



Research Article

A music theoretical history of two continents. German and European roots and (re)reception of pitch-class set theory¹

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Abstract

Pitch-class set theory was developed on the American continent in the 1940s by composers and music theorists such as Milton Babbitt (1916–2011), Allen Forte (1926–2014), and others. Since the 1970s, this discipline, which is located between music and mathematics, can be regarded as more and more established and institutionalised throughout the Anglo-American world. In contrast, it is often strongly rejected in large parts of the European and especially the German discourse, which can be seen as one of the many devastating aspects of the division of the international research community following the Second World War. This study attempts to trace the historical causes of the ambivalent reception of pitch-class set theory world-wide, partly on the basis of exclusive sources, such as an e-mail correspondence with Allen Forte. It discusses the paradoxical situation that it is precisely in German and French music theory of the 19th century (and in some cases even further back) that predecessor models of this music theoretical system can be found in the history of ideas. Only recently, depoliticised and in the context of the ever stronger and more natural international networking of specialist discourse in the German-speaking world and other parts of Europe, has it become possible to consider pitch-class set theory as a meaningful analysis tool for post-tonal Western music and to apply it accordingly, on the one hand, as well as to individualise and further develop it, on the other. In times of internationalisation, globalisation, and digitalisation, this form of re-reception holds the potential to expand pitch-class set theory into a transcultural music-analytical tool that can also gain strength beyond its previous musical boundaries and areas of application.

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Introduction

Hardly any other sub-discipline of music theory is as polarising as pitch-class set theory. On the one hand, in the Anglo-American world it has become an established standard in both specialist discourse and the university curriculum. A veritable cult apparently associated with it in US music theory in the 1980s can be inferred from words by Allen Forte (1926–2014) taken from his opening speech of the 10th Annual Conference of the American Society for Music Theory in 1987: “I did not invent the unordered pitch-class set. That was the creation of a far higher power.”³ On the other hand, pitch-class set theory met with enormous resistance in the anti-systematic discourse of the post-war period in Europe, and especially in Germany, which was at least at first glance difficult to understand both in terms of content

¹ This study was partially presented at the 4th International Rast Music Congress (IRMC), held online in Antalya, Türkiye, on November 30–December 1, 2024.

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³ FORTE 1989, p. 95, see also LEWANDOWSKI 2010, p. 190.

and nature. Michiel Schuijjer describes this dilemma in his book *Analyzing Atonal Music*, published in 2008.⁴ The first section of the introductory chapter of this publication bears the telling title “A Tale of Two Continents”.⁵

Within that chapter, Schuijjer uses an anecdote that took place at the Fourth European Analysis Conference at the Conservatory in Rotterdam/Netherlands to describe the existing dilemma surrounding pitch-class set theory. Firstly, the late arrival of an (anonymous) US-American conference participant during a panel discussion on the analysis of contemporary post-tonal music is described. After listening for only a short time, it continues, he raised his hand and asked the question: “You guys are discussing methods of analyzing twentieth-century music. Why don’t you talk about pitch-class sets?”⁶ Schuijjer continues: “The chairman, a professor from the Sorbonne, was quick to respond: ‘We don’t *talk* about pitch-class sets, because we don’t *bear* them.’”⁷ The ineffectiveness of this answer needs no further elaboration, for the fact that we are still talking about pitch class sets after almost a quarter of a century is proof enough of the value of pitch class theory as an analytical tool.

In the following, I would like to try to get to the bottom of the causes of this polarisation. In doing so, I would like to trace a history of the reception and re-reception of ideas developed step by step over several centuries on two continents. Starting with the development of pitch-class set theory in the USA in the 1940s, I will first follow a timeline backwards to the 19th century and even further. At the end, I would like to briefly outline the status quo of pitch-class set theory in Germany, as well as the potential of this analytical discipline for the present and the future in international discourse.

