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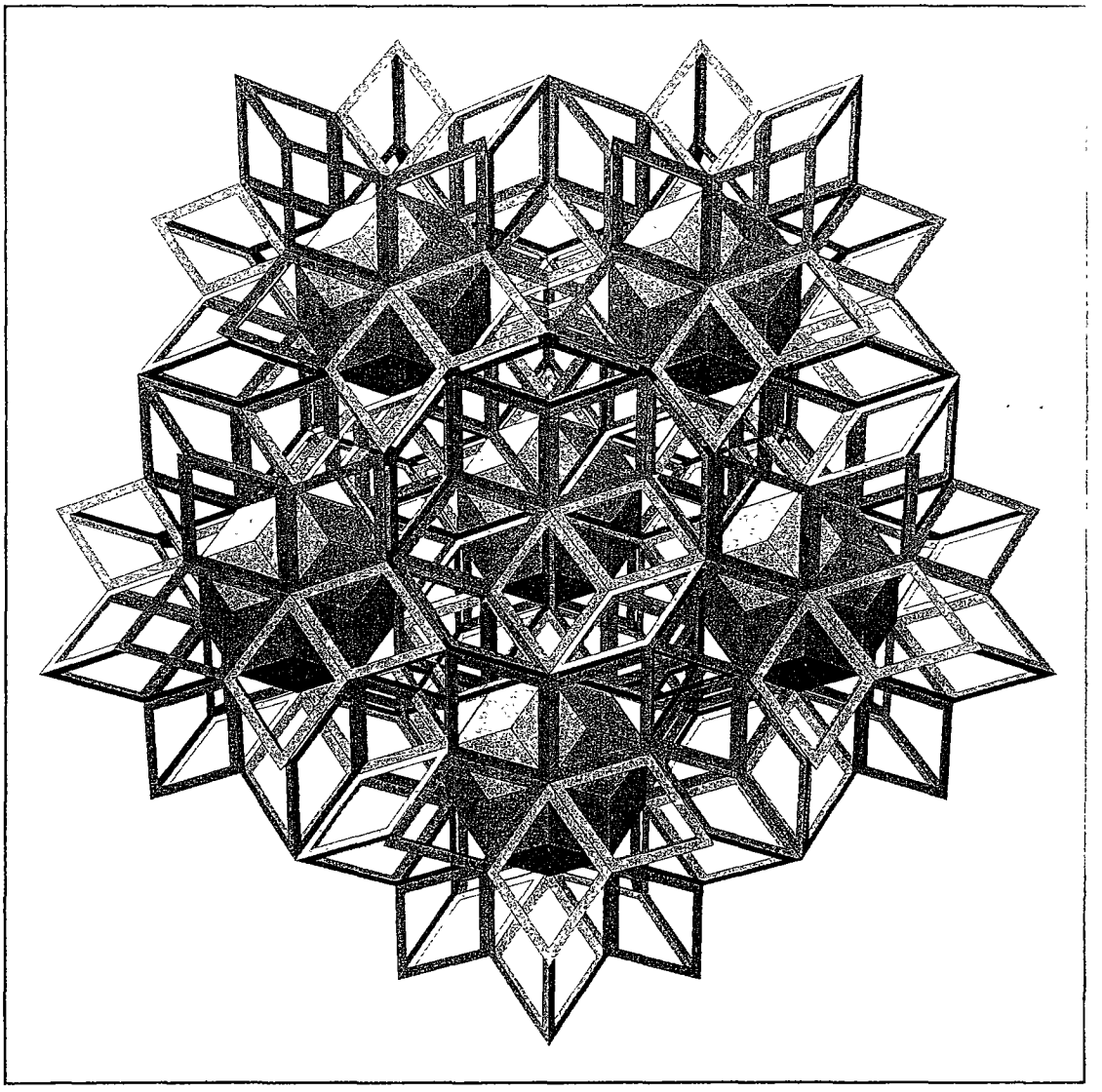

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SYMMETRY IN MUSIC AS A STYLISTIC INDEX FOR THE TRANSITION FROM THE MIDDLE AGES TO THE RENAISSANCE

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Music exists in an anisotropic three-dimensional space whose independent variables are *time, pitch* and *polyphony.* Figure 1 shows part of a score of a chanson by the 15th-century Netherlandic composer Jacob Obrecht, which is a projection of this three-dimensional space onto two dimensions; time runs from left to right, but pitch and polyphony are both projected vertically. Polyphony, the coexistence of several *parts* or *voices,* is indicated on the various staffs, the horizontal barlines in the score. Actually, the different staffs should be projected into a third dimension, perpendicular to the sheet of music, more or less as shown in Figure 2.

Figure 3 shows the three-dimensional music space: the different parts, here called *soprano, alto, tenor* and *bass,* are stacked perpendicular to the polyphony axis. Generally *symmetry* is the imitation of a motiv, theme or module in a pattern. In the three-dimensional music space symmetry may occur as follows:

Any one voice may imitate a given pattern, either at the same pitch, or at higher or lower pitch. In the first case we have translational symmetry along the time axis, in the second and third cases translational symmetry in the time-pitch plane.

Any one voice or part may imitate a theme with all intervals reflected in the time axis, in other words *upside down.* The symmetry in such a case would be *glide-reflection symmetry.* The motiv or theme might be imitated backwards in time; in this case the symmetry of the musical pattern would be that of *reflection in the pitch axis.* Finally, the theme may be imitated backwards as well as upside down, in which case the symmetry is two-fold rotational: the pattern would be invariant to a 180° rotation. These symmetries are shown schematically in Figure 4, with the notes designated by white rectangles.

