that resembled the later types which were moulded from earthenware. The moulds used were described by ancient Chinese authors, as being a goose egg for the outside, and a chicken egg for the inner form. The description of the "original" of this type is best described by
 37
 Herrlee Glessner Creel:

The Shang example is about two and a half inches high, and more or less barrel shaped. It is decorated with two so-called t'ao-Tieh or ogre masks, such as are found on bronzes. There is a hole at the top to blow into, and five holes on the sides

³⁷ H. G. Creel, The Birth of China (New York: 1937) p. 99.

which may be stopped with the fingers to vary the pitch. Mr. Liang, who kindly demonstrated it to me, blew do, re, mi, fa, and said that by blowing harder on one note, it was possible to produce sol.

Curt Sachs mentions in observation of this, that the appearance of the semi-tone in tetrachord order, followed by a whole tone, is not evidence of the early use of the diatonic scale. The semi-tone, however, provides the instrument with the ability to produce the Anhemitonic scale two ways; i.e., alternating do, re, mi, sol, with do, ra, fa, sol.

At this time the globular flutes appeared in almost every corner of the world, and in every conceivable material, eg. wood, metal, stone, porcelain, bone, shell, and in the modern world, ebonite and plastic. The Chinese used the water tremolo device with these flutes, by putting water where it interfered with the air outlet. These instruments have, perhaps, gained their most useful position in their world-wide distribution as inexpensive toys for children. Historically, however, it holds a much more curious place, in that in 1860, a certain Donati in Southern Italy "invented" a globular beaked flute of clay or porcelain, in the shape of a turnip with a whistle head and eight finger holes in a convenient arrangement. This he called the ocarina

(translated: "the nature of geese") and they were eventually produced in sets from treble to bass.

The curiosity of the matter was this. In what Donati had termed an invention, he reunited the two separate branches of the globular clay whistle; the cavity sound and finger holes of one, with the cross arrangement and whistle system of the other.³⁸ Also, to a lesser significance, he combined one feature of each of all known flute types into one, that is:

1. The whistle beak head of the whistle flute.
2. The cross arrangement of the transverse flute.
3. The air vessel of the globular instrument.
4. The basic finger system used in the eight hole, end-blown flute.

Another curiosity in the realm of globular flutes is the "whistling pot"., found among the Peruvians.³⁹ This type had two communicating earthenware vessels, both half-filled with water. When the player blew into one of them, the water was driven into the second one

³⁸Sachs, op. cit., p. 167.

³⁹Ibid., p. 199.

where the increased volume of water compressed the air and sent it through a whistle head.

Transverse Flute

--The transverse, or cross flute, whose role it was to be the solitary example of the flute family to persist to the present day; experienced a humble beginning and an extremely slow development until comparatively recent times. While the recorder enjoyed the limelight of the wood wind world, the transverse flute held only its traditional place with the percussion as an accompaniment for marching feet.

The oldest sources make mention of four flutes, three of which fall into types already discussed. The fourth, the Ch'ih was a bamboo flute, which, according to a medieval source,⁴⁰ is said to have five finger holes and one back thumb hole. Also it states that it had a stopped ti with a blow hole "like a sour jujube". The word stopped, of course, means at the top end, and the fact that it has a separate blow hole establishes this as a cross flute, in fact, the oldest cross flute in recorded history.

⁴⁰

Geiringer, op. cit., Chapter 8.

In that we know the instrument was used in unison with the globular flute, we can establish its date back to the 9th century B.C.⁴¹

The instrument came from the East to the West by way of Byzantium,⁴² and the oldest record of it among the Greco-Roman civilization is from the record of the excavated Etruscan tomb of 2000 B.C. An urn that was revealed ..(now called "urna del flautista") had carved upon it, the head of a musician playing a cross flute. The interesting point is that both of his hands are covering finger holes, and the mouth hole is surprisingly well placed in relation to the keys. Also worthy of note, is the long-standing example of one such flute stamped on a coin from the Syrian town of Caesarea, (169 A.D.).

The cross flute became the outstanding instrument of ancient India as of the 1st century A.D. It has been pictured on reliefs of the temple at Sanchi during this time, and in the centuries to follow, formed an

⁴¹Ching, op. cit., p. 10.

⁴²Geiringer, op. cit.,

important part of the celestial music.⁴³ In fact,
 "Krishna", one of the divinities, played it himself, in
 that he, after being saved by a shepherd from death, he
 became a herder.⁴⁴

When his flute sounded,
 The spirits were enchanted; the rivers paused
 and stopped flowing, the birds halted in their
 flight, flew down and listened jealously; all
 inanimate things under the sun grew brighter.

The middle ages saw little in the line of flute
 development, except in the Far East where the cross flutes
 were known in four variations, each with a different
 finger hole arrangement.⁴⁵

1. Ch'ih has five and one.
2. Ti Tse has six and one with a membrane cover.
3. Yamato fuye has six, and one wrapped in
silk and laquered.
4. Yoko Fuye has seven.

(The one thumb hole.)

Their method of performance differed greatly from the
 occidental style. Sustained tones were considered dry

⁴³Collected music of this era consisted of
 instruments of aristocratic character which are suspended
 in heaven to be played by superhuman and invisible hands
 as entertainment for the Gods.

⁴⁴Sachs, op. cit., p. 159

⁴⁵Ibid., p. 179

and lifeless unless the players sharpened or flattened the beginning and end of the note. His ability and taste in this technique was considered one of his greatest achievements.

The westward path of the Cross flute, was marked by a cross flute player on a Hungarian Aquamanile of about 1100 A.D. in Budapest. The next evidence, chronologically speaking, is a miniature in the "Hortus Deliciarum" by an Alsatian abbess in the 12th century, here it is known by the name of "Swegal". In the 13th century, "Flauste Traversaine" is mentioned in France.

When Germany became a musical center, it was called the "German flute" or the "Flute Allemande". The French, however, complained of its being connected with the Germans, in that they played it better.

The variation of the Cross flute, which represented this type for hundreds of years when the "German flute" was out of favor, was the Swiss Pipe. This was a small, cylindrical flute, with six holes; that became a real companion of the foot soldier. Played with drums to accompany marching, these became the favorite of the Swiss Lansquenets, hence it soon became known as the "Schweizerpfeiff" (Swiss pipe) and later on, just fife.