Pitch-class set theory was developed in the United States in the 1940s. Pioneers of this discipline included Milton Babbitt (1916–2011), George Perle (1915–2009) and Allen Forte. Two factors played a decisive role in the development of a discipline located between music and mathematics:

- The emerging computer age. At least in the early days of pitch-class set theory, there was a vision of being able to analyse musical scores in the future with the help of computers, which at that time were still space-consuming machines with a very low memory capacity that is unimaginable today and had to be fed with punched cards. Allen Forte even developed his own programming language called SNOBOL3, the functionality of which he published in an article.⁸ The fact that this vision – fortunately! – was not to be fulfilled, need not be explained in detail from today’s perspective. However, pitch-class set theory was to prove its usefulness and informative value for post-tonal music, especially the pre-dodecaphonic music of the Second Viennese School. It continues to have a great influence on the discourse surrounding this oeuvre to this day.
- The presence of Arnold Schoenberg (1874–1951). Schoenberg, who lost his position as Professor of Composition at the Stern’sches Konservatorium in Berlin immediately after Hitler came to power as Reich Chancellor, emigrated to the USA. In fact, the development of set theory or pitch-class set theory is linked to twelve-tone theory and Schoenberg’s ideas on this topic, in particular. The composer was now able to teach and disseminate his theories personally through lectures and classes at US universities. This already reveals the first direct European roots of pitch-class set theory in the history of ideas.

The latter can be vividly illustrated by Schoenberg’s music-theoretical and composition-theoretical English-language terminology, which has been constantly developing since his move to the USA, but also by the conceptual ideas of twelve-tone and row-based composition, as well as post-tonal composition in the run-up to dodecaphony. For example, the term “row” goes through several stages of development: While Schoenberg initially chooses the term “row” as a literal translation of the German word “Reihe”, he later opts for the word “series”, which already comes much closer to his concept in the context of composing with twelve equal tones, but is still not completely satisfactory for him.⁹ Finally –

⁴ SCHUIJJE 2008.

⁵ Ibid, pp. 1–4.

⁶ Ibid., p. 2.

⁷ Ibid.

⁸ FORTE 1967.

⁹ PERLE 41977, p. 2, see also BEICHE 1984 and LEWANDOWSKI 2017, p. 7.

allegedly at the suggestion of George Perle – he uses the word “set”, since Schoenberg’s twelve-tone rows are basically unordered groups of tones and thus by definition pitch-class sets.¹⁰

In the beginning of Schoenberg’s dodecaphonic creative period the chromatic total is achieved by a special arrangement of three tetrachords (see ill. 01). A little later, from Op. 31 onwards, Schoenberg uses two hexachords, each of which complements the other to form a chromatic total (see ill. 01b). The hexachordal row technique was extensively studied by several music theorists, including Milton Babbitt, and labelled “combinatorality”.¹¹ Its preliminary form with the three tetrachords can also be described with this term. It is used in the *Suite for Piano* Op. 25, a work that represents Schoenberg’s earliest composition organised entirely in twelve tones – although the *Waltz* from the *Piano Pieces* Op. 23 was written even earlier according to the history of its composition.¹² Schönberg used the *Suite* in a text, originally written in German, to illustrate his “method with twelve tones related only to each other” (originally in German: “Methode der Komposition mit zwölf nur aufeinander bezogenen Tönen”).¹³ It emphasises that every note within a row (within a set) is treated equally respective has equal musical rights.



Figure 1. Twelve tone row used in A. Schoenberg: *Suite for Piano* Op. 25.

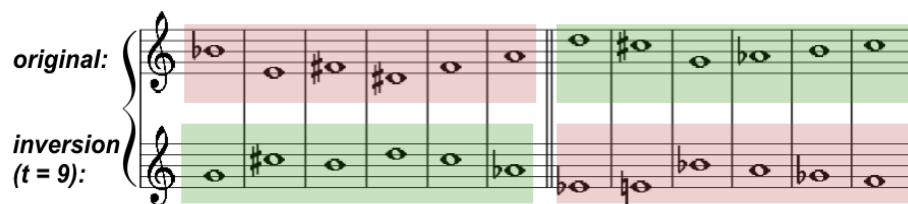


Figure 2. Twelve tone row with combinatoriality used in A. Schoenberg: *Variations for Orchestra* Op. 31.

The misunderstanding of the concept of a row as a linear phenomenon is rooted in several European twelve-tone textbooks of the post-war period. In particular, the publications of Herbert Eimert (1897–1972)¹⁴, Hanns Jelinek (1901–1969)¹⁵, and Ernst Krenek (1900–1991)¹⁶, who was even a student of Schoenberg, should be mentioned in this context. The concept of a row as a primarily or even exclusively linear-contrapuntal phenomenon never actually existed, at least in relation to Schoenberg’s twelve-tone technique.

