Cantus-firmus Technique
in the Sixteenth-century Fundamentum
and Contemporary Counterpoint Treatises:
An Introduction with an Extensive Bibliography
on Fundamentum

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Introduction
This study is part of my larger, ongoing research on Fundamentum, which was initiated more than thirty years ago as one of three topics for my preliminary examination of the doctoral candidacy at Duke University, administered from December 1986 to January 1987 with Prof. Dr. Tilman Seebass as chair of the committee. This topic could have been one for my doctoral thesis, but I did not choose it for several reasons. The main reason for not doing so was that I am not an organist in a strict sense. Nevertheless, during the past decades, this topic has been one of my genuine concerns, and time to time I have taken occasion to look into related sources and to talk about findings and share them with my students.

Curiously enough, Fundamentum (Foundation [of organ playing]) is not discussed in the New Grove Dictionary, and the term is not even listed in it. To begin with Conrad Paumann’s Fundamentum organisandi (1452), for example, this tradition of didactic tool for organ improvisation and composition was central to the organ literature, eventually culminating in J. S. Bach’s chorale compositions for organ. To understand the music repertoire for organ, especially in Germanic countries, this tradition must be discussed more extensively and precisely. Only recently, in fact, August Valentine Rabe (University of Vienna) has taken up the topic for his Ph.D. thesis, Fundamentum organisandi – Didaktik am Tasteninstrument ca. 1440–1540,
which, to my best knowledge, has not yet been completed.\(^1\) I hope this short article will contribute as an impetus for further research on Fundamentum, and eventually lead to a better understanding of the history and culture of organ music, especially in the German tradition.

1. A surge of printed instructions for music in Germanic countries

It is something of a spectacle that a number of musical treatises and textbooks came out in print, roughly centering around Saxony, Thuringia, and Basel, in the first half of the sixteenth century; for example, in chronological order (by no means exhaustive because some authors, Rhau for instance, published a series of books of similar content):

2) Cochlaus, Johannes. *Musica* (Cologne? c. 1504?).
3) ———. *Tetrachordum musices* (Nuremberg, 1511).
9) Heyden, Sebald. *De arte canendi* (Nuremberg, 1540).
10) Spangenberg, Johann. *Questiones musicae in usum scholae Northunsiae* (Wittenberg, 1542).
12) Faber, Heinrich. *Compendium musicae pro incipientibus* (Brunswick, 1553).

Of these publications, Wollick’s, Cochlaus’s, Ornithoparchus’s, Glareanus’s and Coclico’s include discussion on counterpoint. Wollick’s, in fact, is the first of this kind from Germany. Of the others, those published by Rhau in Wittenberg and some from Nuremberg are more of pedagogical and practical nature, dealing mainly with elementary matters of music: explanation of musical terms, musical notes, etc. (these elements are, of course, indispensable for the other treatises of more theoretical nature), as some of their titles may suggest: *Musicae rudimenta* by Johannes Aventinus (Augsburg, 1516) or by Nicolaus Listenius (Wittenberg, 1533), for instance. And Virdung and Agricola are notable also for their extended interest in instrumental music.

Contemporaneous to these publications, there are five collections of *Fundamenta* left from the first half of the sixteenth century known to us as follows (in chronological order):


2) Basel, Universitätsbibliothek, F. VI. 26c (*Fundamentum*, compiled for Oßwald Holtzach, 1515).

3) Zurich, Zentralbibliothek, S284a/b (*Fundamentum* by Hans (Johannes)

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2) The chapter on counterpoint was actually written by his teacher, Melchior Schanppecher.

Buchner, c. 1520).4)

4) Kraków, Biblioteka Polskiej Akademii Nauk, 1716 (Fundamentum by Jan z Lublina, 1537-48).

5) Basel, Universitätsbibliothek, F. I. 8a (a copy of Zurich, Zentralbibliothek, S284b, 1551).5)

Since the last one is an expanded copy of the one at Zurich, there are essentially four examples from this period. Of these, Buchner’s example is the most systematic and comprehensive. The one in Krakow abounds in musical examples, but its written instructions are available only in facsimile.6) The other two Fundamenta in Basel, which were prepared for amateur musicians in Basel, are rather brief.

This is not a mere coincidence, but a general interest in music theory and instruction, particularly in counterpoint and instrumental music, was strong at that time in the Germanic regions, and the interest was promulgated by the rapid development of printing industry, a revolutionary step in the expansion of the knowledge of music theory.7)

Considering such conditions of sources, either in manuscript or print, and their practical availability at present, I would like to discuss and compare Buchner’s Fundamentum (c. 1520 and 1524-38) with Ornithoparcus’s


5) The date given in Caldwell, Sources, p. 726, is 1551 when this copy came into Bonifacius Amerbach’s property. The original date of compilation is between 1524-38. See Buchner, Werke II, p. 90.