J'ay pris amours

Jacob Obrecht

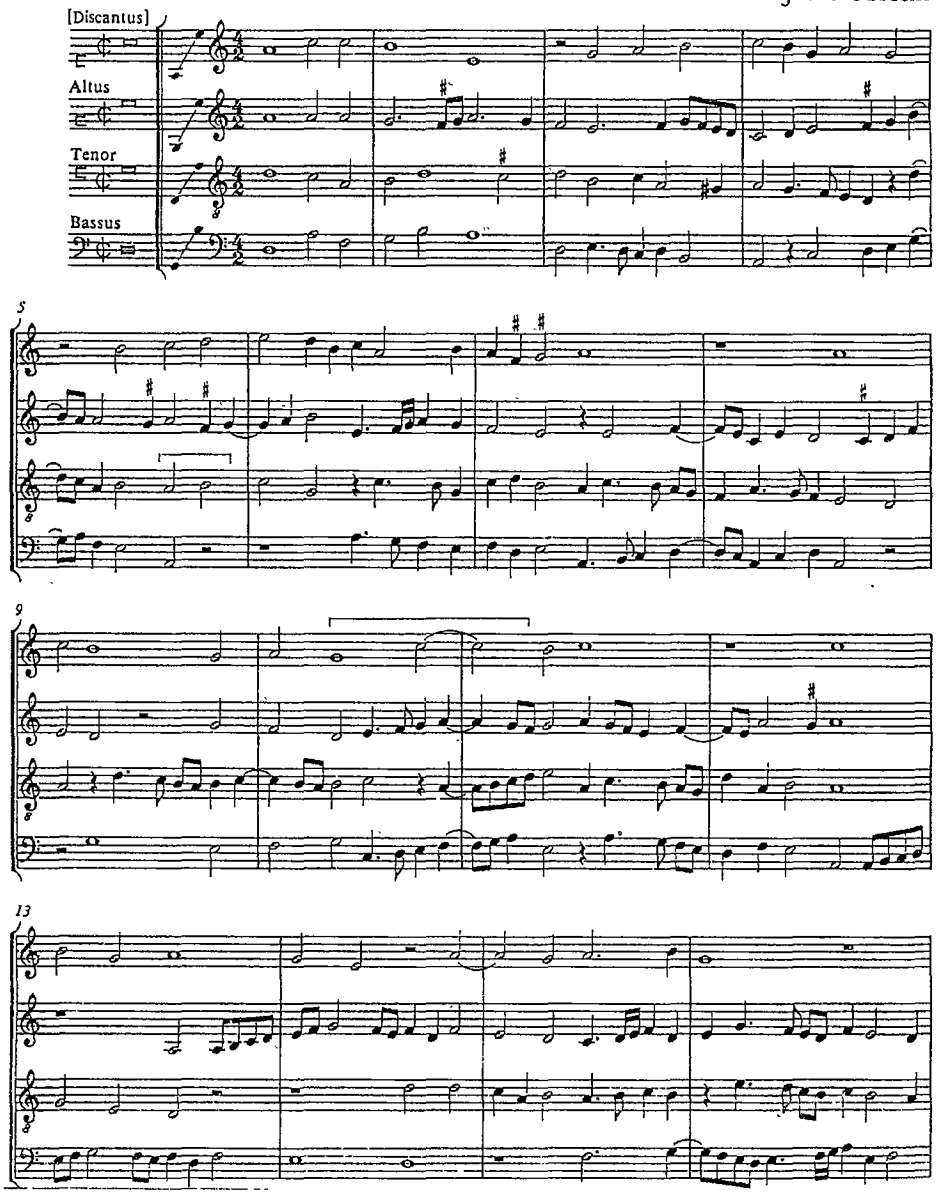



Figure 1

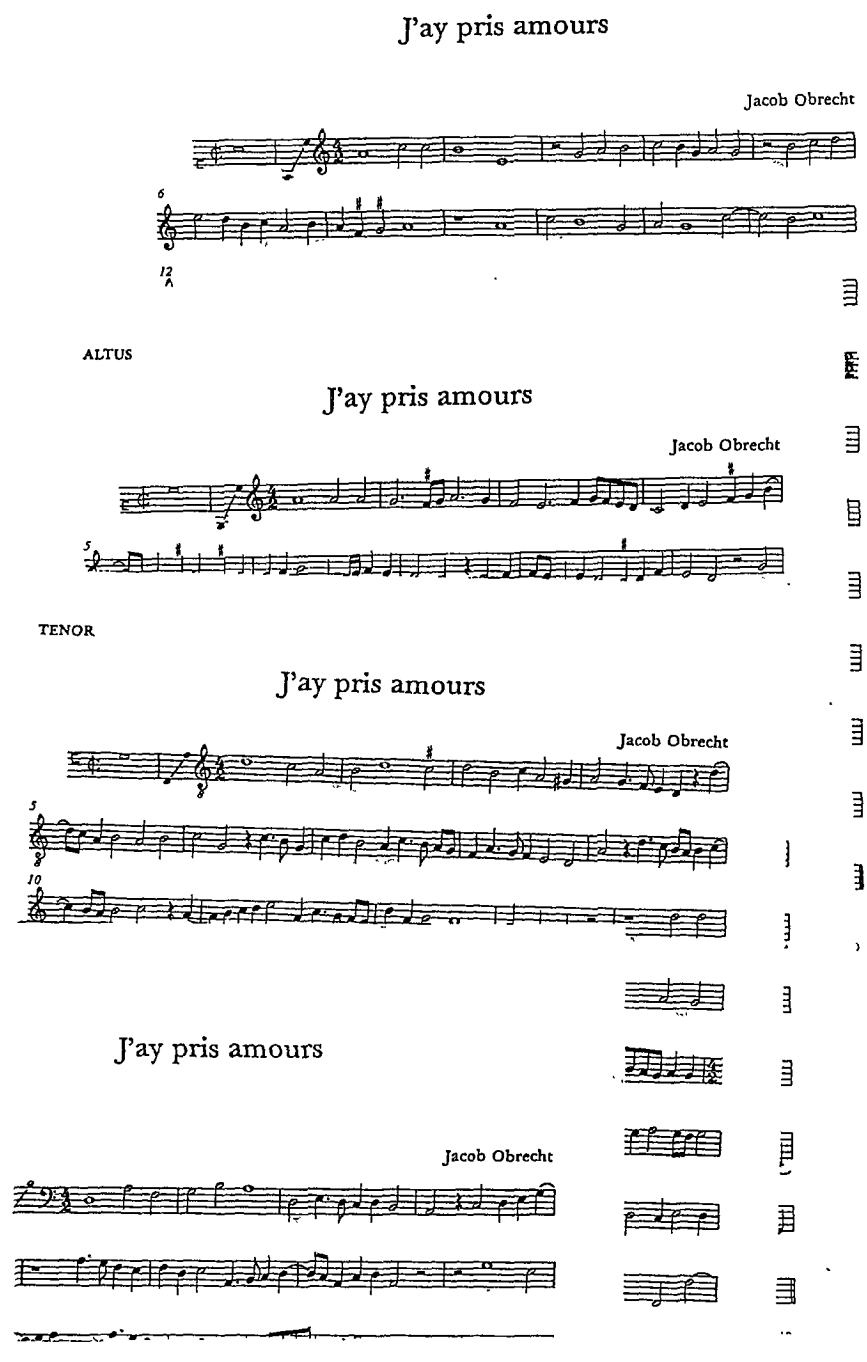

J'ay pris amours
Jacob Obrecht
ALTUS
J'ay pris amours
Jacob Obrecht
TENOR
J'ay pris amours
Jacob Obrecht
J'ay pris amours
Jacob Obrecht

Figure 2

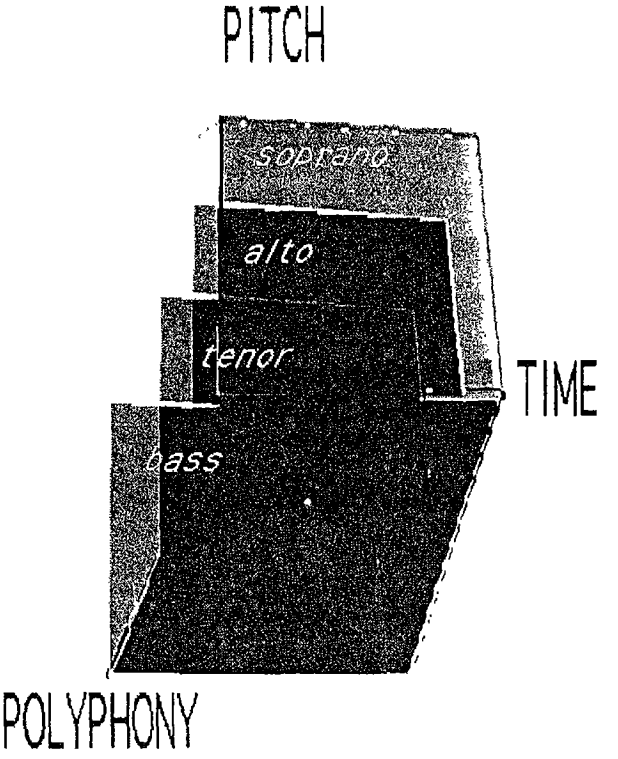


Figure 3

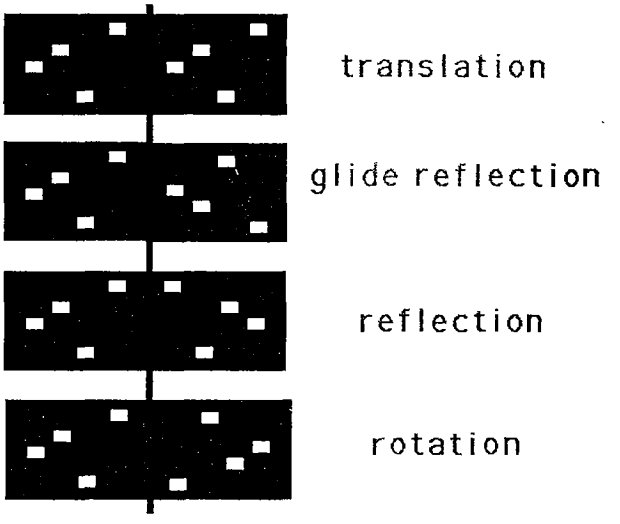


Figure 4

The theme may also be imitated among different parts or voices: the symmetry then has a component along the *polyphony*-axis. Figure 5 shows the Polyphony-Time plane. *Counterpoint* describes the sequence in which the different parts imitate the theme(s); the relation between pitches in different parts at any given time is called *harmony.* The use of symmetric imitation in different parts or voices gives rise to musical forms such as the *canon, ricercar* and *fugue.* Although Johann Sebastian Bach's *Kunst der Fuge* and the canons in his *Musikalisches Opfer* represent a culmination of the use of the symmetries illustrated in Figure 4, the historical origin of the use of these symmetries lies in the early renaissance in the northern part of the medieval Burgundian realm. This is not the place for an exhaustive enumeration of all possible symmetry patterns in the three-dimensional music space; rather we shall focus on the historical development of polyphonic music, and the stylistic parameters which characterize the Renaissance.