Rather, the arrangement of the twelve tones using three four-tone pitch-class sets shows the possibility of a harmonic and contrapuntal encounter of all possible row tones. Motivic ideas and ideas for the reorganisation of traditional forms,

¹⁰ PERLE 1977, p. 2.

¹¹ BABBITT 1950, p. 160, PERLE 1977, p. 129–131.

¹² SICHARDT 1991, pp. 206–211.

¹³ SCHOENBERG 1976.

¹⁴ EIMERT 1950.

¹⁵ JELINEK 1952.

¹⁶ KRENEK 1952.

such as the suite or the sonata form, are particularly prominent at the beginning of Schoenberg's twelve-tone phase. This goes so far that even within a tetrachord the order of the notes can be interchanged in favour of a consistent sequencing, as the opening bars from the *Musette* of the *Suite for Piano Op. 25* show (ill. 02).

Figure 3 displays a musical score from Schoenberg's *Suite for Piano Op. 25*, specifically the *Musette* movement. The score is divided into several measures, each containing a tetrachordal grouping of notes. These groupings are labeled with letters and abbreviations: T, TU, TUK, DU, DK, and DUK. The labels are color-coded: T (red), TU (purple), TUK (orange), DU (blue), DK (purple), and DUK (blue). The score is written for piano and includes dynamic markings such as *fp* (fortissimo) and *pp* (pianissimo). The tempo markings include *accel.* (accelerando), *rit.* (ritardando), and *a tempo*.

Legend:

- T** = tonic, not transposed prime form of the row
- TU** = inversion of the tonic
- TUK** = retrograde form of the inverted tonic
- DU** = inversion of the dominant (transposed form of the row)
- DK** = retrograde form of the dominant
- DUK** = retrograde form of the inverted dominant

Figure 3. Arrangement of notes within tetrachords as parts of the underlying twelve tone row, as being present in the opening bars of the *Musette* from A. Schoenberg: *Suite for Piano Op. 25*.

Unordered groups of notes, or pitch-class sets, also play an essential role in pre-dodecaphonic concepts of material arrangement. Arnold Schoenberg's *Piano Piece Op. 23*, no. 2, for example, consists entirely of subsets, taken from a super set, or the musical "Keimzelle", which is exposed at the beginning of the piece. The composition is de facto a compositional realisation of the relationships between supersets and subsets described in later theories by Allen Forte¹⁷, whereby freely atonal and sequentially bound sections alternate in this work.¹⁸

Josef Matthias Hauer's (1883–1959) tropes also represent unordered groups of six tones that complement each other to form a chromatic total. In this respect, Schoenberg's and Hauer's approaches to twelve-tone technique are even similar. In the context of the bitterly fought so-called priority dispute over the question of which of the two Viennese composers had discovered his respective method of twelve-tone composing earlier, there would certainly have been agreement from a set-theoretical perspective. Hauer described his theories in two self-published works.¹⁹ His pathetic, sometimes cryptic, writing style makes the small books difficult to understand and may have prevented a wider reception.

However, the roots of pitch-class set theory go back even further in history. In the second half of the 19th century, a generation of music theorists emerged whose spirit can be described as more or less rigorous. Among them were Carl Friedrich Weitzmann (1808–1880), a friend of Franz Liszt (1811–1886), Friedrich Zamminer (1817–1858), Friedrich Wilhelm Opelt (1794–1863), Josef Anton Singer (1810–1882), and Heinrich Josef Vincent (alias Winzenhörlein) (1819–1901), to name just a few.

In the following, I would like to concentrate on Vincent, as his ideas seem to be most far-reaching, partially even appearing as a look into the future. Also they seem very refreshing, as they are not much influenced by any chains of historicity. It is not my intention to judge Vincent's ideas, either positively or negatively, but to point out some interesting (conscious or not conscious) relationships between him and other theorists of other eras, relationships which seem to show that music theory keeps coming back to the same problems at different levels. I believe that the more recent history of music theory, especially the development of pitch-class set theory, has shed some new light on Vincent's ideas, which were developed in the second half of the 19th century.

¹⁷ FORTE 1972 and FORTE 1973.

¹⁸ For detailed analyses of Schoenberg's *Op. 23*, no. 2 see HOLTMEIER 1999 and LEWANDOWSKI 2019.

¹⁹ HAUER 1925 and HAUER 1926.