During the Renaissance, the transverse flute finally saw some development. The narrow bore became wider, giving more musical access to the lower register.⁴⁶ Thus, the instrument was no longer limited to a shrill octave. In spite of the fact that it was made in three sizes for different needs, little place was given it in art music. The sizes, according to Praetorius are:⁴⁷

	Size	Lowest Note
Treble c.	20 in. long	(a ¹)
Alto-Tenor C.	30 in. long	(d ¹)
Bass c.	45 in. long	(g)

The Alto-Tenor of this group most closely resembled our modern flute, in that d¹ is the lowest note without the foot joint; and Praetorius states that it can be used for playing soprano parts. Here then, is perhaps the first flute with the approximate measurement of our modern C flute.

Praetorius also mentions the Swiss pipes as having a length of two feet with a two octave range. However,

⁴⁷Michaelis Praetorius, Theatrum Instrumentorius seu Sciagraphic Wolfenbutter (1615).

the narrower bore, to facilitate high notes, produced a much coarser tone.

Although the instrument was completely in the background as far as the performance of art music was concerned, mention was made of it in the literature of the period.

Machault,⁴⁸ in his "La Prise d'Alexandrie", includes floutes traverseinnes in a list mentioned by Deschamps in the 14th century. Rabelais, around the year 1535, describes Gargantua⁴⁹ as playing the German flute with nine holes.

In spite of its inauspicious role up to the 17th century, the die was cast. The cylindrical bore, and placement of the finger holes according to pitch principles supplied the prototype of the instrument which was, by virtue of its ability to direct air as the performer desired, far more capable of portraying the personal element.

⁴⁸Guillaume de Machault, La Prise d'Alexandrie.

⁴⁹Gargantua -- The hero of a satirical romance by Rabelais. He is a gigantic King, educated according to the humanistic ideas of the Renaissance.

The Flageolet

--appears for the first time in 1581, when Sieur Juviney, who is credited with its invention, played it in the "Ballet Comique de la Royne."⁵⁰

The name, derived from the Latin, was used for some time as a French name for some kinds of flutes. Eustache Deschamps, a poet of the 14th century, praised "Les Doulx Flageolez Ressonans."⁵¹ Juviney applied this to his own creation which was a small, narrow-bore recorder with six holes; four on top and two thumb holes on the back. At this time the instrument was made in both double and triple versions, rendering these capable of playing chords and double line music. The double and triple versions had one mouth pipe leading to either two or three pipes.

A great number of these instruments have been preserved til this day, as well as some of the music written for them. This is a slight indication of the

⁵⁰ Willi Apel, The Harvard Dictionary of Music (Cambridge, Mass: Harvard University Press, 1956) p. 267.

⁵¹ Sachs, op. cit., p. 351

great popularity that they must have enjoyed. Among the oldest remaining music for these is a printed, four-part "Vaudville" pour les flageoletts", by Sieur Henry Le Jeune.⁵²

The most interesting development in flageolets comes in the middle of the 18th century, and will be dealt with subsequently. The English version appears even later; to leave its mark in the development of our modern instrument. These are important enough to be taken up in the period of the 17th and 18th century flutes.

⁵²Eric Blom (ed.), Grove's Dictionary of Music and Musicians (London: Macmillan and Co. Ltd., 1954) p.150

D. The Flute of the 17th and 18th Centuries.

The turn of the 16th to the 17th century, witnessed a sort of revolution of musical style. The new generation of composers:⁵³

Emphasized the contrast to the old style with decisiveness, indeed arrogance; never before heard. They laid stress on the novelty of their style with similar determination.

The tendencies of the day were to express strong emotion and appeal to the heart of the listener. The polyphonic style was replaced by the monodic style. The latter being better able to express man's mind and emotion. Their instrumental demands were also changed, in that this monodic style required an instrument capable of wide dynamic ranges, an extreme compass, and, most of all, emotional quality never before called for in a wind instrument. In short, the instruments had to "sing" as a human voice.

All of the wind instruments that had no control of expression, no dynamic elasticity, and those that could not overblow to a higher octave, were soon abandoned. Only the bassoons, the small shawns (oboes) and flutes were preserved. It is interesting to note

⁵³Sachs, op. cit., p. 351.

that the recorder, which at this time, represented the flute family for the most part, did not have much dynamic elasticity or power of expression as was the demand. However, the very fact that it was capable of difficult, articulate parts; and because of its blending qualities, the composer found ample use for it.

The restriction against "color" instruments in the orchestra had no sooner taken place, than it began to be lifted. The string orchestra was established at this time, but winds were needed occasionally; both to enliven the monotony of the strings and as a means of characterization in scenes of operas. Hence, the winds moved back into the orchestra, but not until they underwent some changes.

The Recorder

--due to its nature, could be changed very little to conform to the new demand, except that now the four lower holes on the larger forms were covered by keys. The aesthetic transformation was much more radical. The Renaissance instrument had the shape of a small staff, but the Baroque recorder "assumed a shape obvious of the

canons of form of the day,"⁵⁴ a gracefully curved profile. The recorder went out of favor for the aforementioned reasons, (its sweet, subtle tones and its overall inability to answer the demands of subjective expression) and was gradually supplanted by the rapidly developing transverse instrument.

The Flageolet

--saw its most important change in 1750, when the recorder-like beak was replaced by a nozzle of bone or ivory as a mouth pipe leading into a pear shaped chamber which fitted over the fipple. This chamber contained a sponge, the object of this being to absorb the moisture of the breath and avoid condensation. The English flageolet of a later period had this arrangement, but had the six finger holes, (a la Penny Whistle) in the front, and the thumb hole from the recorder on the back. Some also had a seventh hole for the D[#]. The English double flageolet had a damper arrangement to silence one tube when desired. "Bainbridge, the pipe maker succeeded in making it popular about 1800," relates the Proceeding

⁵⁴Geiringer, op. cit., p. 175.

of the Musical Association of 1907.⁵⁵ Also a tutor was published for it including solos.

