

FROM ANALOGUE TO DIGITAL: AN INTERVIEW WITH GOTTFRIED MICHAEL KOENIG

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Abstract: Gottfried Michael Koenig (b. 1926) is a seminal figure in the history of electronic music. He contributed important technical and musical ideas at WDR studio in Cologne from 1954 to 1964. He was then the director of the Institute of Sonology in Utrecht, Netherlands until 1986. Since 1986, Koenig has continued to compose, to develop complex computer systems, and to edit, translate, and publish his extensive corpus of theoretical writings.¹ This conversation, which aims to foster further English-language scholarship on Koenig and his music,² took place in English in May 2015 at the Institute of Sonology, now located in The Hague, Netherlands.

Early Musical Experiences

Ji: Can we begin by talking about your early musical experiences and your training? What were the first experiences with electronic music?³

GMK: I came from a family with musical interests. My mother played the piano, my father only a little; I took piano lessons from a very good professional teacher, and there was some musical instruction available in the primary school. After the war, I questioned whether to study some science subject, which would have otherwise been my preference, or to stay in music, which I did. I went to the Conservatory in

¹ Koenig's personal website is extensive: <http://www.koenigproject.nl/indexe.htm> (in English and German; accessed 14 July 2015). Throughout this article, I cite Koenig's English-language translations of his own writings where available on his website. German-language writings are collected in the multi-volume Gottfried Michael Koenig, *Aesthetische Praxis: Texte zur Musik* (Saarbrücken: PFAU, 1991–2007).

² See Björn Gottstein, 'Gottfried Michael Koenig. Die Logik der Maschine', *Musik als Ars Scientia: Die Edgard-Varèse-Gastprofessoren des DAAD an der TU Berlin 2000–2006*. Bilingual edition (Saarbrücken: PFAU, 2006), 56–67; Stefan Fricke, *Gottfried Michael Koenig: Parameter und Protokolle seiner Musik* (Saarbrücken: PFAU, 2004); Heinz-Klaus Metzger and Rainer Riehn, eds, *Musik-Konzepte*, No. 66: *Gottfried Michael Koenig* (Munich: Edition Text + Kritik, 1989).

³ See Curtis Roads, 'Interview with Gottfried Michael Koenig', *Computer Music Journal* 2/3 (1978), pp. 11–15, 29. See also Koenig, 'Programmed Music: Personal Experiences and Work [1975]' and 'My Experiences with Programmed Music [1975]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

Detmold, the Nordwestdeutsche Musikakademie, from 1947 until 1950, when I decided to stop. I'm not good at studying, doing set work, and taking other people's word. I'm more someone who likes to come to conclusions independently. So I wasn't a very good student. I learned a lot, just by being in this kind of environment for four years, having a lot of friends and talking with them. But as far as the teachers go, they might not have been very happy with me.

After moving back with my parents, I was composing all the time. Even before the war, as a child, I already started writing notes on paper because I think I liked it. I was especially in love with the handwriting of my first piano teacher. When she wrote down a scale together with the fingering as an exercise, I was really in love with her handwriting. That might be one of the reasons I got interested in writing notes. It is necessary to have some idea of harmony and rhythm, which come together to make a piece of music, but there is always a typographic aspect involved.

[In 1953] a friend from Detmold told me that there would be a new institute in Cologne for students looking for a mediating position between music and the technique of recording for radio and television, Gramophone, and what have you.⁴ I had [already] written a letter to Herbert Eimert,⁵ and had found out about the electronic studio beforehand, years before; I heard the lecture given by Werner Meyer-Eppler from Bonn University at Darmstadt in 1951.⁶ The new institute [in Cologne] came into being in 1953 and I went there at the beginning of 1954, but I was not very satisfied with the teaching there. Trautwein came and gave lectures, and many other people.⁷

JJ: Why didn't you attend the *Tonmeister* training course in Detmold?⁸

GMK: I did not want to be a *Tonmeister*. In those days this was work only in the radio stations, to be the mediator between the

⁴ Institut für musisch-technische Gestaltung. See Kees Tazelaar, *On the Threshold of Beauty: Philips and the Origins of Electronic Music in the Netherlands 1925–1965* (Rotterdam: V2_Publishing, 2013), p. 251.

