

The Evolution of Beams in Notation

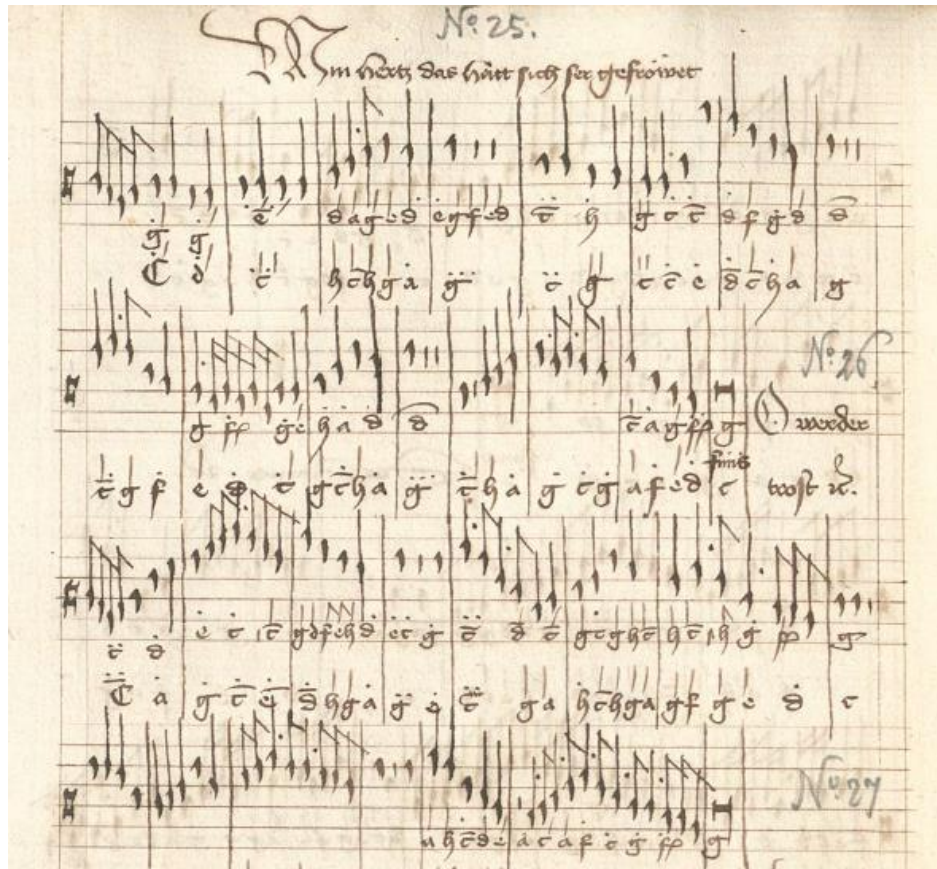


Image Credit: Buxheimer Orgelbuch, 1460 (IMSLP)

This is the first of two blogs which examine beams in some detail: (1) the history of their evolution, and (2) some guidelines about how to angle and manipulate them in Sibelius software.

How beams evolved in musical notation is not an easy piece of research to pursue. Not much has been done on this somewhat esoteric subject, understandably. Willi Apel's groundbreaking (but intimidating) book *The Notation of Polyphonic Music 900–1600* does not really touch on beaming in isolation. Instead, it offers tantalising and fleeting glimpses of the use of beams over this long period.