Heinrich Josef Vincent was born in 1819 in Theilheim, a small town in central Germany. After having studied theology and law, he dedicated his life to music, which was his passion since he was a young boy. He sang (and later conducted) several choirs even during his time as a student. It is documented that he was a good singer and founded the “Liedertafel” in Würzburg, where he studied. After giving up his studies in law, he was engaged as an opera singer on several stages (Würzburg, Halle an der Saale, Schwerin, and Vienna). Besides that, he was a (not very successful) composer of a few operas and musical comedies, and also wrote a biography of Franz von Suppé.²⁰ His radical views on the field of music theory were unique, but probably contributed to him becoming somewhat of an outsider. Beside a few magazine articles, Vincent published between 1860 and 1894 five music theoretical writings:

- 1860: *Kein Generalbass mehr! Dafür: der Geist der Einheit (I) in der musikalischen Progression. Ein Beitrag zur Musikwissenschaft*, Vienna: Wallishauser'sche Buchhandlung (Josef Klemm)²¹,
- 1862: *Neues musikalisches System: Die Einheit in der Tonwelt. Ein kurzgefasstes Lehrbuch für Musiker und Dilettanten zum Selbststudium*, Leipzig: Heinrich Matthes²²,
- 1875: *Die Neuklaviatur. Ihre Vorteile gegenüber den Nachtheilen der alten. Ein Aufruf zur Beherzigung an alle Musiker und Dilettanten, Klavier-Lehrer und Fabrikanten*, Malchin: Adolph Hothan²³,
- 1890: *Die Zwölfszahl in der Tonwelt. Ein Blick in die Zukunft. Beitrag zur Vereinfachung u. Erleichterung des Musikbetriebes*, Vienna: Rörich²⁴,
- 1894: *Ist unsere Harmonielehre wirklich eine Theorie? Eine musikalische Lebensfrage, beantwortet von H. J. Vincent*, Vienna: Rörich²⁵.

The title of the first one contains the straight motto: “No figured bass anymore!”²⁶ It is published anonymously. In the first chapter of this little brochure, Vincent compares music with the arts of poetry.²⁷ He considers it as unnatural, if anybody would have the idea to ask a painter or poet to express his colours, words or even single letters with numbers. But, nevertheless, exactly that would be the content of figured bass.²⁸

Vincent's thoughts about figured bass being old-fashioned and unnecessary are rooted in his very own understanding of Ramistic music theory. This shows his depiction of the G major seventh chord, at first in the “wrong” old system, and then in the “more correct” new one (ill. 03).²⁹

old system:	new system:
f 7	
g 6	
h 6	d 2
d 6	
d 5	f 5
f 5	g 4
h 4	h 4
h 3	d 3
d 3	f 3
f 3	g 2
G (1)	
H (1)	
D (1)	
F (1)	
	f 4
	f 4
	f 4
	F 4
	d 2
	d 2
	D 2
	h 7
	H 7
	G 5

Figure 4. Depiction of the G major seventh chord after ANONYMOUS [VINCENT] 1860, p. 24.

Ludwig Holtmeier writes: “Vincent’s critique is based actually on a misunderstanding: ‘Figured bass’ is for him the Ramistic theory – in this point mainly referring to the writings of S. [Simon] Sechter [(1788–1867)] –, the theory that has pushed away the ‘figured bass teaching’ of the 18th and early 19th centuries.”³⁰ I agree to this fact, though in Vincent’s early writings of the 1860s, Sechter is only mentioned very rarely. Regarding figured bass, Vincent refers in

²⁰ HOLTMEIER 2008.

²¹ ANONYMOUS [VINCENT] 1860.

²² VINCENT 1862.

²³ VINCENT 1875.

²⁴ VINCENT 1890.

²⁵ VINCENT 1894.

²⁶ ANONYMOUS [VINCENT] 1860, title page, orig: “Kein Generalbass mehr!”, own translation.

²⁷ Ibid., p. IV.

²⁸ Ibid.

²⁹ Ibid., p. 24.

³⁰ HOLTMEIER 2008, col. 1036, orig.: “Vincent's Kritik fußt dabei eigentlich auf einem Mißverständnis: Unter ‘Generalbass’ versteht er bezeichnenderweise gerade jene ramistische Musiktheorie (Hauptbezugspunkt sind die Schriften S. Sechters), die wesentlich dazu beigetragen hat, die ‘Generalbaßlehre’ des 18. und frühen 19. Jh. zu verdrängen.”, own translation.