Perhaps its most important contribution to the flute world of today was its capability to play extremely high parts with relative precision. Hence, in the 18th century, it was assigned the highest part in the orchestra under the instrumentation title of "floutine" or "flauto piccolo". This part, of course, later became the Piccolo or octave cross-flute part.

To list a few:

Gluck - "Die Pilgrime von Mekka"

Mozart - "Abduction from the Sereglia"

Sullivan - "Sorcerer"

Because of its pure, high-pitched sound (at times almost ethereal) the early French violin theorists named the harmonics on their instrument, "Flageolet tones". This term, will be noted often in the chapters on imitation.

The flageolet of the 19th century was used primarily for dance music and had holes covered with keys.

It was known by the name, "Quadrille flageolet."

The Double Recorder

--of this period was made with both channels cut in one billet of wood,⁵⁶ this enjoyed some popularity in England and France, but was of no general importance.

In that none of these aforementioned instruments suited the demand completely, the search continued in the direction of the-

Transverse Flute

The Alto-tenor of the Renaissance was divided into three parts; namely, the head which was cylindrical, and the body and tail which were conical to enhance the over-blown harmonics. The conical portion was negative conical, or, from large to small as it progressed to the tail. This was equipped with six finger holes and a D[#] key. This instrument, by virtue of its tightly fitting pieces, could be telescoped to conform with pitch differentiations. Lully introduced this instrument into

⁵⁶Geiringer, op. cit., p. 177.

the opera orchestra in 1677. The earlier of the two forms of this flute was sometimes made of ivory instead of wood, and its six finger holes were united in an individual section of the tube.⁵⁷ The champion of this flute, was one Jacques Hotteterre le Romaine, who, in 1707 in Paris, wrote "Principes de la flute traversiere."

In 1710, the later form appeared, having two groups of three holes each, on one portion of the divided center joint. This was the flute on which King Fredrick the Great of Prussia, excelled.⁵⁸ Also sonatas by Blavet were written with this instrument in mind.

Hence, we come to the first player-theoretician combination, whose works exerted a tremendous impact on flute development and are studied even today. He was Johann Joachim Quantz, the court composer and flutist extraordinary who was personal musical advisor to Fredrick the Great. His life works come to us in the form of vast numbers of flute compositions as well as in his fundamental treatise, "Versuch eihier Anweisung die Flote traversiere zu spielen", Berlin, 1752.

⁵⁷ Sachs, op. cit., p. 381.

⁵⁸ Ibid.

E. The Invention of Theobald Boehm and the Flutes of the 19th and 20th Centuries.

The flute of the 18th and 19th centuries becomes, at long last, the transverse or cross instrument. The recorder has fallen out of favor due to its pale and rather emotionless sound, and also to its lack of power. The flageolet becomes relegated to the routine of 19th century dance music, while the other, more primitive forms of the flute, have settled into a rather permanent non-progressing type, role in either primitive or folk music culture.

Hence, the remainder of this chapter will be devoted to the progressive development of the modern, Boehm key system, flute; completely chromatic and capable of a three octave - plus compass. In order to do this in an orderly manner, some back-tracking is necessary.

The basic innovation of the modern flute, is the perfecting of tone quality and intonation by placement of the tone holes in accordance to acoustical principles (not for the convenience of fingers) and by reworking the shape of the bore.

As was mentioned in the previous section, the important thing to consider, in any instrument requiring

finger holes is, that problem of the fingers reaching the holes after they have been properly bored. There also existed the problem of covering holes added for chromatic tones, for which no finger was available.

In 1670, an unknown inventor, probably of French origin, introduced the D[#] key.⁵⁹ This was probably the first really important step toward the improvement of the flute. The earliest players of note: La Barre, Hotteterre, Buffardin and Blavet; adopted this⁶⁰ immediately.

The mechanism for this key consisted of a raised wooden ring around the tube, with a groove in it to support an axle. On this axle rode the key, at more or less center point, kept in closed position by a spring under the finger end.

In 1707, Hotteterre's flute method "Principes de la flute traversiere" (possibly the first such book in existence) lists the D[#] key in use with the various

⁵⁹ Although keys were used on the large models of the Recorder to cover the lower holes, the transverse flute, up to this time, had only six finger holes.

⁶⁰ The use of this key is not restricted to making D[#], but when held open, vents the entire instrument and produces many more upper partials throughout the complete range. This is, today, considered correct fingering.

forked fingerings, to produce the scale from low D to A³, including all semi-tones save the top F natural.⁶¹ This method of cross or forked fingering was accomplished by, for instance, changing the natural F# to F natural by closing the D hole and leaving the intermediate E hole open, also by half-stopping some holes, other chromatics were possible. Most of the forked fingerings produced a muffled sound of poor intonation, hence, a key restriction to the tonalities of D, G and A with their tonic minors was evident.

Since the advent of equal temperment led the composers of the last half of the 18th century to compose in the remotest of keys, the flute's shortcomings were emphasized. Hence, from this time on, an all out attempt was made to produce an acoustically correct instrument with tone holes drilled in the proper place for each of the twelve tones of the chromatic scale, regardless of the impracticality of its position in relation to finger reach.

Also, it stood to reason that mechanical means had to be provided to cover most of the tone holes, in that only five finger holes of the original six, could be

⁶¹Fitzgibbon, op. cit., p. 32.

used when drilled for the chromatic scale. Hence, the production of the D[#] key (for which cross fingering was not available) heralded the coming of the modern instrument.⁶²

The next keys to be added are difficult to establish in chronological order, but it is safe to say, that by the end of the 18th century, the flute had acquired four keys, the D[#], G[#], F and B^b. Also the lower foot joint was available on some models, bored with a low C[#] and C natural hole, and fitted with a key to be depressed by a remote lever. The latter keys were not accepted completely until fifty years later.