Musicae activae micrologus (1517), which seems to have been widely read in Germany, especially as textbook in universities of this period, and in England through its English translation by John Dowland.\(^8\) Despite such limitations, however, I hope this initial attempt may give us an insight into the relationship between theory and its practical application of the keyboard playing in the first half of sixteenth century.

2. Ornithoparcus’s Musicae activae micrologus

This treatise consists of four books: the first is on plain chant (*cantus firmus*), dedicated to the Governor of the State of Luneburg; the second, on mensural music (*musica mesuraliis*), to Georg Brachius, Ornithoparcus’s friend musician at the chapel of Wittenberg; the third, on accent (in relation to text), to Philipp Surus, Kapellmeister at the court of Count Palatine in Heidelberg; and the fourth, on counterpoint, to Arnolt Schlick, the organist at the court of Count Palatine in Heidelberg.\(^9\)

In general, his presentation of counterpoint theory in Book IV follows a traditional line set by Tinctoris or Gaffurius, as the summary of Ornithoparcus’s citations from them shows.\(^{10}\) Starting with the definition of counterpoint (Chapter 1), Ornithoparcus’s explanation goes through consonance and dissonance (Chapters 2 and 3), general rules for counterpoint, such as the prohibition of *mi contra fa* (Chapter 4), description of parts (Discant, Tenor, Bass, etc.), and rules for cadence (Chapter 5), rules

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\(^9\) This treatise was translated into English by John Dowland, and published in 1609 in London. His translation is fairly trustable. I will therefore refer to this translation in the following discussion. There are occasional abridgements, but they do not affect musical discussion except for one case, which is due to a typographical error in the original Latin edition, that is in Book IV, Chap. 6, rule 8. See Ornithoparcus / Dowland, *Compendium*, pp. X-XI and XXII, n. 39.

\(^{10}\) See *Ibid.*, pp. XXIX-XXX. Ornithoparcus cited Gaffurius as “Gafforus” or “Franchinus,” and Tinctoris as “Tinctor.” Gaffurius’s *Theorica musicae* and *Practica musicae* are frequently cited in this treatise as a whole. See *Ibid.*, p. XII.
for possible combinations of intervals among parts (Chapter 6), rules for rests (Chapter 7), which is also the last chapter of Gaffurius’s *Practica musica*, Book III on counterpoint.¹¹) Perhaps except for his advice for young beginners to use a ten-line staff for counterpoint exercise and his accusation of German singer’s inability, there seems to be nothing particularly new in Ornithoparcus’s discussion of counterpoint theory.

### 3. Hans Buchner’s *Fundamentum*

Hans Buchner (1483-1538), born in Ravensburg and known as a student of Paul Hofhaimer, renowned organist then, became organist of the Konstanz Cathedral, recommended by Emperor Maximilian, and died there. There are three copies of Buchner’s *Fundamentum* (c. 1520) extant: two in Zurich (one is a German translation of the other) and one in Basel. In addition to the part for written instruction, the Zurich copy includes about 20 liturgical compositions for organ, and the expanded Basle copy has some additional 30 compositions (the written instruction in Latin is also expanded). In the Zurich copy, the written instruction consists only of *Fundamentum*, but in the Basel copy, it consists of three chapters: in the first chapter, note shapes and value, tablature, fingering, and system of scale are explained; in the second, intabulation techniques of polyphonic vocal pieces for organ; and in the third, titled *Fundamentum*, “brief and sure guide for treating any plain chant (cantus firmus) in a correct setting of two, three, or more voices” is presented.¹²) Thus, in the Basel copy, rudiments of organ playing are also included in addition to the original *Fundamentum*. Buchner’s inclusion of the intabulation techniques seems to suggest that it was an essential skill for the organists at that time. His explanation of keyboard fingering is thought

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to be the earliest known.\(^\text{13}\)

The chapter on \textit{Fundamentum} in the Basel copy is divided into five sections: in the first section, Buchner explains intervals; in the second, consonances and their classification; in the third, two rules for the correct application of consonances; in the fourth, four rules to show possible Basses under a specific combination of Tenor and Discant and two rules for combination of Tenor and Discant, that is, rules for possible combination of intervals among Discant, Tenor, and Bass; and in the fifth, last section, Buchner explains how to handle plain chants as \textit{cantus firmus} in polyphonic setting, based upon the above rules.\(^\text{14}\) In the first four sections, therefore, Buchner conforms to the traditional account of counterpoint, as discussed above in Ornithoparcus’s treatise, but in the fifth section Buchner pioneers into the actual application of the counterpoint theory to polyphonic settings of plain chants.