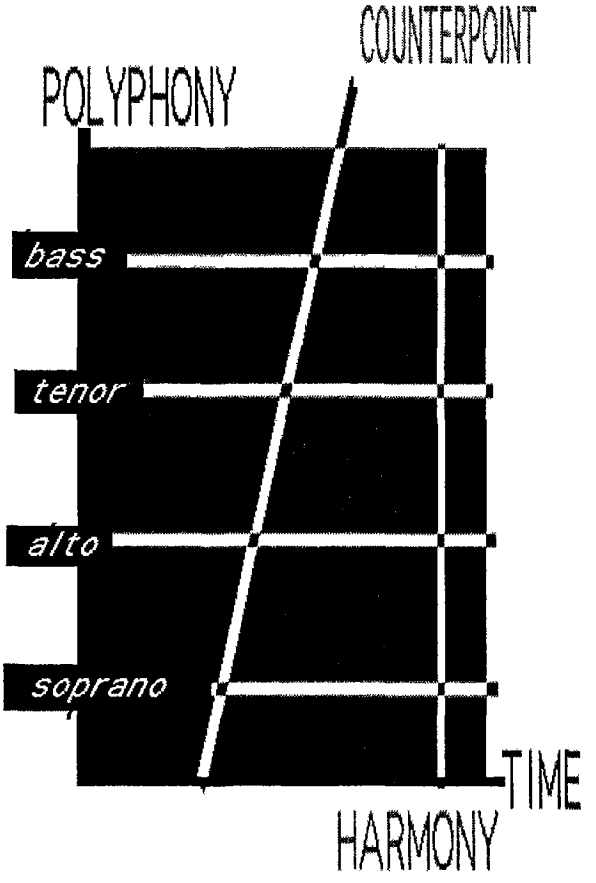


Figure 5

Polyphony, the simultaneous sounding of different voices, developed only gradually. Monophonic chant existed in the synagogue before Christ, and developed in the Catholic liturgy into Ambrosian and Gregorian Chant. To the *Cantus* was added a *Discantus*; the two parts could be very similar (Figure 6) but in most medieval music a traditional melody was sustained in long notes, with two or three freely ornamented parts added (Figure 7). The sustained part, called the *tenor*, was rarely the highest in pitch: there were usually one or two higher parts, called either *discant* or *duplum* and *triplum,* or a lower one, the *bassus*.

The *Caccia* in 14th-century Italy was highly symmetrical: two upper parts moved in strict canon over a sustained line. By the second half of the 15th century, the *Caccia* had become obsolete, however, and is therefore no longer relevant to the transition from Middle Ages to Renaissance.

The famous chanson *De Plus en Plus* by Gilles Binchois, born in Mons in 1400, illustrated in Figure 8, demonstrates the typical unsymmetrical medieval structure, in which each part reveals its own individual history, and the parts do not share thematic material.

Along the time axis, this chanson is highly structured, being a *rondeau*, the most complex of the medieval *formes fixes* or poetic forms. The *music* is in two sections, which we shall denote by lower case *a* and *b*. The *text* uses four different modules, denoted by upper case *A, B, C* and *D*; the repeat pattern of each is shown in Figure 9. Both text and music sequence are highly unsymmetrical. It would go too far here to go beyond a mere hint that medieval architecture, too favored unsymmetrical forms. By contrast, Figure 10 shows a chanson, *Files à marier,* unusual for Binchois. It is not in any of the *formes fixes*, and it is in *four* parts. The tenor is a popular song, *Se tu t'en marias,* but when the composer adds a fourth part, instead of using new thematic material, he writes a *canon*, somewhat reminiscent of the ancient *Caccia*: the two top parts are related by translational symmetry!

Antoine Busnois, born a generation later than Binchois in Busne, French Flanders in 1430, wrote two versions of the chanson *Ha que ville et abominable*, whose title is a pun on the name of its dedicatee, Jacqueline d'Hacqueville. Whereas the first version is a straightforward *Rondeau*, the second, shown in Figure 11, attempts to be a *Rondeau* as well as a Canon. However, in the *b* music the top part goes its own way, and if the chanson is to use the *Rondeau* sequence, the canon is effectually ruined. Frequently, music was to be sung *or* played, and the canonic effect may have been intended for an instrumental version played straight through. This example illustrates the difficulty in combining the highly unsymmetrical *formes fixes* with the symmetrical canon form.

A *solis ortus cardine* (three-voice conductus cum cauda)

Florence, Bibl. Laur., Pluteus 29.1 (F), fols. 242'–43'.