Perhaps a note, as to the key or pitch of this instrument is appropriate at this point. When the basic instrument is drilled with six finger holes, and each finger released in order, the notes of the Major scale are produced, with the second octave available by overblowing. This leads to the erroneous conception that the flute is a D instrument. This is not true. An instrument should be called in D, only when it actually transposes into D, (as in the case of the clarinet family), this means only, that the concert

⁶²Welch, op. cit., p. 35.

flute has a normal scale of D major, thus the requirement of chromatic adjustment to produce a C scale.⁶³

Also of importance is the shape of the tube, in that this underwent many changes in the next century. At the same time of Quantz, the bore was made conical to reduce the shrill, whistle sound of the military instruments. This is, in a manner of speaking, reverse conical, in that the bore diminished towards the end of the tube. A French flute maker in the 18th century, lists the dimensions as conically reduced from 19 millimeters at the mouth hole, to 14 millimeters at the lower end.

The material for the flute of this period, was almost always wood, and in most cases, boxwood. Various compositions were tried, even ebonite, which was used with some success. Metal, for the most part, was an innovation of the later flute makers of the 19th century.

The years immediatly preceeding Boehm's invention were filled with so many and varied attempts at providing the mechanical assistance needed for the flute's perfection, that it is difficult to mention them at all. In fact, with only a few, in chronological

⁶³To the present day, the C scale is the most difficult scale to produce flawlessly, from the stand point of homogeneity of timbre and intonation. On even the most expensive instruments, the C scale is telling proof of a "true" flute.

order, it can be seen that Boehm himself, was the exemplification of the progressive development of the mechanism for the flute.

At the end of the 17th century, there appeared the "Five Foot Flute"⁶⁴ which actually measured four English feet, and sounded an octave below the concert instrument. The instrument, because of its great length, required mechanism even on the face keys, to cover holes too remote for fingers. This is perhaps the first example of keys being used successfully on the six basic tone holes.

The bore on this instrument was basically conical, however, it had the additional feature of being funnel shaped at the lower end, obviously to brighten the notes of the foot joint.

⁶⁴Welch, op. cit., p. 51.

On the MacGregor, Bass flute of 1810, two more keys, (1 and 4) were covered by remote keys, and the head joint, bored double to lessen the reach.⁶⁵

In 1808, the Clergyman, Rev. Fredrick Nolan, of Stratford, took a patent for the "improvement in the construction of slutes, flageolets, hautbois and other winds." Under this patent were ring keys, invented to bring the manipulation of chromatics, heretofore cross fingered, under the modulation of the finger which played the diatonic notes. It was, and still is, simply a ring on a lever, which circled the tone hole nearest the key it actuated, and was unavoidably set into action when the finger opened and closed the tone hole.

Herein lies the germ of open keyed system of fingering. This, coupled with the now eight keys for producing chromatics, and the low C[#] and C, brings the flute up to the invention of Boehm. The body now consisted of the head joint, the two body joints, (called the main and lower) and the foot joint for the lower two notes. The instrument remained conical "in order that it retain the sweetness of tone and provide

⁶⁵ Fitzgibbon, op. cit., p. 90.

better intonation on the high notes,"⁶⁶ in spite of its deadening the lower notes.

Theobald Boehm

--was born in Munich on April 9, 1794, the son of a goldsmith and jeweler. This combination of trades couldn't have been better for the talented Boehm to be apprenticed in. At an early age, he took up the flute on the advice of a Physician, as treatment for a pulmonary disorder. His progress musically, was exceptional, in that, at the age of twenty, he was first flute in the Isargate theatre in Munich, and six years earlier, had made himself a four-keyed flute. Thus we have in one young man, the perfect combination; musician, mechanic, metallurgist and inventor, necessary to solve the flute problem. In 1828 he set up a flute factory in Munich to produce eight keyed flutes, with pillars to support the key axles, rather than the notched ridge around the body.⁶⁷ Boehm performed on this flute, gaining a very fine reputation. It was while on a tour of concerts

⁶⁶ Ibid., p. 44

⁶⁷ Only a drawing now exists of this flute.

that he met another flute virtuoso of his time, who also contributed to the flute's development. He was Charles Nicholson, a flutist extraordinary, who, several years before, had his flute drilled with tone holes much larger than heretofore believed feasible. Upon hearing Nicholson's performance, Boehm was greatly impressed by his broad, powerful sound. This he attributed to the large size holes in Nicholson's flute. In one of his own letters⁶⁸, Boehm states that, but for Nicholson, he would never have attempted any radical change in system. However, he despaired of rivaling him, except by means of an improved instrument.z

Hence, he embarked on an attempt to combine all of the singularly proven aspects of the last forty years in one superb instrument that would feature:

1. Tone quality characteristic of the flute, with singing quality, but with sufficient power to balance with other instruments and answer the demand of the time. Also to be consistent throughout the registers.
2. Flexibility, in order to express deep

⁶⁸Fitzgibbon, op. cit., p. 53.

emotion with music that was often technically difficult as well.

3. Intonation as near perfect as possible by placing the tone holes according to acoustical principles and widening them to the necessary diameter to produce the desired power and tone.

4. A Fingering system, by which these tone holes could be covered and uncovered with keys, in such a manner as to be able to execute the most difficult music written, within its compass.

Already having met Gordon⁶⁹ and seeing his flute in London, (a slightly improved open key system of rings and crescent keys), Boehm decided that the complete abandonment of the old system was necessary, and the improvement of the ring, key system was indicated to the degree that two or more Tone Holes could be closed

⁶⁹William Gordon, a former captain in the Swiss Guards made several humble attempts at reworking the key system at about the same time as Boehm. His attempts finally ended in frustration and he threw his latest model in the lake Geneva. This contact with Boehm, however, was enough for his claim to be the inventor of the perfected system. This caused an outrage (public and private) that went on long after both of their deaths and remains to this day, unsettled.

by one movement of a single finger.

In 1832 he produced his second model⁷⁰ featuring the entirely new idea of the axle pivot which allowed the axle to operate one key, and the axle housing, to operate another, so by means of simple yokes, any two or three keys could be actuated by one finger, together or independently. This flute was demonstrated by Boehm himself, and was warmly received; but did not catch on quickly, due to the disinclination of the flutists of the day, to learn new fingering. For a time, Boehm abandoned efforts toward improving the flute and set himself to such projects as the overstringing of pianos and improvement in the smelting of iron.