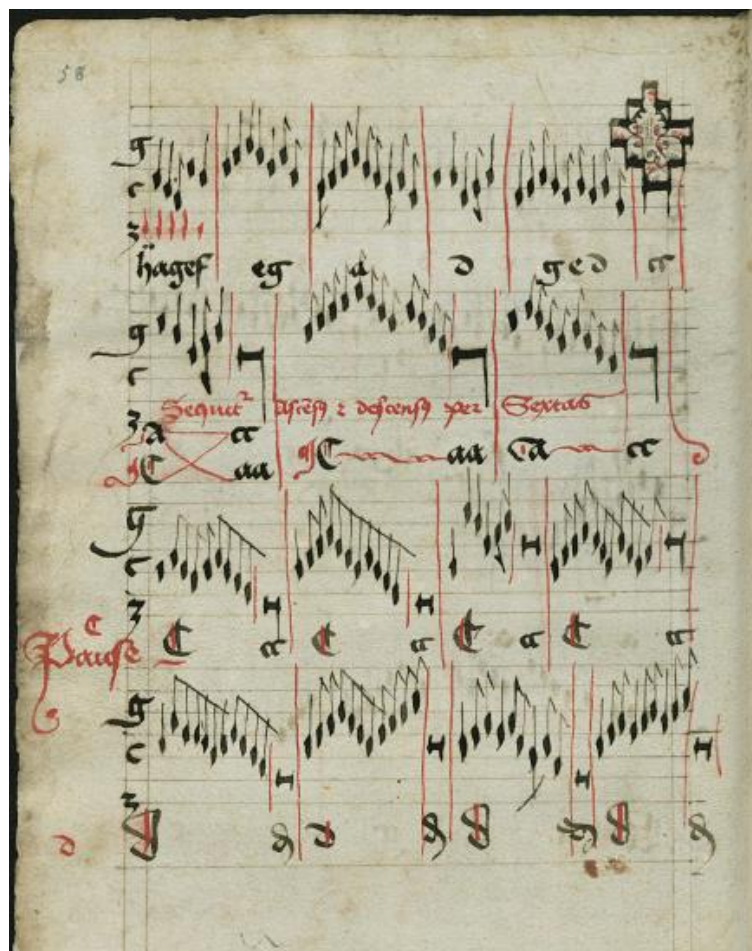
To understand how beams came to be used as a convention, it's important to look at four separate ways of presenting music in the order that they appeared. They are (1) the composer's manuscript and/or hand-written copies, (2) woodblock printing, (3) movable type, and (4) engraving. It's probably safe to conjecture that composers would have

initiated new notational methods well before the printers. This still happens today!

The system of notation where beaming gradually emerges is mensural notation which was the system used in vocal polyphony from the late 13th to the 17th century. It was the first notation to use different shapes of note to show different durations in relation to each other.

Beams were not originally necessary, as the smallest note values were notated as single items. Because the fastest notes would be either stemless squares, or single-stemmed minim/crotchet-like notes, there would have been no need for beams. Beams only evolved when notes with flags entered the fray.

The earliest instance that I have found (to date) of beams in a manuscript appears in the *Lochamer-Liederbuch*, a collection of songs and organ tablature dating from 1451. Apel informs us that, unlike today, if the beam did not extend beyond the final note of the group, that last note would have been double the value of the previous.



Lochamer-Liederbuch, *Fundamentum organisandi*, c.1451–60 (copyist Jodocus von Windsheim) (IMSLP)

Is this the moment that beaming starts? It seems possible that beaming could have evolved from keyboard tablature during the 16th and 17th centuries. The flags seem to blend into each other naturally, especially when the musical line goes downwards:



In the page above (from the same source) you can see how flags are beginning to blend into beaming, but they are still essentially discrete. Composers (and copyists) might have been tempted to join strings of flagged notes together with single lines.

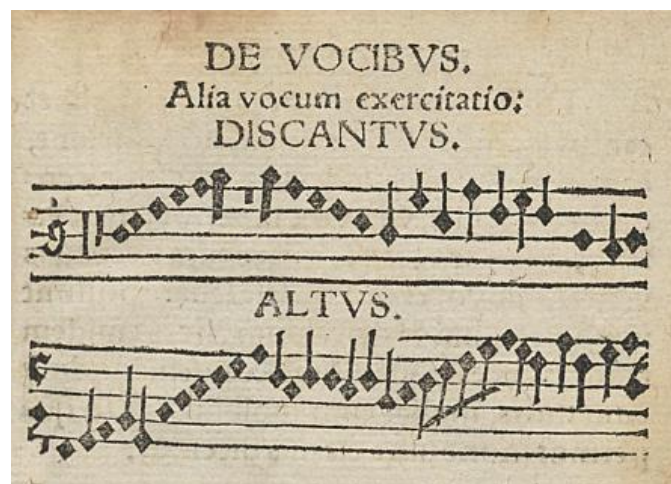
It's unlikely that this caught on immediately as a notation convention. History and evolution move in separate branches, not one straight line, so the idea would probably have occurred to many people at different times and in different places. It almost certainly would have been initiated at the manuscript level, but not at the next stage, which was publication using movable type. Printing conventions remained closer to early Renaissance notation than the composers' manuscripts for a

while. But there was one preliminary stage before movable type: the use of woodblock printing.

Woodblock Printing

Music printing didn't really take off with this technique, although there are some very early attempts. Woodblock involves creating relief, digging out space so that the remaining raised surface takes the ink. It tended to be used in early books on music theory as brief examples. It first appears around 1485 in the *Brevis Grammatica* of Franciscus Niger, demonstrating the rhythms of poetic metres in a book on writing.