Kein Generalbass mehr! to an Italian music theorist as its inventor: “If Lodovico Viadana [(1560–1627)] could have suspected, what misuse would evolve out of his ‘stenographic’ invention with time, he would have – suppressed it.”³¹ After the introduction, the author starts explaining somewhat cryptic laws of numbers, mathematical axioms and progressions.³² He tries to transfer mathematical “progressions of unity”³³ to musical correspondences. Subsequently, Vincent explains the circle of fifths³⁴, then comes soon to the overtone series³⁵ and, among other topics, to problems of enharmonic change.³⁶ His remarks lead Vincent to the conclusion: “It would be good, if we had only twelve names for the twelve notes due to the established temperature; the whole trouble of the orthographic gadget, that is only existing for reasons of orthography, at the end, would be spared to us.”³⁷ He suggests to name the black keys on the piano after the letters “i”, “k”, “l”, “m”, “n” or – without giving a real reason – only to use the tone names *d flat*, *e flat*, *g flat*, *a flat* and *b flat*.³⁸ Such an emancipation of tone names falls under the term “solidarity”³⁹ used by Vincent. No note should have any advantages by having more names than others. By reducing the system of notes to twelve and by treating them as equal, Vincent anticipates some fundamental ideas of later evolving twelve-tone theories.

At this point, I would like to make a short digression. It is worth mentioning that Vincent presents the picture of a new keyboard in the earliest of his five main writings (see ill. 04a).⁴⁰ This keyboard consists of a permanent change of black and white keys, the places where only two white keys appear in the normal keyboard (*e* and *f* as well as *b* and *c*) are missing. It is described as very practical for playing scales. The chromatic scale would be, of course, without any difficulties anymore. Furthermore, the major scales are reduced to two schemes, either three white and four black keys or four white and three black keys. Vincent is sure that the near future will accept this new keyboard, although his radical changing of the tone-names will cause more difficulties.

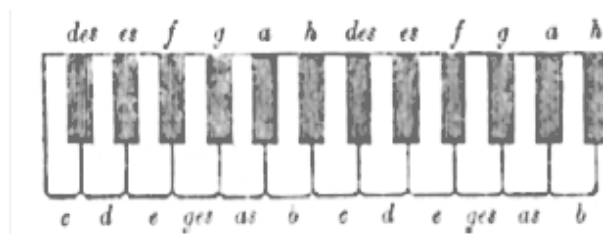


Figure 5. Depiction of Vincent's new keyboard, ANONYMOUS [VINCENT] 1860, p. 27.

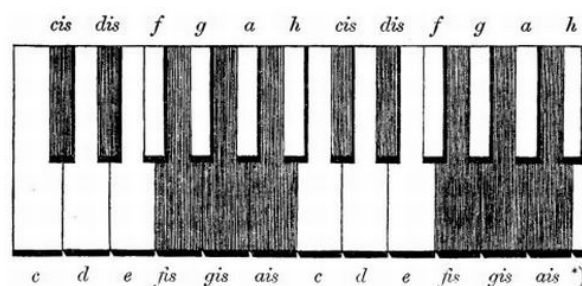


Figure 6. New keyboard by Karl Bernhard Schumann, SCHUMANN 1859, p. 11.

Vincent's writing entitled *New Musical System* [Neues musikalisches System] from 1862⁴¹ refers directly to this previous publication. Its intention is to render a more detailed version of the thoughts he had previously introduced. However, the idea of the new keyboard is missing in it. It should take 13 more years, until Vincent finally dedicated a

³¹ ANONYMOUS [VINCENT], orig.: “Hätte Ludovico Viadana [(1560–1627)] ahnen können, welcher Missbrauch mit der Zeit erwüchse aus seiner ‘stenografischen’ Erfindung, er würde sie – unterdrückt haben.”, own translation.

³² Ibid., pp. 3–9.

³³ Ibid., p. 5, orig.: “Progressionen der Einheit”, own translation.

³⁴ Ibid., p. 7f.

³⁵ Ibid., p. 9.

³⁶ Ibid., p. 11f.

³⁷ Ibid., p. 12, orig.: “Es wäre gut, wenn wir für die zwölf Töne Angesichts [sic] der eingeführten Temperatur auch nur zwölf Namen hätten; es würde der ganze orthografische Apparat, der doch nur am Ende um der Orthografie willen existirt, erspart sein.”, own translation.

³⁸ Ibid.