⁵ Hebert Eimert (1897–1972) was a musicologist, theorist, critic and composer. He was the first director of the WDR electronic music studio (from 1953–1962), and producer of the cult-favourite WDR *Musikalisches Nachtprogramm*, a weekly radio program that played and contextualized new music in the post-war years.

⁶ Werner Meyer-Eppler (1913–1955) was a scientist with a special expertise in phonetics, communication and information theory at the University of Bonn. He wrote *Elektronische Klangerzeugung* (1949), and contributed much to the intellectual, technical and aesthetic development of the WDR studio in Cologne. See Elena Ungeheuer, *Wie die Elektronische Musik "erfunden" wurde ... Quellenstudie zu Werner Meyer-Epplers Entwurf zwischen 1949 und 1953* (Mainz: Schott, 1992). Meyer-Eppler's Darmstadt 1951 lecture is reprinted in Gianmario Borio and Hermann Danuser, *Im Zenit der Moderne: Die Internationalen Fereinkurse für Neue Musik Darmstadt 1946–1966*, vol. 3 (Freiburg im Breisgau: Rombach, 1997), pp. 102–4.

⁷ Friedreich Trautwein (1888–1956) was a scientist and inventor of the Trautonium, one of the first electronic keyboard instruments. See Peter Manning, *Electronic and Computer Music*, 4th edition (New York: Oxford, 2013), Thom Holmes, *Electronic and Experimental Music*, 4th edition (New York: Routledge, 2012) and Joel Chadabe, *Electric Sound: The Past and Present of Electronic Music* (Upper Saddle River, NJ: Prentice Hall, 1997).

⁸ Meyer-Eppler's materials, held at the Akademie der Künste in Berlin, show his yearly participation in the *Tonmeister Tagung* [Sound Engineer Study Days] at the Nordwestdeutsche Musikakademie in Detmold, Germany beginning in 1949. This is, of course, the same city and college that Koenig attended.

conductor and the technician who took the recording. You had to be able to read score, and to make the arrangements with the microphones and so on, because the technician wouldn't be able to understand music, and the conductor has no idea of the techniques; so you need someone who is on both sides. The course in Cologne did not aim at the *Tonmeister*, not at all. It was more to do with sociology of music; the way concerts and radio programming were made. The Cologne programme was more scientifically oriented, not musicology, but with a wider approach.

At the WDR

JJ: How did you begin working at the WDR studio, then?

GMK: I wasn't satisfied so I went back to Eimert, and he brought me together with Stockhausen. I became aware of Stockhausen for the first time in 1951, in Darmstadt, when he played together with Karel Goeyvaerts this famous Sonata piece.⁹ We met in the studio and talked together and he showed me the equipment, showed me the first pieces, *Studie I* and *II*. Goeyvaerts was still present, and also the Swiss architect Paul Gredinger, who was not really a composer. Everything came automatically, I could say. Boulez came along and I had already met Nono and Maderna, and also Heinz-Klaus Metzger, Stephan Wolpe and Herbert Brün in Darmstadt. It was an ongoing process of making acquaintances and taking up knowledge and experience.

JJ: Did you know in 1954 that electronic music would be your life's work?

GMK: Yes, in 1954, when the first concert had taken place,¹⁰ the two technicians were Heinz Schütz and Erhard Hafner, who then went to the radio drama division (see [Figure 1](#)).¹¹ And I took his [Hafner's] place, more or less. I'm not sure, I guess he was just paid as a technician, and then I was paid as a technician for a couple of months, until they found out that I had no technical study and I was not a technician so they couldn't really pay me without having a conflict with the labour people. So the *Musik Abteilung* [Music Division of the WDR] took over and paid me my monthly honorarium.