I wasn't expecting to find any developments regarding beaming with this technology, but to my surprise I noticed a very early printed beam in the 1546 edition of a theory book by Georg Rhau:



Enchiridion Utriusque Musicae Practicae, Georg Rhau, 1546 (IMSLP)

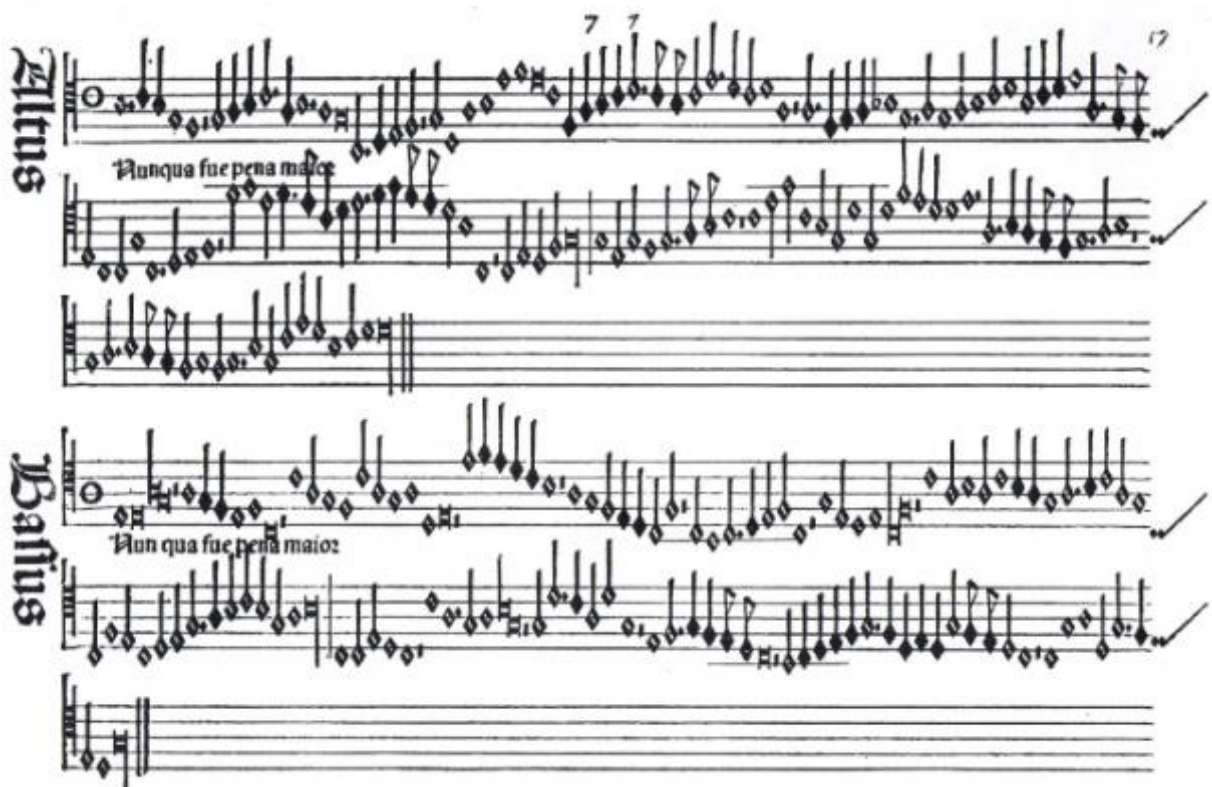
It's rough, as most of the rare woodblock music was, but unmistakable. The next technology could be regarded as a bit of a step backwards for beams, as it took time and effort to make them work.

Movable Type

As is well known, Gutenberg pioneered the more practical movable type in 1450 for text, music following on a few decades later. This technology used individual pieces of type which were set up horizontally in a case. Each note on the type included a portion of the staff. You can often see how these portions don't quite match up! (See the Ballard example

below.) Beaming was not used initially in moveable type, probably for technical reasons, even though composers were very likely eliding their flags on paper by this time.

The earliest printed music that exists (currently in the British Library) is the *Constance Graduale* of 1473, a set of chants and hymns set by an unknown printer in South Germany. The next improvement in developments came with the Venetian printer Ottaviano Petrucci (1466–1539) whose work was outstanding. He published much of Josquin Des Prez's work, thus enabling that composer to become internationally famous. Petrucci's name may not be immediately familiar to you, but IMSLP, the International Music Score Library, is also known as the Petrucci Music Library in his honour. He was the first to standardise the length of the single stem to an octave and it has remained the same ever since. Here is a beautiful example of his craft:



Harmonice Musices Odhecaton, publ. Ottaviano Petrucci, Venice, 1501 (IMSLP)

It's hard to pinpoint the first appearance of beaming in movable type, but round about 1608 we find the Parisian publisher Pierre Ballard attempting the following :



Airs à III, IV, V et VI parties, Claude Le Jeune, publ. Pierre Ballard, 1608 (IMSLP)

Ballard may have been one of the pioneers of beaming in his movable type. You can see in the above that there are some single notes with curly flags, and others with a beam extending just before and after the stem end. They connect (with varying degrees of success) in some cases. It looks like some type punches had three versions, one with just a stem, another with a flag, and then another with a fragment of beam attached. It's rough work, but you have to start somewhere!