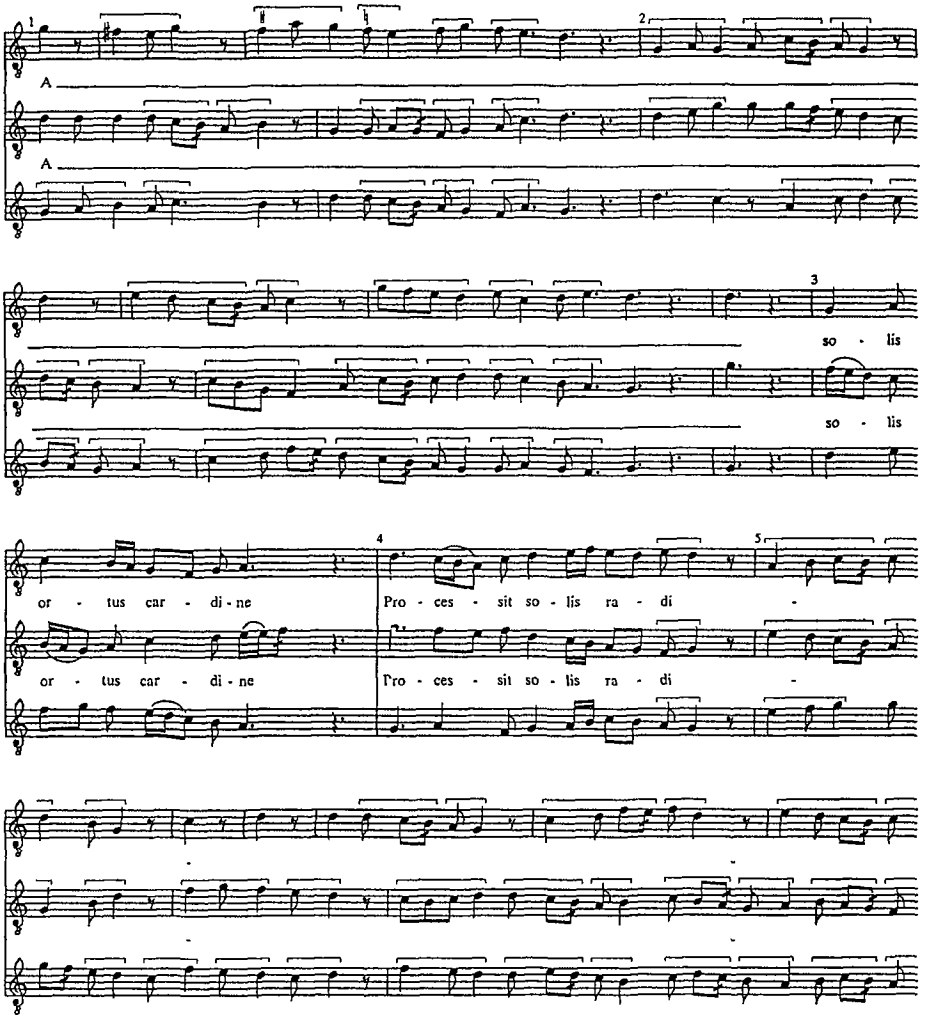



Figure 6

Perotin, *Alleluia: Posui adiutorium*

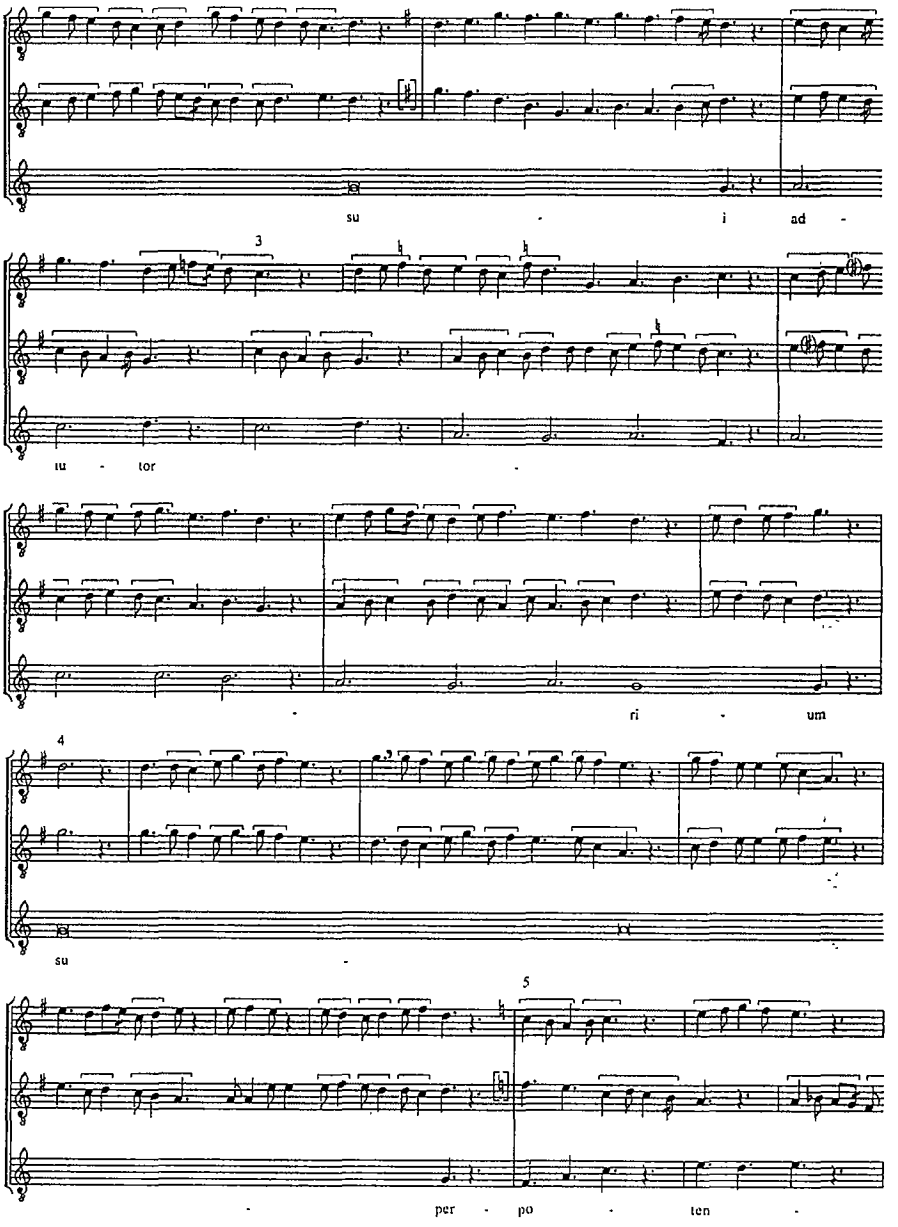



Figure 7

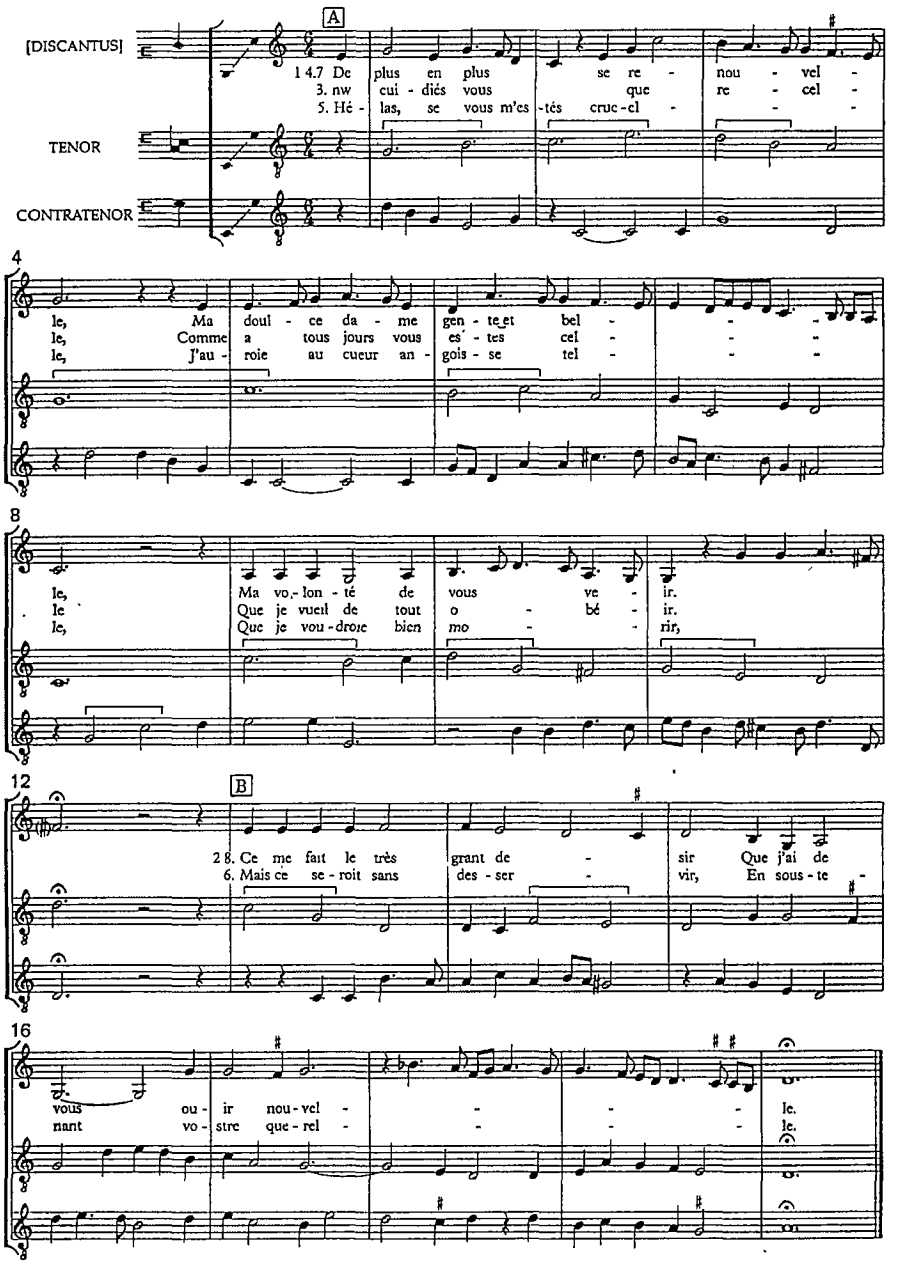
De plus en plus

[DISCANTUS]
TENOR
CONTRATENOR
A
1 4.7 De plus en plus se re - nou - vel -
3. nw cui - diés vous que re - cel -
5. Hé - las, se vous m'es -tés cruc - el -
4
le, Ma doul - ce da - me gen - te et bel -
le, Comme a tous jours vous es' - tes cel -
le, J'au - roie au cueur an - gois - se tel -
8
le, Ma vo - lon - té de vous ve - ir.
le Que je vueil de tout o - bé - ir.
le, Que je vou - droie bien mo - rir,
12
B
2 8. Ce me fait le très grant de - sir Que j'ai de
6. Mais ce se - roit sans des - ser - vir, En sous - te -
16
vous ou - ir nou - vel - le.
nant vo - stre que - rel - le.