Having studied acoustics under Schalhautl at the Bavarian University, he set to work in 1847 to improve the bore of the flute. Now working with metal tubes,

⁷⁰Boehm's first model was the Gerock and Wolf flute, sold in 1831 in London. It was improved with an added F key and an open G# - total 8 keys, 2 rings. The rod or axle, to produce a lever of the third order, is still wanting.

he tried 300 experiments on the proper position of the holes, their size, the shape and the position of the mouth hole. The product of these experiments is essentially the same flute on which we play today. He restored the old cylindrical bore for the body (thus gaining responsiveness), but fitted it with a slightly parabolic head joint, the inside of which curved toward the stopped end. This replaced the sweetness and purity produced by the conical body and at the same time allowed the lower notes to speak. In that the tone holes were of larger size and unequally distributed along the tube, they were all fitted with keys and more improvements were made on the system; in fact, with only a few exceptions, this was our modern flute.

Other patentees are credited with several improvements and innovations after Boehm's death, most of these consist of alleged "improvements" and easier fingerings for trills.

The climax of the tinkering was reached by James Matthews, whose flute had no less than 28 keys with the tube of gold, keys of silver and head joint of ivory (with a perfectly square mouth hole). All of these so called improvements and fads considered, Boehm's own model, with

open or closed G#, is still the best and is used almost universally.

The Boehm flute was first made in metal but in 1848, the Godfroy and Lot Company of Paris (later to become the Louis Lot Co.) began to produce them of cocoa wood. This company also began perforating the keys in the center to be covered with the fingertips in that, "delicacy of intonation is increased." Thus was the French Style flute of today born.

The invention and its many variations, was taken up in all parts of the world (including the U.S.) before Germany adopted it. In fact, in 1866, we have evidence of the old, eight-keyed flute in the orchestras of Berlin and Vienna.

The outstanding producer of modern flutes in Europe was the Louis Lot Co. of Paris. Their best instruments are considered to be the Stradavarii of flutes. In the U.S. the instrument is probably best represented by the Haynes Bros. (whose flutes were made under the various titles of the Haynes Flute, The George Haynes Co., and presently, The William Haynes Co.) and the slightly younger company of Verne Q. Powell, who was an associate of the George Haynes Co.

It is interesting to note that due to the extremely high pitch used in the Boston Symphony Orchestra, compared to the relatively low pitch standard of Europe for which Louis Lot's flutes were produced, the most satisfactory instrument in several cases has been the combination of a "Lot" head joint in a Powell body; the former gives the exquisite overall quality, the latter appropriating the comparable responsiveness at the necessary higher pitch.

The William S. Haynes Co., as of the past few years, has made available no less than five different head joints with a variety of wall heights,⁷¹ and three different body weights whereby each player may select the exact quality that he desires when he orders the instrument.

Both companies offer a flute of solid sterling silver, solid gold or platinum with gold keys. All of these are available in the French style perforated key or the solid key system. Both are satisfactory intonation-wise, but the professional players, through the influence of the

⁷¹Wall height refers to the measurement of the opposing lip on the blow hole at which the air is directed.

French school of flute playing, lean toward the perforated key.⁷²

By and large, the solid silver instrument has been most satisfactory while the gold flute produces a darker sound, which, though exquisite for chamber music, does not have the carrying power required of an orchestra flutist. The platinum body, being prohibitively expensive (\$3200.), has not proven to be any more valuable in general use than the silver.

The octave flute, or piccolo as it is commonly referred to, has not been dealt with in detail because, since its appearance in 1799,⁷³ it has been subjected to the same basic reforms as the concert instrument, except it is made without the foot joint. This extra length is omitted on this instrument, because the lower fifth of its range is its most ineffective register. The

⁷²It is interesting to note that in the last ten years Marcel Moyse, a leading exponent of this French Flute school, has not plugged the perforation in the keys with cork stoppers, thereby defeating their function. I will refrain from comment on this and leave it only as a note of interest.

⁷³K. Geiringer.

Chapter Three
The Flute as Imitator

A. Of the sounds of nature and portrayal of moods.

Evidence of the popularity of the flute as an imitator is found wherever music exists. Perhaps the most imitated of all wild life is the bird. Birds of all sizes have been audibly portrayed by flutes, and poetic verse frequently compares the songs of various birds to the flute sound.

Tennyson, for instance, goes from one extreme to the other when he writes, "the mellow ouzel fluted in the elm."¹ In approximately the same year, he writes of the "swan that, fluting a wild carol ere her death."² Hence, the flute seems to hold sort of priority on description when a bird is to be referred to or imitated.³

¹Tennyson, op. cit., p. 109.

²Ibid., p. 87.

³To establish the usage of the word flute as a noun and a verb, I quote: Websters New Collegiate Dictionary (Springfield, Mass.; G & C Merriam Co.; 1956):

- N. flute 1. A wind instrument. Consisting of a hollow cylinder or pipe, with hobs along its length, stopped by the fingers or by keys.
- V. flute 1. To play, whistle or sing with a note like that of a flute.

In 1882, "Punch" describes a performance at St. James Hall of Henry Nicholson (1825 - 1907), a flute player for seventy years, performing under such notables as Berlioz, Mendelssohn, and Brahms. It relates in part:

"A mocking-bird, perched on his own flute and hopping from note to note in the most delightfully impudent and irritating manner. Shut your eyes and there was the mocking-bird, open them and there was Mr. Nicholson. What a pity he couldn't appear in full plumage with a false head and tootle on the flootle through his beak."⁴

Of all bird imitators in the flute repertoire, none is more descriptive or more often enjoyed by young and old alike than the Prokofieff "Peter and the Wolf" example with text, "On the branch of a big tree, sat a little bird, Peter's friend. All is quiet: chirped the little bird gaily."

Peter and the Wolf, p.5, Serge Prokofieff:



⁴Fitzgibbon, op, cit., p.27.

And later the bird changes her mood when the duck asks
 "What kind of bird are you if you can't swim?" The musical dialogue:

Peter and the Wolf, p. 11, Serge Prokofieff:

Handwritten musical notation for Peter and the Wolf, showing a dialogue between a Bird and a Duck. The notation is on two staves. The top staff is labeled "Flute - Bird" and the bottom staff is labeled "Oboe - Duck". The Bird's part consists of a series of rhythmic patterns, including a sequence of eighth notes and a sequence of sixteenth notes. The Duck's part consists of a series of rhythmic patterns, including a sequence of eighth notes and a sequence of sixteenth notes. The notation is handwritten and includes various musical symbols such as clefs, notes, rests, and dynamic markings.