There was always work to do. I was helping Stockhausen with his *Gesang der Jünglinge*, and other composers came.

⁹ Goeyvaerts's Sonata for Two Pianos (1951). Stockhausen and Goeyvaerts performed section two of the integral serial, pointillist piece in Adorno's seminar at Darmstadt in 1951. Adorno responded with disdain, and Stockhausen rushed to Goeyvaerts's defense, reportedly chastising Adorno for looking for a chicken in an abstract painting. See Karel Goeyvaerts, 'Paris-Darmstadt 1947–56', *Revue Belge de Musicologie* 48 (1994), pp. 35–54; Robin Maconie, *Other Planets: The Music of Karlheinz Stockhausen* (Lanham, MD: Scarecrow Press, 2005), pp. 40–42; Richard Toop, 'Messiaen/Goeyvaerts, Fano/Stockhausen, Boulez', *Perspectives of New Music* 13/1 (1974), pp. 141–69.

¹⁰ The *Musik der Zeit* concert at the WDR in Cologne on 19 October 1954. See Frank Hilberg and Harry Vogt, eds, *Musik der Zeit 1951–2001: 50 Jahre Neue Musik im WDR* (Hofheim: Wolke, 2002).

¹¹ See Marietta Morwaska-Büngeler, *Schwingende Elektronen: Eine Dokumentation über das Studio für Elektronische Musik des Westdeutschen Rundfunks in Köln 1951–1986* (Cologne: P.J. Tonger, 1987).



Figure 1:

Left to right: Gottfried Michael Koenig, Erhard Hafner, Heinz Schütz, Herbert Eimert in the WDR Studio c. 1954 (photo © WDR Bild-Archiv)

There was Hambraeus from Sweden, and Klebe from Germany, Evangelisti from Rome, and others.¹² Someone was needed to work with them. Schütz alone was not always the right person, because his background was in radio technique and he was of little help to composers who wanted to discuss musical problems during the work. And Stockhausen was busy; he had no time for that. For me, it was a very practical situation, since I was a composer and also very well acquainted with the equipment. I could then accompany the young composers to explain the studio, and at the same time discuss musical problems and how to translate the musical [idea] into a working method.¹³

Jl: Can you describe what a typical day would have been like when you were working as a technician, with someone like Ligeti or Klebe?

GMK: I was the first one at the studio in the morning and let's say Franco Evangelisti came a little later, and we went on with whatever we'd left the day before. That means making sounds, cutting tape, splicing tape, making transpositions, realizations and so on. Then we'd go to have something to eat in the canteen, the *Teestube*, and in the afternoon we went on until 4 or 5 o'clock, and then we parted until the next day.

Jl: Sometimes composers would come in with an idea or a score that didn't work at all. What happened in those types of situations?

GMK: That was not the regular case. In most cases, composers had some previous idea because they have already heard some

¹² Koenig served as the technician for Stockhausen's *Gesang der Jünglinge* (1955–56); Bengt Hambraeus's *Doppelrohr II* (1956); Giselher Klebe's *Interferenzen* (1955); and Franco Evangelisti's *Incontri di fasce sonore* (1957), among many others. See Hilberg and Vogt, *Musik der Zeit*, pp. 138–41 or Morwaska-Büingeler, *Schwingende Elektronen*, pp. 109–11.

¹³ See Koenig, 'Studio Technique [1955]', trans. Hans. G. Helms, *Die Reihe*, vol. 1 (Bryn Mawr, PA: Theodor Presser, 1958), 52–4; and 'Programmed Music – From the Composer's Viewpoint [1968]', <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

electronic music and had some idea of how to work with it.¹⁴ Then they got some instruction from me, I showed them how to operate the machines from the musical standpoint, not from the technological. It wasn't only about what sounds you could make, but also what relationship you could make between this sound and other sounds. That you could discuss with a composer. I remember a situation when I was working at the WDR. Kagel, working in another room, came to me and said, 'Can you come to my studio? I have made a sound and I would like to show it to you'.¹⁵ He played the sound, and I didn't know what to say about it. It's a sound, OK. Maybe he wanted to know whether I liked it. Yes, I thought, I could say whether I liked it or not, but we are composers who make music, not sounds. A sound is not music. If he were to tell me or show me other sounds around this one, then I could say something about it. But a single sound could be just anything. It is rather a taste decision, whether to like it or not.