Figure 8

TEXT : A B C A D B A B
MUSIC: a b a a a b a b

FORME FIXE: RONDEAU

Figure 9

Gilles Binchois, 8 chansons

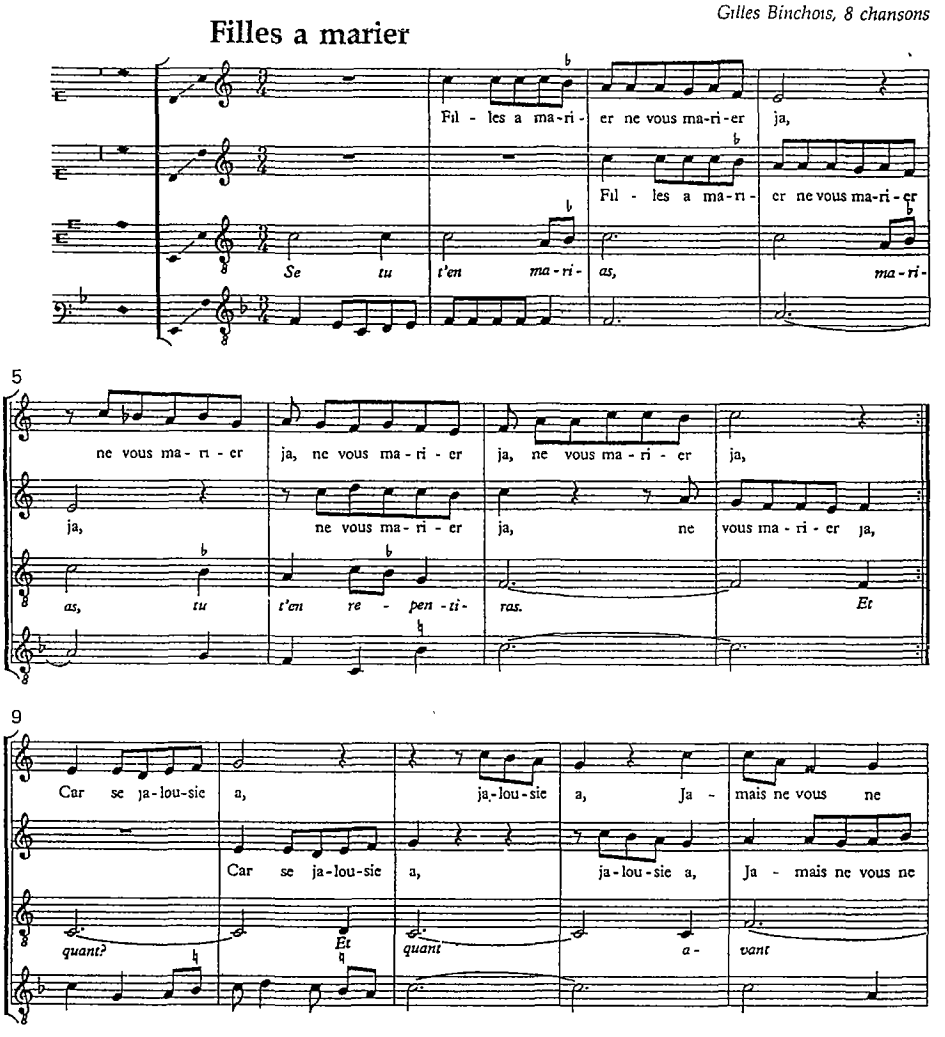



Figure 10

Antoine Busnois, 5 Songs a 3

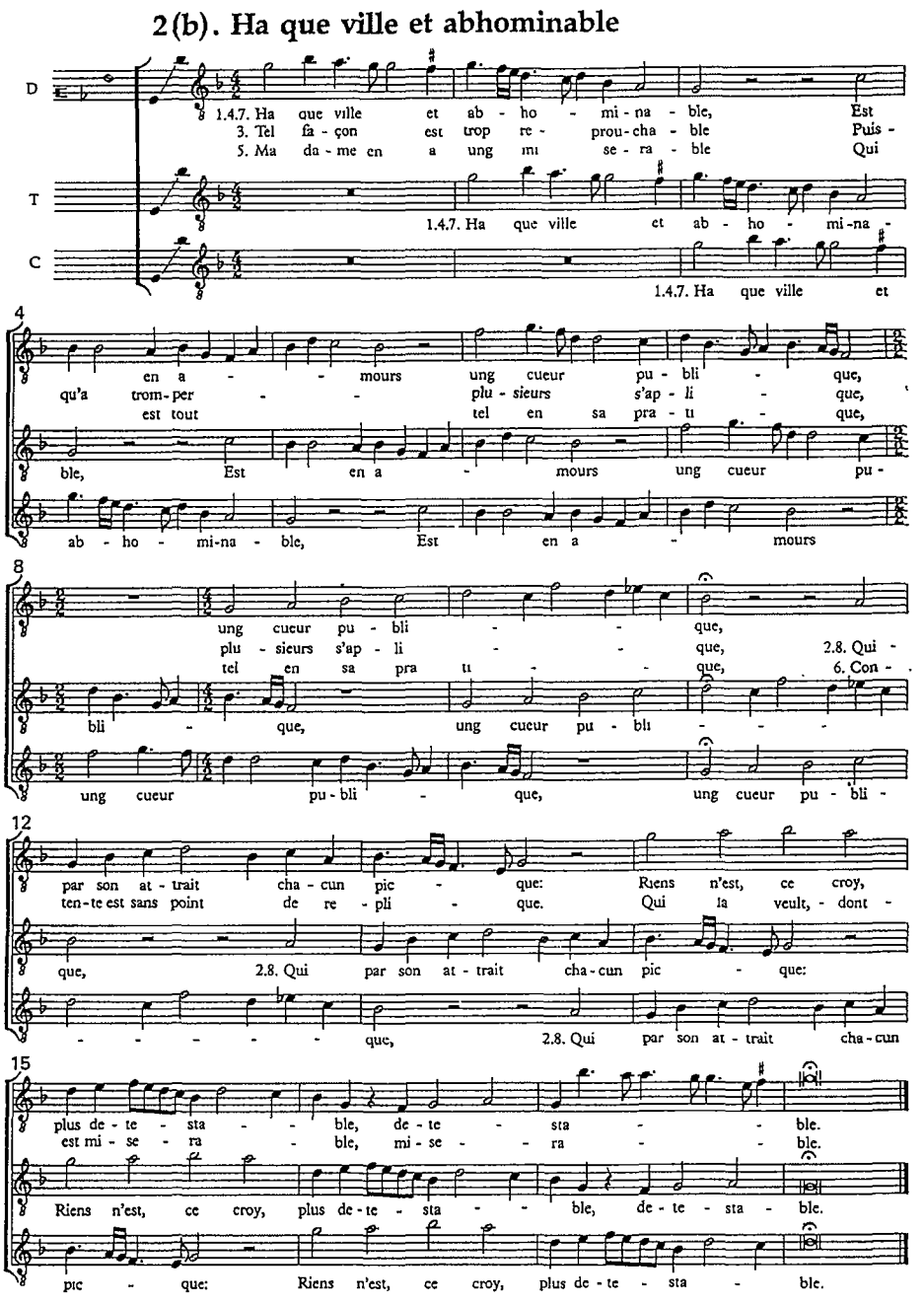



Figure 11

Although music in many more than three voices was not uncommon, the texture of a tenor on a well-known theme with two more florid, thematically independent, parts does characterize the High Middle Ages. Binchois's *Filles à Marier* points the way to a four-part texture in which some or all voices are thematically related. As the number of parts increases, keeping the voices thematically distinct becomes more problematical. The transition from Middle Ages to Renaissance is in any case aesthetically characterized by a change from a heterogeneous to a more homogeneous, harmonious texture.

Margaret of Austria's favorite composer, Pierre de la Rue, born only thirty years after Busnois, wrote in a typically early renaissance style (Figure 12). The chanson *Mijn hert altijd heeft verlangen* starts canonically with the *altus* and *bassus*. This beginning is deceptive, however, for when the *tenor* enters, it alone continues the original chanson in the medieval tradition, while the other three parts, once the tenor has taken hold of the original melody, perform elaborations and variations based on the traditional melody. These *tenor songs* with their deceptive canonic pre-imitation and retention of the cantus, became a very common form characteristic of the early renaissance.

The great Josquin des Prés, who was born in the middle of the 15th century and died in 1521, went further, as seen in his chanson *Baisés moy* , a double canon. (Figure 13) Here both the tenor and the bass carry the melody in strict canon, whereas the top two parts, also canonically, ornament the melody. Around measure 10 it appears for a moment that all four parts will enter in canon, but the top entrances are again deceptive, for soon they are off on their own. Since there are two separate but simultaneous canons, this example is called a *double canon.*