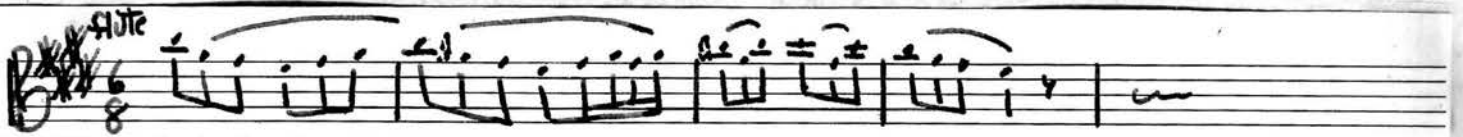
The cuckoo bird has been imitated in music by both the flute and the clarinet so often, that an example is not necessary.

In most cases, the bird imitated is singular; however, Wagner scored an interesting effect using three flutes and one piccolo, depicting the flutter of birds in the finale to Act II of Siegfried.

Siegfried, Act II, Richard Wagner:

Handwritten musical notation for Siegfried, Act II, showing the flutter of birds. The notation is on three staves. The top staff is labeled "3 flutes" and the middle staff is labeled "1st Violin". The bottom staff is labeled "Pic" and "3 fls". The notation is handwritten and includes various musical symbols such as clefs, notes, rests, and dynamic markings. The top staff shows a series of rhythmic patterns, including a sequence of eighth notes and a sequence of sixteenth notes. The middle staff shows a series of rhythmic patterns, including a sequence of eighth notes and a sequence of sixteenth notes. The bottom staff shows a series of rhythmic patterns, including a sequence of eighth notes and a sequence of sixteenth notes. The notation is handwritten and includes various musical symbols such as clefs, notes, rests, and dynamic markings.

Elsewhere in nature, the flute has found an equally important role of imitation, i.e., the mood of daybreak and sunset. The most well-known, but by no means overdone, is the morning setting from Grieg's "Peer Gynt Suite." Peer Gynt Suite, "Morning," Edvard Grieg:



And of a more violent nature, Beethoven, in his Pastoral Symphony, scored the flute and piccolo separately in the storm scene. Gluck, in the storm scene from "Iphigenie en Tauride" uses flute and two piccolos, voiced in 11ths with first violins to produce the desired tenseness of the tempest.

Iphigenie en Tauride, "Storm Scene," Gluck:

Handwritten musical notation for the storm scene in Gluck's "Iphigenie en Tauride". It consists of three staves. The top staff is labeled "fl + Picc" and shows a melodic line with slurs and accents. The middle staff is labeled "1st Vlns." and shows a rhythmic accompaniment of eighth notes. The bottom staff shows a dense texture of notes, likely representing the combination of flute and piccolo. Dynamics markings "sf" (sforzando) are present in the middle and bottom staves.

Sir Arthur Sullivan made very effective use of flutes in the storm scene in the "Golden Legend." The flutes are scored extremely high and are sustained to depict the wind and storm raging round the spire of the Cathedral and at the devil's words, "Shake the casements." The dying away of the storm is portrayed by a chromatic descending passage in rapid staccato.

Golden Legend, "Storm Scene," Sir Arthur Sullivan:



B. Of inanimate objects

Among the inanimate objects imitated by the flute, the most common is no doubt the chimes and bells. Several instances of each are well known, but by the way of example, the "Harold in Italy" of Berlioz will serve well. In the second movement, the "Procession of the Pilgrims," the Pilgrims' Hymn is heard over and over. Between each statement, as the pilgrims approach, the "Bells of the Convent" are heard, played by the flute and harp.

Harold in Italy, (Procession of the Pilgrims), Hector Berlioz:

The image shows a handwritten musical score for three instruments: Flute (fl.), Harp, and Violin (vio.). The score is written on four staves. The Flute staff has a treble clef and a key signature of one flat (B-flat). The Harp staff has a treble clef and a key signature of one flat. The Violin staff has a treble clef and a key signature of one flat. The score consists of seven measures. The first two measures are mostly rests for all instruments. In the third measure, the Flute and Harp play a chord of D4 and F4. The Flute part has a dynamic marking of *f* and a breath mark. The Harp part has a dynamic marking of *f* and a breath mark. The Violin part has a dynamic marking of *f* and a breath mark. In the fourth measure, the Flute and Harp play a chord of D4 and F4. The Flute part has a dynamic marking of *f* and a breath mark. The Harp part has a dynamic marking of *f* and a breath mark. The Violin part has a dynamic marking of *f* and a breath mark. In the fifth measure, the Flute and Harp play a chord of D4 and F4. The Flute part has a dynamic marking of *f* and a breath mark. The Harp part has a dynamic marking of *f* and a breath mark. The Violin part has a dynamic marking of *f* and a breath mark. In the sixth measure, the Flute and Harp play a chord of D4 and F4. The Flute part has a dynamic marking of *f* and a breath mark. The Harp part has a dynamic marking of *f* and a breath mark. The Violin part has a dynamic marking of *f* and a breath mark. In the seventh measure, the Flute and Harp play a chord of D4 and F4. The Flute part has a dynamic marking of *f* and a breath mark. The Harp part has a dynamic marking of *f* and a breath mark. The Violin part has a dynamic marking of *f* and a breath mark.

A different sort of bell imitation appears in Sullivan's "Golden Legend," this being obviously a set of smaller bells in motion, and portrayed by a piccolo and two flutes.

Golden Legend, Sir Arthur Sullivan:

A solo flute very characteristically depicts the fluttering of the flag on Isolde's boat in Act III of Wagner's "Tristan and Isolde."

Tristan and Isolde, Act III, Richard Wagner:

Handwritten musical notation for Wagner's "Tristan and Isolde, Act III". The score is in 2/2 time with a key signature of two flats (B-flat and E-flat). The melody is written on a single staff. The lyrics are: "Es Naht Es Naht mit mu Töer Hast sie weht". The notation includes various ornaments and slurs, and the word "Töer" is written with a tilde over the 'ö'.