Later, similar but more sophisticated developments occurred about 1687 in London with John Heptinstall whose adoption of the 'new -ty'd note' can be seen below. Here, fragments of angled beams are cut at the ends of the stems. Notice how this forces the beams to follow the contour of the notes quite literally, creating paired wobbly wavy lines, unlike the way we do it today:



Vinculum Societatis, Third Book, printed by T. Moore and J. Heptinstall for John Carr, 1691 (IMSLP)

Heptinstall went on to publish Henry Purcell's *Dioclesian* in movable type in 1691.

Although copper engraving evolved while this technology was still in use, there were later, significant improvements in movable type by Johann Gottlieb Immanuel Breitkopf (son of the founder of the world's oldest music publisher Breitkopf and Härtel), who was using it by 1756:



Il trionfo della fedeltà, Maria Anna Walpurgis, 1756 (IMSLP)

Beaming is now simplified to the uni-directional angles that we recognise today, although the length of stems differs more widely due to the steepness of some of the beam angles. Some of them look pretty horrible here, but as the years go by, more standardisation of stem lengths affected by beams comes into play. (For more detailed information about the now standardised rules, see Elaine Gould, *Behind Bars*, pp. 18ff.)

Further developments evolved using mosaic typesetting, which incorporated an increased number of individual components of type using fewer 'attached' lines of the staff. This jigsaw-like method of setting music was very popular in London during the 19th century and even into the 20th century, including Elgar's publisher Novello. But, improvements notwithstanding, typesetting was stylistically restricted due to the limited numbers of type punches available.

Copper Plate Engraving

Engraving involved drawing and cutting out the music in a mirror-image format on a sheet of metal, initially copper but later using pewter, which was softer. The ink would be applied, then rubbed off, having sunk into the indented hollows. This is called *intaglio*, as opposed to the 'relief' method of woodblock printing.

The earliest copper plate engraving of music dates from around 1536. The following *Canzonette* engraved by Simone Verovio, in Rome in 1591, shows an elegant use of beaming. It was much easier to shape and

finesse the beam contours with this technique. Note how the beams extend beyond the final note in each group, betraying their origin in flags:



Canzonette, publ. Simone Verovio, 1591 (IMSLP)

Moving on to c.1613, here is an early English engraving by William Hole, perhaps not quite as elegant as the previous, but more precise with its stem lengths. We even see the use of 32nd-note beams:



Parthenia, printed by William Hole, 1613 (IMSLP)

In 1672, London publisher John Playford started to use copper plate engraving. You can see from the example below how beams now begin to look very curvy, due to the flexible technique of drawing (or scoring with a knife) directly on to the copper plate.



The Division Violin, publ. John Playford, 2nd edition, 1685 (IMSLP)

Amazingly, the publisher Henle continued to use this technique of engraving until 2000 when it finally went over to computer. You can see their video of the process below (notice at 4:31 how a beam is cut using a hand tool). Those of you who have grown up only knowing Sibelius as a means of publishing your music will almost certainly find this video quite startling and utterly fascinating:

[YouTube: Sharp as a Tack: Music Engraving](#)

(Permission kindly granted by G. Henle Verlag to include this video here)

It's quite moving to consider the skill, artistry, labour and inventiveness of these early pioneers of music printing, and the artisans in this video. We take it so much for granted that we can print our own music using computer programs now, but we should also never forget that this convenience rests on the shoulders of giants and came about thanks to them.

I have endeavoured to be as accurate as possible in this minor piece of research on beams, but a lot more work could be done in this area, particularly on the many changes in music notation that occurred during the 17th century. If I have made any errors at all, or missed out any developments and significant examples, I would be most grateful to receive corrections for future versions of this blog.

Further reading

Willi Apel, *The Notation of Polyphonic Music 900–1600*, Oxford City Press, 2010 (orig. published 1941)

Alexander Hyatt King, *Four Hundred Years of Music Printing*, The British Museum, 1968

Elaine Gould, *Behind Bars, The Definitive Guide to Music Notation*, Faber Music Ltd, 2011

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