³⁹ Ibid., orig.: “Solidarität”, own translation.

⁴⁰ ANONYMOUS [VINCENT] 1860, p. 27.

⁴¹ VINCENT 1862.

complete work to this topic: *Die Neuklavatur. Ihre Vorteile gegenüber den Nachteilen der alten* [The new keyboard. Its advantages in comparison to the disadvantages of the old one].⁴²

It might be the case that Vincent has been inspired by ideas of other theorists of his time when developing his new keyboard, especially by Karl Bernhard Schumanns *Vorschläge zu einer gründlichen Reform in der Musik* [Suggestions for a fundamental reform in music], published in 1859, one year before Vincent's first writing appeared.⁴³ Schumanns depiction on page 11 shows some similarities to Vincent's presentation (ill. 04b). Vincent writes that both, he and the physician Karl Bernhard Schumann, living in the small town Rhinow/Mark Brandenburg near Berlin, had invented the new keyboard at the same time, later on admitting that Schumanns writing had been published earlier than his own.⁴⁴ In 1843 William A. B. Lunn had already written a paper dealing with a "sequential keyboard", which was nearly identical to Schumann's and Vincent's. Lunn used the pseudonyme Arthur Wallbridge for this publication.⁴⁵ A fine overview about the history of the development of new keyboards and systems of notation in the 19th century is given in Otto Quantz' work *Zur Geschichte der neuen chromatischen Klaviatur und Notenschrift* [On the history of the new chromatic keyboard and notation].⁴⁶

The digression on this topic should now be concluded and Vincent's writing from 1862 should return to centre stage. This even more emphatic writing, which he published not anonymously anymore, and in which he states that "a musical Galileo is still missing", once again harshly renounces figured bass.⁴⁷ It does however contain some interesting concepts of presenting chords, mainly consisting of three or four notes, on circles.

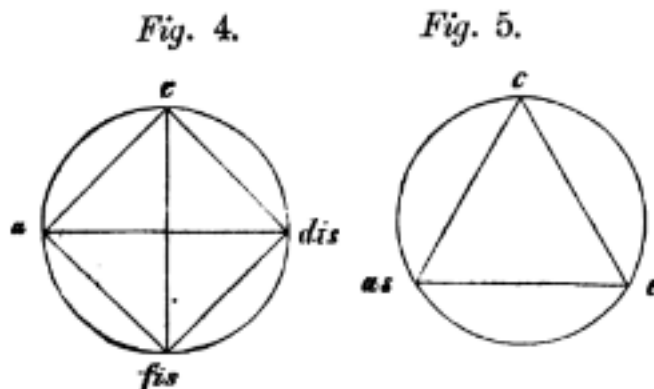


Figure 7. Symmetric sounds on circles, VINCENT 1862, p. 25, figures 4 and 5.

Vincent uses the names 'triangle' for the augmented triad and 'square' for the diminished seventh chord – sounds that are symmetric ones in the geometrical sense (see ill. 05). He points out, that the symmetry of the eye does not correspond to the symmetry of the ear.⁴⁸ The geometric figures are based on a clock-like system of numbers, representing the twelve tones. As a point of reference, the note *c* is placed at the position of the 'full hours'. A geometric representation of a chord contains, beside its original appearance, all its inversions and – if the circle is revolved – all transpositions, and, of course, all the transpositions of its inversion as well. Furthermore, with such a geometric appearance of a sound, nothing is said about whether the notes it is consisting of are played simultaneously or successively. This way Vincent's figures entail some of the main attributes of an unordered group of notes that later generations of music theorists have called a pitch-class set.

⁴² VINCENT 1875.

⁴³ SCHUMANN 1859.

⁴⁴ ANONYMOUS [VINCENT] 1860, p. 26.

⁴⁵ WALLBRIDGE 1843.

⁴⁶ QUANTZ 1877.

⁴⁷ VINCENT 1862, p. IV, orig.: "Der musikalische Galilei fehlt uns noch.", own transl.

⁴⁸ Ibid., p. 25.

a)	c	-	f	-	b	-	es	-	as	-	des	-	ges
	0		5		10		15		20		25		30
	c	-	g	-	d	-	a	-	e	-	h	-	fis
	0		7		14		21		28		35		42
	0		12		24		36		48		60		72
b)	c	-	f	-	b	-	es	-	as	-	des	-	ges
	0		5		10		3		8		1		6
	c	-	g	-	d	-	a	-	e	-	h	-	fis
	12		7		2		9		4		11		6
	12		12		12		12		12		12		12

Figure 8. Vincent's early description of 'modulo 12 thinking', reproduced after VINCENT 1894, p. 1, figure 1.