Due to its great flexibility of sound, the flute is often used to imitate other orchestral instruments. An interesting example appears in the Mozart 39th Symphony, which is scored for two clarinets, but only one flute. Since clarinets were, relatively speaking, newcomers to the symphony, the flute takes a place of second interest in the wind section. Its most noticeable appearance is in the trio of the minuet, when the single flute echoes the first clarinet in direct imitation.

Symphony #39, Minuet-Trio, W.A. Mozart:

Handwritten musical notation for Mozart's "Symphony #39, Minuet-Trio". The score is in 3/4 time with a key signature of one flat (B-flat). It shows a flute part (labeled "fl.") and a clarinet part (labeled "Trio"). The flute part features a melodic line with slurs and ornaments, while the clarinet part provides a rhythmic accompaniment with repeated eighth-note patterns. The notation includes various ornaments and slurs.

The ethereal quality of the flute in its upper register is brought about by its almost complete lack of overtones. This same quality appears in string harmonics of all sorts, thereby making the flute's high register ideal for imitating harp harmonics. Berlioz was the one who used this to great advantage in the third movement of "Harold in Italy," when the Harold theme returns for the last time. The movement here is in double meter, i.e., the violas in parts are playing the little mountain tune at twice the tempo, as the harp harmonics, echoed by the flute, play the "Harold" theme.

Harold in Italy, Serenade (final Allegro), Hector Berlioz:

The image shows a handwritten musical score for flute and harp. The top system consists of three staves: Flute (treble clef), Harp (C-clef), and a third staff (likely for a second harp or piano). The flute part is marked "Allegretto. flute" and features a series of notes with stems pointing upwards, some with diamond-shaped ornaments. The harp part is marked "Harp" and features a series of notes with stems pointing downwards, some with diamond-shaped ornaments. The third staff has a series of notes with stems pointing downwards. The bottom system consists of three staves, with the top staff having a treble clef and the other two having C-clefs. The top staff has a series of notes with stems pointing upwards, some with diamond-shaped ornaments. The middle staff has a series of notes with stems pointing downwards, some with diamond-shaped ornaments. The bottom staff has a series of notes with stems pointing downwards. The score is written in ink on aged paper.

The flute, in its low register, produces a dark, almost thick sound, when played forte. This is the only instance where any appreciable amount of harmonics is produced. Gabriel Faure has chosen this register to echo the horn in direct imitation in the suite from the incidental music to "Pelleas et Me'lisande." When Golaud, brother of Pelleas, walks into the woods, he hears the sound of the forest: a horn call and an echo. Another call and his attention is directed to a spring where stands Me'lisande. His feeling is portrayed then, as the flute leaves the note of echo and, in a rising arpeggio, joins with the horn in a shimmering chord.

Pelleas et Me'lisande, 1st Mov., Gabriel Faure:

Handwritten musical score for Flute, Horn, and Arpa. The score is written on four staves. The top staff is labeled "Flute" and the second staff is labeled "Horn". The bottom staff is labeled "Arpa". The music shows a horn call followed by a flute echo. The flute part includes a rising arpeggio. A bracket indicates a 2-measure rest for the horn and flute parts.

ex. cont'd next page -

D. Of the human voice

The first record of the flute accompanying the human voice is found in the Egyptian civilization. Throughout the ages, we have graphic accounts in wall paintings etc. of the lyre and flute being played with or as accompaniment to the human voice. The qualities of purity, agility and delicateness, make this instrument a natural one for this purpose. The timbre of the soprano closely parallels that of the flute, thereby giving great flexibility to the composer for writing extremely florid passages in unison and thirds, sometimes over more than two octaves.

Perhaps the most well known is the obligato in the "Mad Scene" from "Lucia" by Donzetti, while perhaps not so well known, but much more imitative of the human voice, is the example by Bishop, "Pretty Mocking Bird."

Pretty Mocking Bird, Cadenza, Bishop:

Fitzgibbon⁵, in his books on the flute, mentions the first American flutist to make a great reputation for himself as an accompanist to sopranos. He was John Kyle (1810 - 1870), the son of an English bassoon player and solo flute in the New York Opera Co. and the New York Philharmonic. Kyle accompanied Jenny Lind and Catherine Hayes in their tours through America. He is said to have "played obligatos to the voice, so skillfully, that it was well nigh impossible to tell which was the voice and which was the flute." This is certainly a tribute to any flutist's imitation of the most perfect of instruments.

A popular example of the Grand Opera, and one which has recently been brought to the foreground again by Roberta Peters⁶, via television, is the "Shadow Song" from Meyerbeer's long-forgotten opera "Dianora."
Shadow Song, (from Dianora), Meyerbeer: (see p. 82-a)

⁵Fitzgibbon, Ibid., p. 41.

⁶Roberta Peters - Soprano, the Metropolitan Opera Co.

Shadow Song, (from Dianora), Meyerbeer:

Cadenza. as sung by Galli-Curci

The image shows a handwritten musical score for a cadenza. It consists of several staves. The top staff is labeled 'Voice' and contains a melodic line with some notes and rests. The second staff is labeled 'flute' and contains a series of notes, some with '+' signs above them, indicating fingerings. Below these are two systems of piano accompaniment. The first system has two staves, and the second system also has two staves. The piano part features complex rhythmic patterns and many notes, some with '+' signs. Vertical dashed lines divide the music into measures. The handwriting is in black ink on aged paper.

Chapter Four

The Flute As Subject of Imitation

A. By the String Family

The popularity of the flute timbre with composers is evident in the many instances of its imitation by other instruments. String imitation of the flute almost always include the term flageolet,¹ with the written notes, and "Flageolet tones"² has labeled the earliest use of the stringed instruments, harmonics. In his "Violinschule" of 1756, Leopold Mozart makes a very definite point of avoiding accidental harmonics or their use as a technical device, in a footnote:

"He who wishes to make a flageolet (tone) heard on violin, will do well to write his own concerto or solo thereon, and not mix them with the natural violin tone."³

¹Flageolet - High-pitched, narrow-bore, fipple type, end-blown flute. Explained in full in Ch.2.