Immediately before starting this fifth section, Buchner clearly states that the plain chant can be freely put in Discant, Tenor, or Bass. That is, not only Tenor and Discant, as in the traditional notion of \textit{cantus firmus} carrier, but also Bass is now recognized as proper carrier of \textit{cantus firmus}.\(^\text{15}\) This, of course, seems to follow the new trend in the vocal polyphony from the later 15th century, that is, permeation of \textit{cantus firmus} material into all parts and increase of motivic imitation in all parts. Then Buchner gives, as the first musical example, a three-part setting of \textit{cantus firmus} “\textit{Te Deum}” in Discant. In our terms, this is a simple three-part harmonization of \textit{cantus firmus} in Soprano:\(^\text{16}\)

Ex. 1:


\(^{\text{15}}\) Buchner, \textit{Werke} I, p. 22.

On this example, Buchner comments:

This is the simplest method to set a melody polyphonically. But since the result shows no grace, the organists furnish each voice with coloration.17)

And he shows the same setting with coloration, as follows:18)

Ex. 2:

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17) Ibid.

As can be seen in this example, procedure of coloration is basically to add passing notes, neighbor notes, turns (especially in Discant), and occasional suspension (as in mm. 7-8). Also note that there is one measure added (the last measure of the first system, where only the lower stave is filled) between mm. 4-5. Although Buchner gives no explanation to this added measure, which functions like an interlude, his next point seems to be related to such procedure. Buchner writes:

It is most pleasing to hear, if you lead into or at least allude to the arranged melody, especially at the beginning of the piece and at the beginning of section, with all voices. This process belongs to *ars fugandi*.$^{19}$

And in his third example, an arrangement of “Tibi omnes angeli” in Discant, Buchner introduces an imitation between Bass and Tenor in the beginning four measures as follows:$^{20}$


Ex. 3:

Such procedure did not appear in the fifteenth-century *Fundamenta*, Conrad Paumann’s *Fundamentum organisandi* (c. 1452), for instance. As mentioned above, Buchner’s emphasis on such imitative procedure seems to be a parallel to the similar tendency in the vocal polyphony in this period. In this example, Buchner put a postlude in the last five measures, though not in imitation.\textsuperscript{21)

In the rest of this chapter, Buchner recommends the reader to use tables he devised to inform such coloration procedure, by which he meant not only melodic ornamentation, but also provision of prelude, interlude, postlude, and explains how to use them. There are ten such tables in all: three tables are provided for examples of cantus firmus in Discant, Tenor, Bass, respectively; and each of the three is assigned respectively to ascending (*ascensus*) one, descending (*descensus*) one, and repeating (*redeuntes*) one. And at the end, two tables for ars fugandi are given respectively for ascending one and descending one.\textsuperscript{22)

\textsuperscript{21) Ibid.}

\textsuperscript{22) Ibid., pp. 26-27 for Buchner’s explanation, and pp. 28-34 for the tables.}
In each table, types of *cantus firmus* are arranged vertically according to their melodic intervals, from second (*ad secundam*) to fifth (*ad quintam*); and horizontally, according to the harmonic intervals between Discant and Tenor at the beginning. For example, tables for ascending *cantus firmus* in Discant are as follows:23)

Ex. 4:

From these tables, therefore, one can find a model setting for a specific melodic interval of cantus firmus and for a specific harmonic interval between Discant and Tenor systematically. We should note here that Buchner gives no discussion about meter or rhythm of *cantus firmus*, though in general, according to Young, Buchner seems to have preferred the duple meter.24) If this is the way to set a *cantus firmus* polyphonically, the result


will be merely a patchwork of no originality or individuality. But when we examine his own cantus firmus settings, placed after the written instruction part of Fundamentum and assumed to be practical application of the given rules, this is not necessarily true.

There are three settings for Hymn “Veni creator spiritus” as a group at the beginning of these pieces, as if intended to exemplify his written instructions.25) The cantus firmus is given respectively to Discant (Ex. 5a), Tenor (Ex. 5b), and Bass (Ex. 5c). Let us examine how Buchner set the first two notes of the chant, which is an ascentus in second (ad secundam) as follows:26)

Ex. 5a:

Ex. 5b:

Ex. 5c:

25) Zurich copy, fols. 9-11.