Another futuristic aspect of music theory of Vincent's later period shall be mentioned here. In the writing *Ist unsere Harmonielehre wirklich eine Theorie?* [Is our Harmonielehre really a theory?]⁴⁹ Vincent comes really close to pitch-class set theory by using its system of numbers: 0 for *c*, 2 for *c sharp* or *d flat*, 2 for *d* etc. This way the *c* major chord, in example, appears not as 1, 3, 5, like in the old system of figured bass, but as 0, 4, 7, representing the set class 3-11. The left part of ill. 06 shows that the addition of the numbers in each column leads to sums that may be divided through twelve, while the right part represents that the number twelve is subtracted at each point where number twelve is exceeded, a procedure that is called 'modulo 12' in mathematics and that is, again, one of the basic tools of pitch-class set theory.⁵⁰

The phenomenon of futuristic music theory in the second half of the 19th century was by no means limited to the German-speaking world. The writings of the French customs official, music theorist and publicist Anatole Loquin (1834–1903) should also be mentioned here, in particular his *Notions élémentaires d'harmonie moderne* [Basic notions of modern harmony]⁵¹ and the work entitled *Une révolution dans la science des accords, algèbre de l'harmonie* [A revolution in the science of chords, algebra of harmony].⁵² The subtitle of the latter work, *Traité complet d'harmonie modern, sans notes de musique ni signes équivalents, avec des nombres pour représenter les combinaisons harmoniques et des lettres pour exprimer les successions mélodiques* [A complete treatise on modern harmony, without musical notes or equivalent signs, with numbers to represent harmonic combinations and letters to express melodic successions]⁵³ – is revealing with regard to the significance of Loquin's various concepts and intellectual approaches in connection with the emergence of pitch-class set theory.

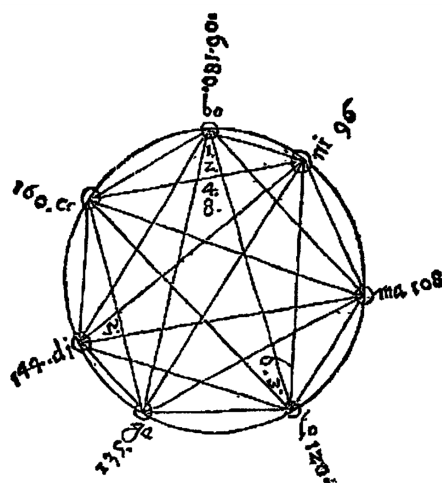


Figure 9. Depiction of sounds on a circle-based system after LIPPIUS 1612, f. 3r.

⁴⁹ VINCENT 1894.

⁵⁰ See also WASON 1988, pp. 62–64.

⁵¹ LOQUIN 1862.

⁵² LOQUIN 1884.

⁵³ Ibid., title page.

Let us return to the circles of Heinrich Josef Vincent, by means of which he systematically graphically depicted sounds and musical material. Such systematisations have existed long before. One of the earliest approaches of this kind was provided by the philosopher, theologian, and music theorist Johannes Lippius (1585–1612) in his *Synopsis musicae novae*⁵⁴ (see ill. 07). In terms of its content and methodological approach, Lippius' treatise largely represents a compendium of musical practice that was common at the time it was written. However, the doctrine of double counterpoint, to which many authors devote themselves at the end of similar works, is replaced in Lippius' work by a chapter characterised by revolutionary ideas. His approach is also based on a circular diagram that serves to visualise all possible intervals within the Ionian scale, which in Lippius' work functions as a material background. A line between two tones now results in an interval class in the sense of pitch-class set theory, as it graphically realises both an initial interval and its complementary interval. But Lippius' approach is even more far-reaching: more than a century before Jean-Philippe Rameau's (1683–1764) *Traité d'harmonie*⁵⁵, he recognised the sixth chord and the fourth sixth chord as de facto inversions of the triad by describing them as leading to an identical geometric figure.