²Flageolet tone - French and German term for harmonic notes, doubtless so-called because in quality they resemble the sound of the flageolet.(Grove's Dictionary of Music)

³A treatise on the fundamental principles of Violin playing. Leopold Mozart, 1756, J.J.Lotter, Augsburg. Present edition, translation by Editha Knocker with preface by Dr. Albert Einstein. 1948, Oxford Univ. Press; London, New York, Toronto.

Hence, the flageolet tones, or harmonics as they are known today, are clearly a direct imitation of the flute. The comparison of the two is doubtlessly taken from the lack of overtones present in both the high-pitched sound of the flageolet, and from the ethereal and fragile purity of the string harmonics. The relation of the two is pointed out in Wagner's scoring of "Prelude to Lohengrin." Here the flutes sound just before the string harmonics. Prelude to Lohengrin, (Introduction), Richard Wagner:

Handwritten musical score for the Prelude to Lohengrin, Introduction, by Richard Wagner. The score is written on six staves. The top staff is for 3 flutes (3 fl.), the second for 2 oboes (2 ob.), the third for 4 solo violins (4 Solo Vlns.), the fourth for 2 flageolets (Flageolet), the fifth for 3 flageolets (Flageolet), and the sixth for 3 flageolets (Flageolet). The music is in G major and 3/4 time. The first staff shows the flute parts with various notes and rests. The second staff shows the oboe parts. The third staff shows the solo violin parts. The fourth, fifth, and sixth staves show the flageolet parts, which are primarily sustained notes with some rhythmic markings. The score is handwritten and includes various performance markings such as dynamics and articulation.

Harp harmonics are also marked "flageolet," to indicate the composer's intention. Berlioz, in "Romeo and Juliet," writes a harp passage with just such a marking.

Romeo and Juliet, Hector Berlioz:

The image shows a handwritten musical score for a passage from "Romeo and Juliet" by Hector Berlioz. The score is arranged in four systems, each with two staves. The instruments are labeled as follows:

- System 1:** Flute (top staff) and English Horn (bottom staff). The Flute part features a melodic line with slurs and accents. The English Horn part has a similar melodic line.
- System 2:** Harp I (top staff) and Harp II (bottom staff). Both harp parts are marked with "flageoletton" above the first measure of the system. The notation consists of rests in the first measure, followed by a single note in the second measure, and then rests for the remainder of the system.

The notation is handwritten and includes various musical symbols such as slurs, accents, and rests. The overall style is that of a working draft or a personal manuscript.

Another example of string terminology derived from flute imitation, is the bowing technique, "flautando,"⁴ which produces an eerie, light-colored sound, highly imitative of a flute. This is produced on the violin by bowing lightly enough to permit only a minimum amount of bow hair to connect with the string, thereby reducing the complexity of the tone.

Flautando Bowing --- also marked *sul tastiera*, and in the French, *sur la touche*, is found throughout the string family. Although most common to the violin repertoire, it has been used especially by the impressionists for effects in the lower strings. Ravel's "Rhapsody Espagnole" contains this bowing, used to great effect. (see page 87)

⁴Flautando - (Italian for fluting) Flute-like, brittle tone produced by drawing the bow lightly over the strings, near the bridge.

Rhapsody Espagnol, IV Feria, Maurice Ravel:

Handwritten musical score for Rhapsody Espagnol, IV Feria, Maurice Ravel. The score is for Cello and Contrabass (CB) and includes performance instructions like "Sur la Touche" and "en se perdant".

2 Solo Cello

Sur la Touche

Cello Sur la Touche.

1st Solo CB

2-3 1st Solo CB

Sur la Touche

CB. Sur la Touche.

en se perdant

B. By the Keyboard Instruments

Flute imitation among the keyboard instruments is restricted to the flageolet or harmonic effect except in the case of the organ, where any number of solo and group effects called flute stops⁵ are available. It must be

⁵Flute stops - one of three general classes of tone quality on the organ.

made clear that the title flute on an organ stop does not necessarily mean that it sound like, or imitates, a flute to any extent. This is in general, a category or type of pipe which is made in all lengths.⁶

Piano harmonics are a rather popular effect of the 20th century. These are produced by pressing down the keys without sounding the actual notes,⁷ the strings vibrating sympathetically. Morton Gould, in his "Latin American Symphonette" used this very effectively, and in an earlier example, Arnold Schonberg's "Pierrot Lunaire" used this device three times. (see page 89)

⁶Flute pipes are pipes in which the edge tones, formed at a wooden or metal lip by eddies, in a sheet of wind issuing from a flue, are reinforced by resonance of a column of air enclosed by the body of the pipe and by forced vibrations in the wooden or metal substance of the pipe. Flute tone can be produced by both open and closed type flue pipes. The combination of pipes may form harmonics which serve as fundamental of a new tone. Flute stops are marked "flageolet stops," "Flautino," "Flauto," "Flute 2," Pavillion, etc.

⁷Thesaurus of Orchestral Devices - Gardner Reade; 1953; Putnam Publishing Co.; New York, Toronto, London.

Pierrot Lunaire, (Der Dandy), Arnold Schoenberg:

Handwritten musical score for Pierrot Lunaire, (Der Dandy) by Arnold Schoenberg. The score is written on five staves. The top staff is labeled "Pic" and contains a series of rests. The second staff is labeled "Klar." and contains a series of rests. The third staff is labeled "Resistive" and contains a series of notes with various markings. The fourth staff is labeled "Klar." and contains a series of notes with various markings, including "Flageolet", "Tastlos wiederdrücken.", and "flage.". The bottom staff contains a series of notes with various markings.

While the "flute stops", as such, fail in many cases to produce a pure flute imitation, the combinations of certain of the higher and lighter pipes of the flue type can be remarkable authentic.

As early as the 18th century, the French composer Louis Claude D'Aquin (1694 - 1722) wrote in his "Livre

de Noels," a piece "Noel sur les flutes," to be played only with flute pipes and obviously meant to be an imitation of the flute.

Noel Sur Les Flutes, Louis Claude d'Aquin:

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