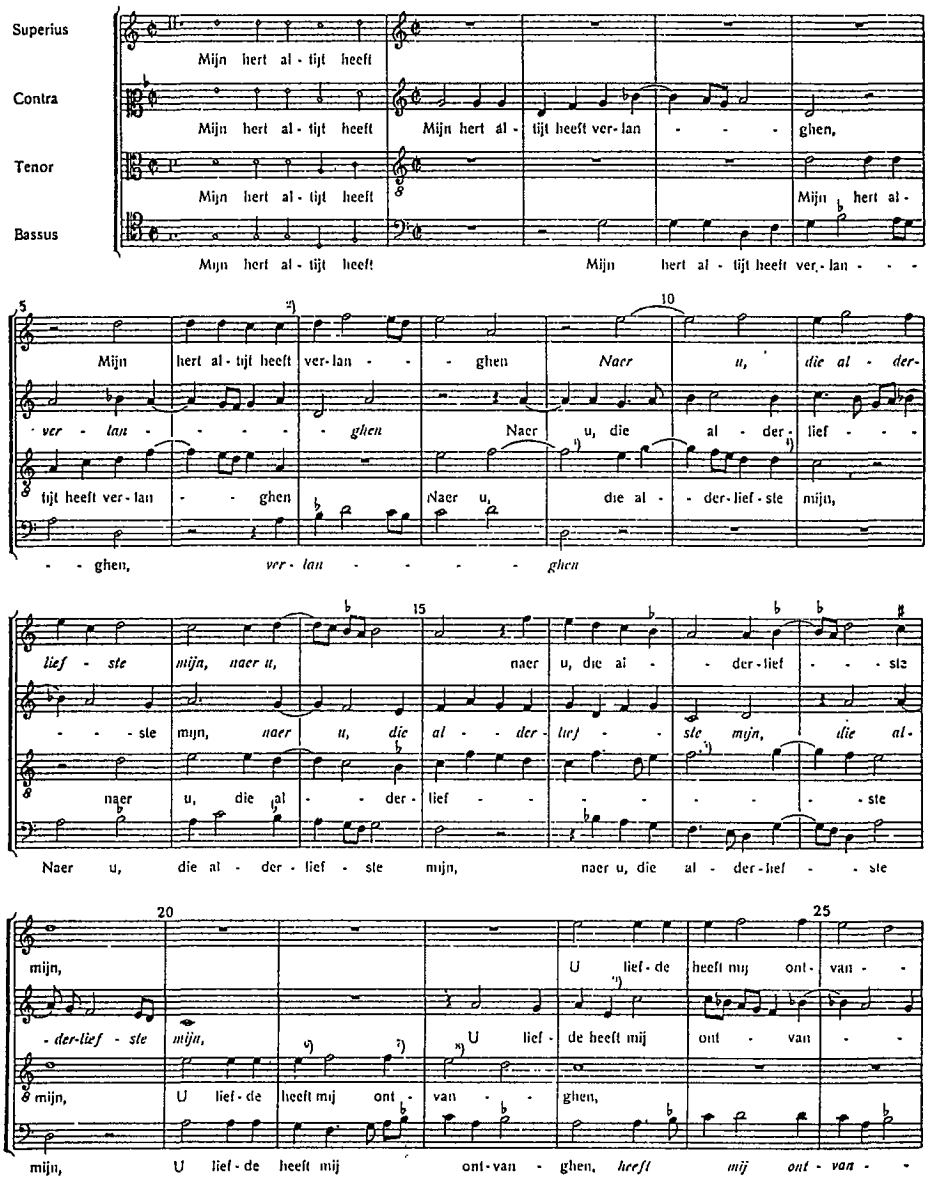
Note that in each of the two canons the two partners enter and remain a fourth apart. *Alto*, or more properly counter tenor, and bass voices are an octave apart, as are *soprano* and *tenor*. As the thematic material in the different parts became less diverse, the desire was to have similar instrumentation or voices in each of the parts. Families of wind and string instruments developed, each family having members of three or four different sizes, hence ranges. Sopranos and altos, and equally tenors and basses tend to be about a fourth or a fifth apart, and therefore will pair off in canons at the fourth and fifth rather than the unison or octave. Note that in *Baisés moy* the soprano and tenor have a flat in their key signature, the alto and bass do not.

Adriaan Willaert lived from 1485 to 1562, and studied with Josquin's student Jean Mouton. In his *Inter natos* (Figure 14) also a double canon, the two inner parts combine into one canon, the two outer voices into a second one. Whereas the two outer voices are an octave apart, Willaert attempts a canon for the two inner parts a minor third apart.

38 Pierre de la Rue

(± 1460-1518)

MIJN HERT ALTIJT HEEFT VERLANGHEN[1]



[1]In partituur gebracht volgens Brussel, Koninklijke Bibliotheek, Ms. 228, fol. 16v - 17r Anoniem.
[2]In plaats van semibrevis c. [3]Niet gebonden [4]In plaats van semibrevis d [5]Semibrevis f, gevolgd door minima e.
[6]20_4 - 21_1: gebonden. [7]Minima f, gevolgd door semibrevis f. [8]In plaats van 2 minimae e. [9]In plaats van minima f.