Conclusion

The above considerations lead to the conclusion that pitch-class set theory, which originated on the US American continent and subsequently spread worldwide from there, is by no means an original creation, but is inconceivable without historically far-reaching models on the European continent. It is also impossible to imagine its development in the way it took place without reference to global political and technical events. As a result of these events, music theory research is divided into a specifically European and an Anglo-American strand. While the European research community, as a result of the disastrous initial situation in large parts of mainland Europe, tended to be critical of any form of systematics and dogmatics and instead strongly emphasised the individualism of works in music analysis, this reluctance did not exist in North America, which was much less affected by the Second World War. The Schenkerian system for tonal music can become established and institutionalised at US colleges and universities. Schenker's own problematic and highly remarkable relationship to the National Socialist regime can be slowly but steadily depoliticised, as it were, with a sufficient geographical safety distance, and develop in this form. For post-tonal music, the pitch-class set theory, which was available in a teachable form in the 1960s, represented a welcome and very suitable counterpart to layer theory in the university curriculum, especially as Schönberg himself as a source of inspiration (and at least in part probably also to be inspired) was ultimately in the immediate vicinity.

It should be mentioned that Allen Forte, whose 1973 book *The Structure of Atonal Music*⁵⁶ is perhaps the best-known internationally recognised standard work of 'classical' pitch-class set theory, was a Schenkerian in his early days. His first book publication dates back to 1955 and is entitled *Contemporary Tone Structures*⁵⁷. One searches in vain for set-theoretical content. Instead, the author deals with the question of how the graphic analysis methods of layer theory can also be applied to post-tonal repertoire. Linear-contrapuntal aspects of the analysed works take centre stage – an aspect to which Forte was to return in his very late publications.⁵⁸

This book publication is spectacular because Forte took an arch-conservative stance in the decades that followed, in the midst of an emerging bitter dispute between the revisionists among the Schenkerians and the traditionalists. The Travis-Forte debate in particular, a verbal dispute between the composer Roy Travis and Forte involving several mutual attacks and counter-attacks, is legendary.⁵⁹

In 2007, I had the honour of exchanging a few emails with Allen Forte, courtesy of Janet Schmalfeldt. In one of these e-mails, Forte casually summarises the gap between the two continents, which remained almost unchanged then as it does today in 2024, when he mentions his former doctoral student Janet Schmalfeldt and her dissertation, which deals with the set-theoretical analysis of Alban Berg's opera *Wozzeck*: "Janet Schmalfeldt's *Wozzeck* study was the first (and

⁵⁴ LIPPIUS 1612.

⁵⁵ RAMEAU 1722.

⁵⁶ FORTE 1973.

⁵⁷ FORTE 1955.

⁵⁸ See for example FORTE 1988 and FORTE 1992.

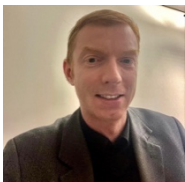
⁵⁹ See for example TRAVIS and FORTE 1974.

still the best) large-scale analysis of a major non-tonal work. I have suggested to Janet that she might do something with Olivier Messiaen's music as well, which I believe remains untouched, since the French seem to be behind the times in analytical matters – although some of the younger scholars have removed the blinders!⁶⁰ This description may sound arrogant at first glance. It was never intended for the public. Nevertheless, it may be true.

However, the French colleagues may not have been exclusively unfamiliar with or interested in pitch-class set theory, or blind to it from Forte's point of view. Rather, the situation in Germany is equally as follows: Publications on pitch-class set theory by German-speaking authors appear comparatively late, their number is extremely small and they are sparsely received.⁶¹ Their supposed lack of musicality and analytical errors are often criticised in specialist circles. Nevertheless, in these times of globalisation and the internationalisation of musicological and music-theoretical discourse, with its growing interest in intercultural and ethnomusicological research, pitch-class set theory has great potential. Depoliticised in its current generation - and hopefully not re-politicised in the context of current global and regional political events - there are many directions in which it can develop further.

This primarily concerns the expansion of their analytical tools: set-theoretical systematics can potentially also be designed beyond the scales of Western music. Algorithms can also be transferred to other musical parameters: To the level of rhythm, timbre, dynamics, articulation, etc. A much larger repertoire of music is waiting to be systematically analysed in a way that is by no means remote from music and ahistorical, and in this way to find its deserved place in the focus of current international discourse.

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⁶⁰ FORTE 2007.

⁶¹ See for example LAGALY 1995, SCHEIDELER 2005, SCHMIDT 2009, and LEWANDOWSKI 2017.

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