26) Ex. 5a is reproduced from Buchner, Werke II, p. 10; Ex 5b, from Ibid., p. 13; and Ex. 5c, from Ibid., p. 16.
The combination of intervals among three parts at the beginning of the first two measures can be diagrammed as follows:

Ex. 5a: Between Tenor and Discant 8 | 6-8  
Between Tenor and Bass 1 | 5-3

Ex. 5b: Between Tenor and Discant 8 | 10  
Between Tenor and Bass 8 | 6

Ex. 5c: Between Tenor and Discant 8 | 8  
Between Tenor and Bass 8 | 10

Now let us compare these with Buchner’s tables, reproduced in Ex. 4 above. Ex. 5a corresponds to m. 25 of Ex. 4a, where we find a model setting for a cantus firmus in Discant, which ascends in second (ad secundam) and makes an interval of octave (in Octava) with Tenor. However, the intervallic combinations at m. 25, that is, (Ten. and Dis.) 8-6, 6-5 / (Ten. and Bass) 3, 4-6, and the melodic figuration of each part are different from those of the first two measures of Ex. 5a. Similarly, Ex. 5b corresponds to mm. 33-34 of Ex. 4b, where the intervals 8, 5-6 / 3, 6-5, but the figurations are different. And. Ex. 5c corresponds to mm. 34-35 of Ex. 4c, where the intervals 8-10, 6 / 8, 10 is somewhat similar, but not exactly the same, and the figuration is again different. Thus, there is no exact correspondence between the models given in his tables and his actual cantus firms settings at least in these examples. This may suggest that what Buchner intended in these tables was to show the beginners possible solutions for cantus firmus settings, but not to imitate them as they are given in the tables. That is to say, in practical compositions, one must try his originality or spontaneity as Buchner exemplifies in his settings for “Veni creator spiritus.”

Conclusion
From the above observations about the counterpoint theory in Ornithoparcus’s Musicae acitiae micriologus and that in Buchner’s
Fundamentum, we may conclude that Buchner’s Fundamentum (chap. 3) is intended for a more practical use than Ornithoparcus’s treatise, Book IV. While Ornithoparcus basically stays within the conventional account of contrapuntal theory at that time, referring to his predecessors, Buchner proceeds to its actual application to the cantus firmus setting, which was a more urgent task for the organist. Although there seems to be no specific connection between the two contemporaneous works, we should still ask what social background existed behind them. In this period, the development of Humanism and the impact of Lutheranism must have been an impetus for a number of pedagogical books in music; and it seems to me that Buchner’s compilation of Fundamentum too must have had something to do with such social background. This trend was certainly supported by the rapid diffusion of the printing technology throughout the sixteenth century. Including this point as Rabe touched on, these issues need another discussion.  

(I am grateful for Mr. Nobuaki Tanaka’s assistance in preparing music examples for this article. Mr. Tanaka is currently a doctoral student at University of Music, Würzburg, Germany, specializing in Franz Benda studies.)

A Bibliography on *Fundamentum*,
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要旨

本研究は、これまで、海外でもしばらく研究が途絶えていたFundamentum（「[オルガン演奏の]基礎」、日本語の定訳はない）という、オルガン演奏や作曲の実態の歴史に関する重要な史料について、新たな関心を喚起しようとするものである。ここではハンス・ビュヒナー（Hans Buchner, 1483-1538）が残した手書きのFundamentum（1520年頃成立）と、オルニトパルクス（Andreas Orinithoparcus, 16世紀、生没年不詳）による音楽理論書（1517年ライプツィヒで出版）「Musicae activae micrologus」で、それをジョン・ダウランド（John Dowland, 1563?-1626）が英訳した出版物「A Compendium of Music Practice（音楽実践概論）」（1607年ロンドンで出版）の比較検討を通して、15-16世紀のオルガン奏者が、演奏の実践的教育の現場でどのような演奏、教育活動をしていたのかについての実例を、対位法の説明の仕方を通して報告することにした。また、このテーマに関する詳細な文献表を整備することで、今後の研究の進展に資することも意図している。

この時代の社会的背景として重要なことは、まさにこの時期に出版技術が浸透し、音楽楽や楽譜を含めて、多くの音楽理論書が出版された画期的な時代であったことである。こうした傾向は、特にドイツ語圏内の国々で顕著であり、一方で、Fundamentumもまた、同様な国々で資料が多く残されていることは、単なる偶然の出来事ではなく、手書きによる理論説明とそのための譜例と、同様な内容の印刷された出版物との関係性がどのようなものであったのかについては、今後さらなる検証が必要になるであろう。また、ドイツ語圏の国々において、こうした音楽の指導書が重用され、聖歌や美歌の定旋律に基づくオルガンのための作品が作られる伝統が形成されたことは、後のJ. S. バッハのコーラル作品にもつながる重要な歴史である。

Ornithoparcus/Dowlandの著作と、Buchnerの手稿譜の内容を比較検討
すると、前者は、当時の伝統的な対位法理論について述べる一方、Buchnerの譜例は、より実践的な記述になっており、当時のオルガン奏者が、特に即興演奏の現場において、Fundamentumとして記述された旋律定型を使いながら、実際の演奏に応用していた可能性が明らかである。