Figure 12

2. BAISES MOY

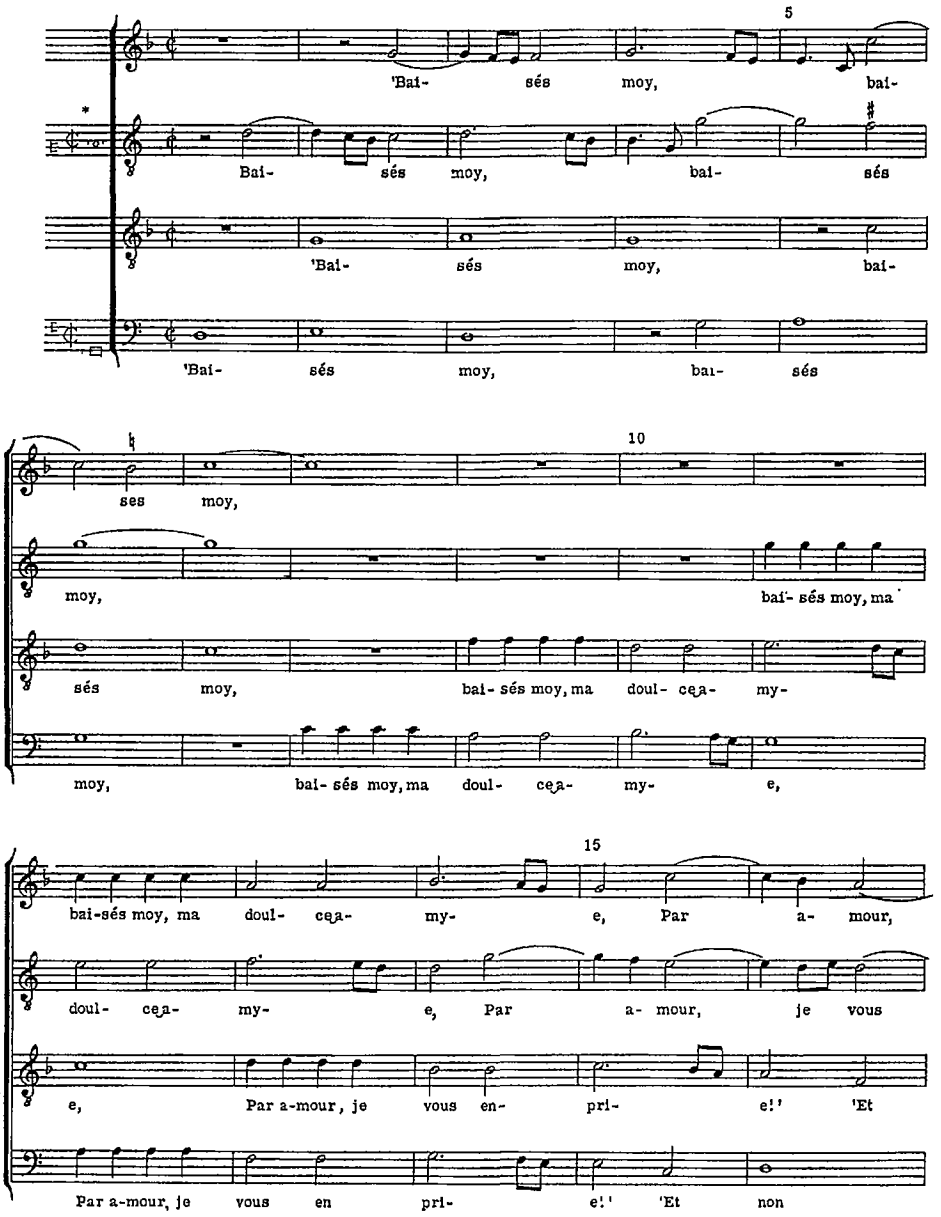



Figure 13

1. Inter natos

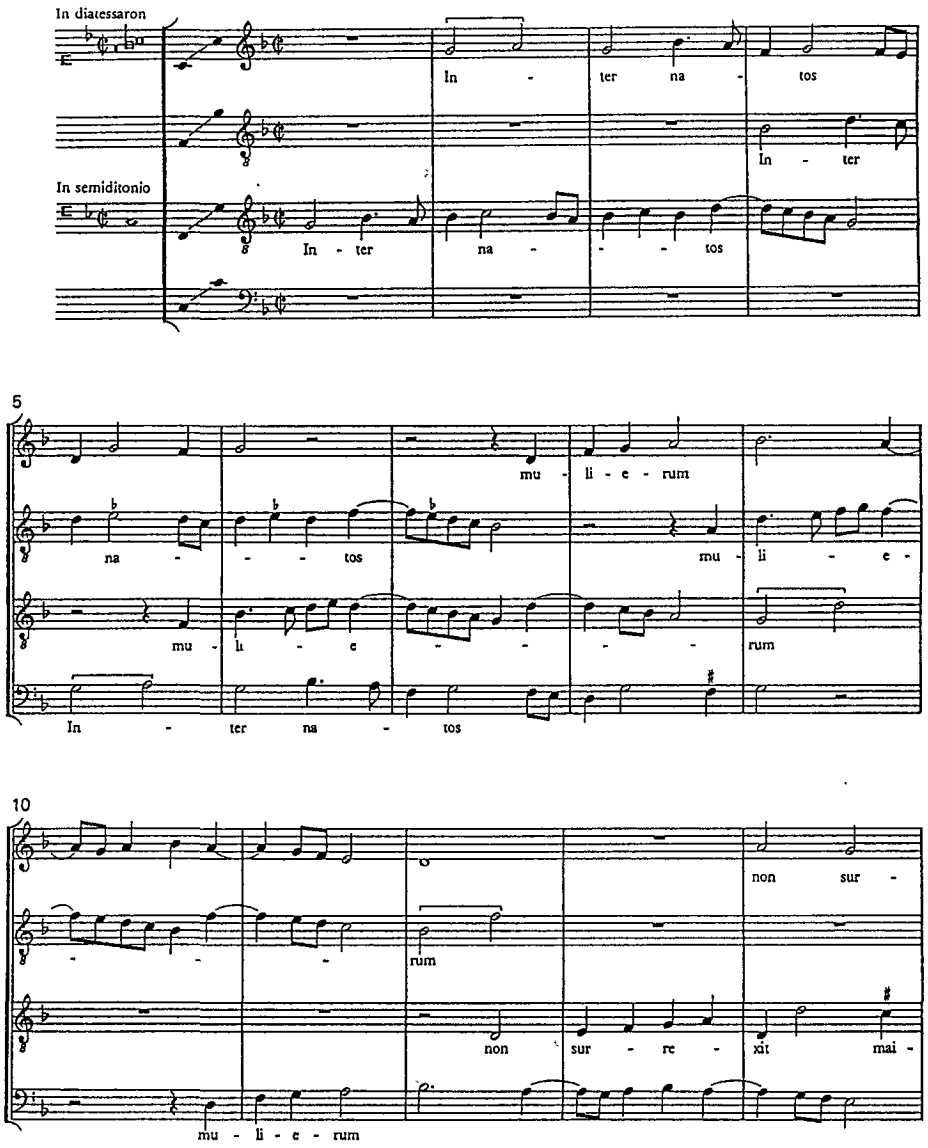



Figure 14

However, he runs into a problem here, which we can understand by considering Figure 15, *the circle of fifths* or *quintencirkel,* which shows the key relationships between the different scales. The scale of what we presently call *C major* has no sharps or flats; neither has the scale of *a minor*. Note that *a* is ninety degrees to the right of *C*. Every time we move one place (30°) clockwise, we add a sharp or remove a flat from the key signature. Analogously, a counterclockwise move removes a sharp or adds a flat to the key signature.

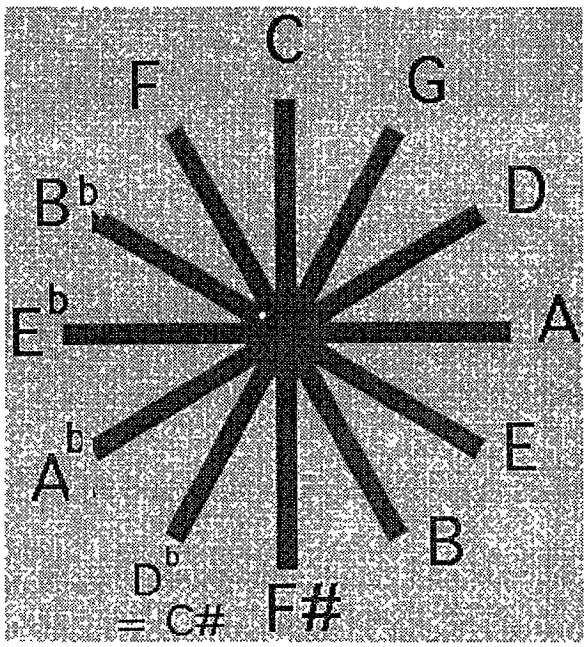


Figure 15: Quint Circle (Circle of Fifths)

Note that adjacent positions in the circle of fifths are a fourth or a fifth apart. In the Middle Ages the intervals of a fourth and fifth as well as the octave were considered consonant, but the third was still a dissonant. In a canon at the fourth or fifth the key signatures of the parts differ by only one sharp or flat. Returning to Willaert's *Inter Natos*, (Figure 14) we note that the middle two parts start respectively on *g* and *b flat*, a minor third apart. Note, however, that the tenor starts with a minor third upward (*g* to *b flat*), whereas the alto starts with a major third (*b flat* to *d*). In point of fact, the inner parts are actually related by something akin to color translation symmetry: the translation transposes the parts from what is presently called the minor mode to the major one. In the circle of fifths, *g minor* and *B flat major* are just 90° apart, and have the same key signature!

47 Josquin des Prez

(± 1450-1521)

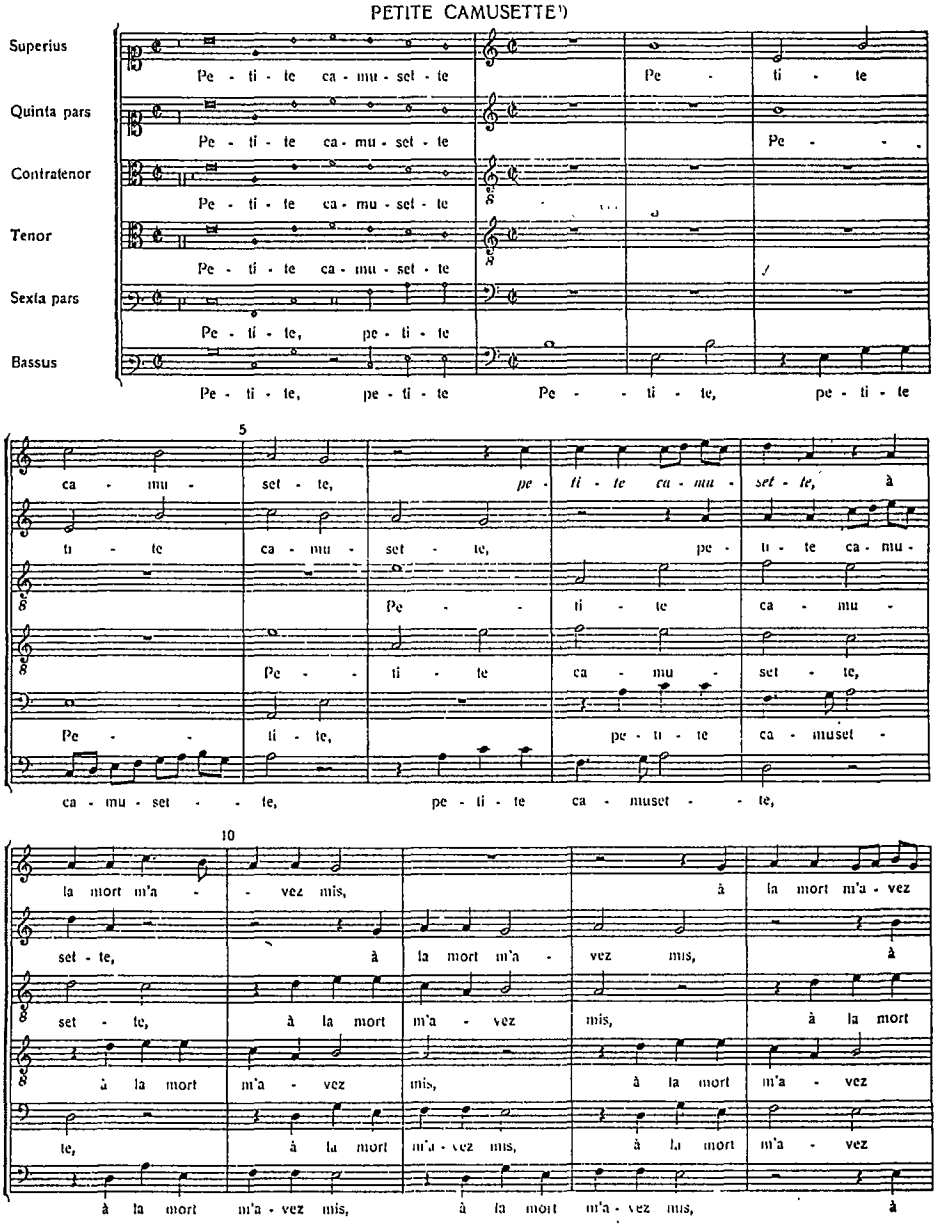
PETITE CAMUSETTE[1])

[1]) Overgenomen uit de Werken van Josquin des Près, vijfde aflevering, blz. 43 - 44.

Figure 16

2. Mir ist ein rot Goldfingerlein

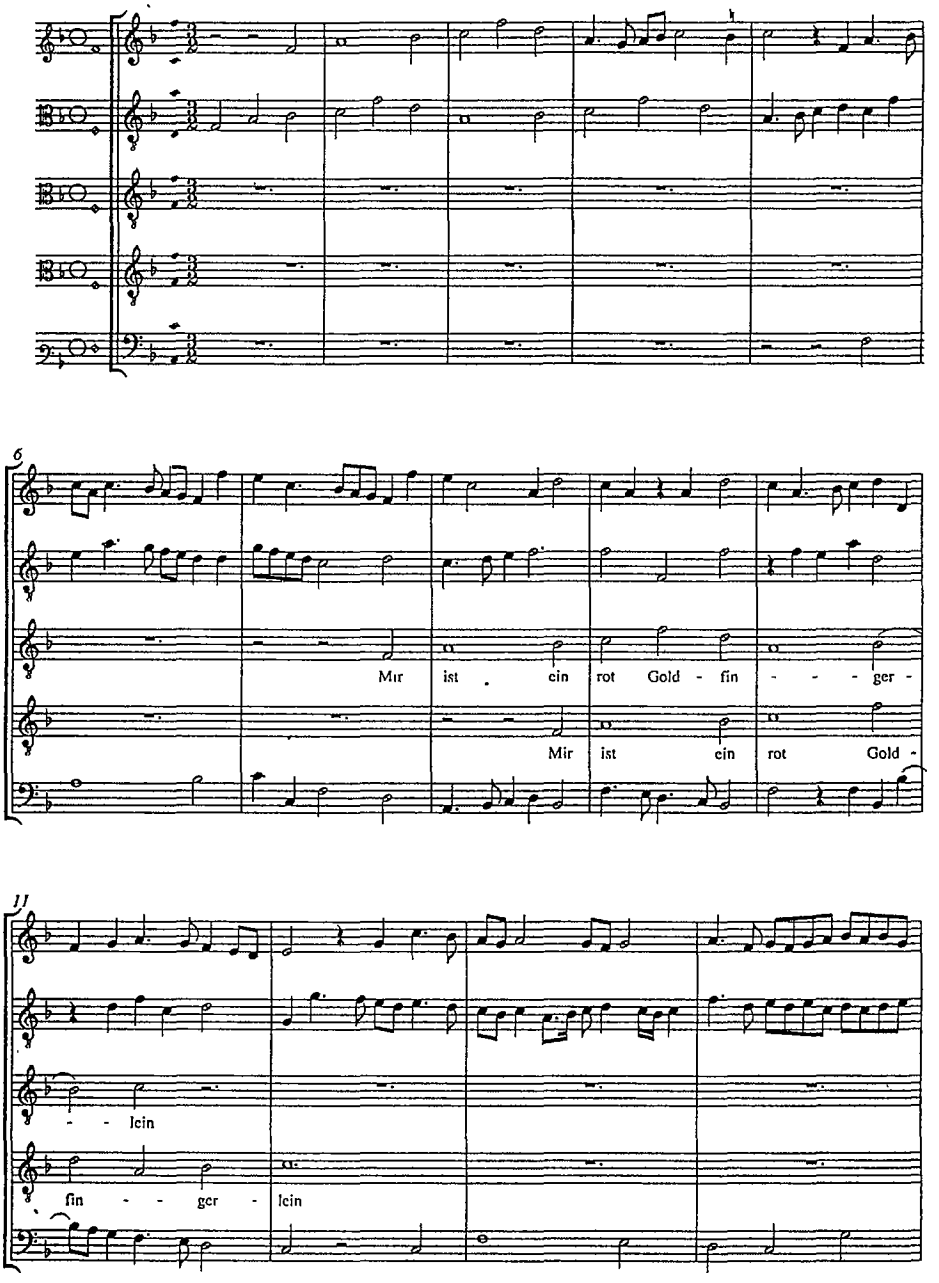



Figure 17

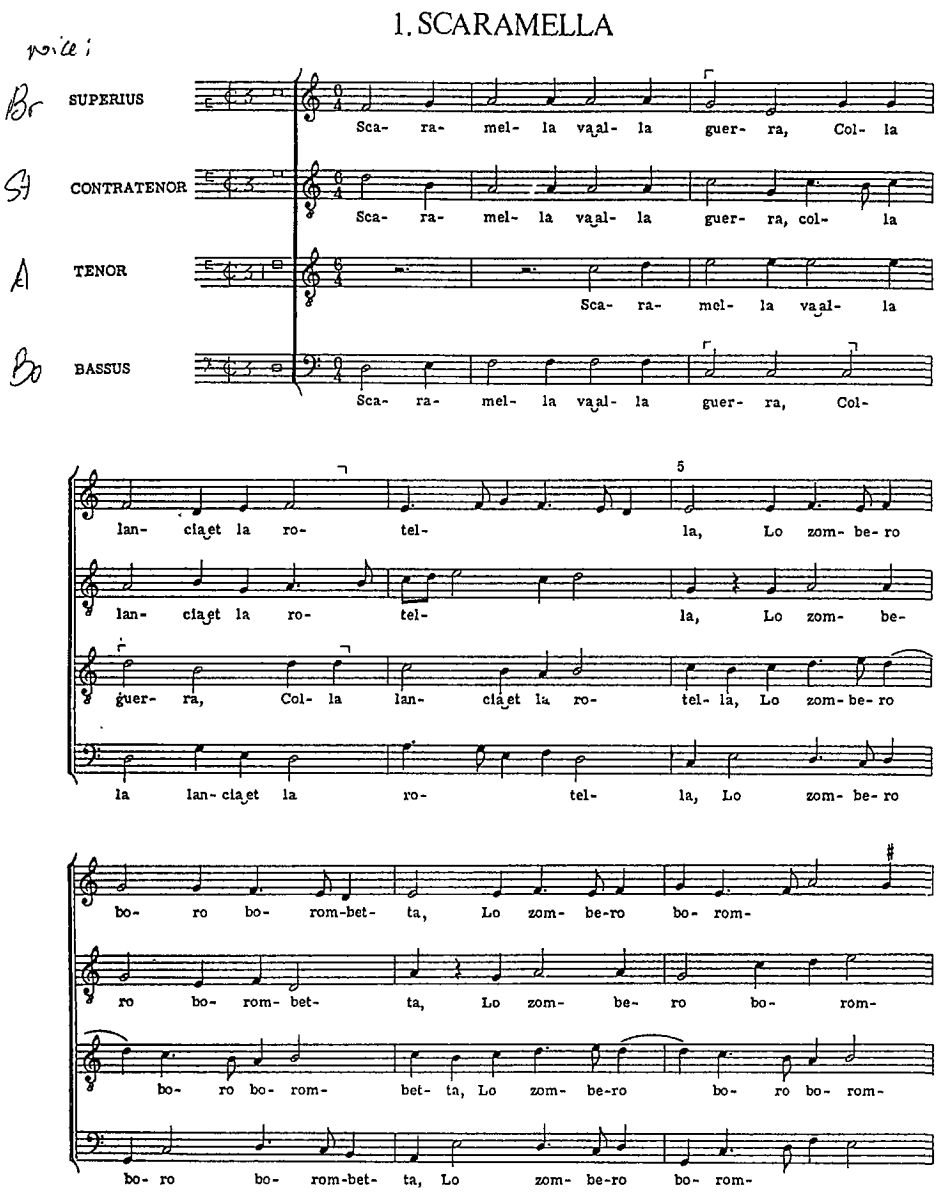



Figure 18

Adriaen Willaert experimented with double canons, which became very fashionable in the early 16th century. With the introduction of the interval of a third and the major-minor relation in his canons, he was far removed from the medieval texture of distinct parts and voices. In this he was not alone, but it does appear that the Burgundian Low

Countries were the birthplace of this new style of composition. A particularly notable example is the beautiful and ingenious chanson *Petite Camusette,* by Josquin (Figure 16), in which the two middle parts are strictly canonic, the top and bottom nearly, but not completely so, but elaborate of the original melody in the middle parts. Note that, as in the Middle Ages, the tenors still carry the unadorned traditional tune.

Most of the composers from the Burgundian *Pays LàBas* traveled widely, exporting their canonic counterpoint. Henric Isaac followed Marguerite's father, the emperor Maximilian, to Salzburg, where the Swiss composer Ludwig Senfl took up his counterpoint (Figure 17), and Adriaen Willaert in Venice became the spiritual ancestor of Andrea and Giovanni Gabrieli, composers of multichoral music for San Marco. Conversely, these Netherlandic composers returned home bringing a yet more symmetrical form of composition, the Italian Renaissance madrigal. Figure 18 is an example of such an Italianate composition, Josquin's *Scaramella,* in which three of the four parts start and finish their phrases simultaneously rather than entering in counterpoint, only the tenor maintaining its traditional autonomy for a bit. The parts are linked harmonically, that is to say that at any given time the four parts sound the notes of a major or minor triad, by then the most harmonious consonance.

In too few minutes we have traversed a period of radical change in musical texture, characterized by an increase in symmetry. Although the Burgundian counterpoint became superseded by Italian homophony, polyphonic counterpoint survived in the baroque, culminating in the works of Johann Sebastian Bach, surfacing again in the organ music of César Franck, and experiencing a renaissance in the 20th century.