In my experience, the composers came with a score – not a complete score of course, but some notes about what kinds of sounds to make and what kinds of experiments to try out, and things like that. And I would send them home to draw their conclusions, put them together and develop a score: 'You are the composer, you tell me what you want. I won't make your piece'. On the other hand, we had also composers who said, 'I have a certain idea of sound, I will try to explain it to you, and you can try to make it'. You get some literal description of sound and then you have to translate it. Then I would consider our equipment, think something up and give the composer some advice. It's difficult. A person has to have a certain kind of *Selbständigkeit* [independence] to do the work.

Ji: Were you always testing the results with your ear?

GMK: You can't make sound without hearing them at the same time. The *Lautsprecher* [speaker] is always 'on'. So you can judge whether you are correctly following your notes and, at the same time, whether your notes correctly describe your intentions. Only during the montage, when sounds are combined to form structures, the work is less experimental and more directed towards the whole form of the piece. There are questions like how to put the sounds into layers in order to synchronize them, and how precisely that can be done with respect to the exactness of the machinery. The ear is still involved, but the main work done with your hands.

¹⁴ One notable exception is György Ligeti (1923–2006), who worked with Koenig at the WDR in 1957. Ligeti had little exposure to electronic music and technology, but considered it the 'best shock of his life'. Ligeti writes about the WDR experience, giving credit to Koenig's important guidance and tutoring, in 'Auswirkungen der elektronischen Musik auf mein kompositorisches Schaffen', *Gesammelte Schriften*, vol. 2, ed. Monika Lichtenfeld (Mainz: Schott, 2008), pp. 86–94; quotation from p. 86. See also Ligeti, 'Musik und Technik', *Gesammelte Schriften*, vol. 1, ed. Monika Lichtenfeld (Mainz: Schott, 2008), 237–65 and Ligeti, 'Mein Kölner Jahr', *Gesammelte Schriften*, vol. 2, 29–32.

¹⁵ During the composition and realization of *Transición I* (1958–59).

JJ: When you were working as a composer how was your day different?¹⁶ Did you have technicians who helped you with those pieces?

GMK: After making preparations for the first concert, I decided to try my own hand in making an electronic piece. I had composed already for many years, but always instrumental music. Since I got interested in electronic music – three years before I came to Cologne – I wanted to realise music that could not be played by an orchestra. I even wrote a score to be realised in a studio as soon as I would find one. In the meantime I rewrote it for orchestra.¹⁷ That this was possible shows how much my musical thinking had still been based on instrumental music.

I made my first electronic piece according to the [WDR] equipment and the way you can use it. I never had a technician help me, except when Ligeti came.¹⁸ I didn't need much help. I was used to working alone. To be able to do this, I had arranged my methods of sound making, modifying and synchronizing in such a way that I wouldn't need any help. Stockhausen was very happy that he could discuss problems and work with me together. It's just faster. The one is busy with the score, writing down frequencies, composing actually. And the other one could already make the preparations for the technical realisation. Instead of doing it one after the other, one could do it in parallel. That helps of course, with time. But for myself, I invented working methods that were done in a very rational way. I am always looking for the fastest way to get to the results. That didn't mean that they weren't very complex, but I was interested in the shortest way to complexity. I do not like being watched when I am at work. I prefer to be alone.

JJ: So having someone else increased the efficiency but it also made you feel somewhat self-conscious.

GMK: Self-conscious, yes, that's one point. On another point, there had been friends who came along to have a look and a talk, interrupting me, because I couldn't continue working and having a conversation at the same time. With Stockhausen, it was different; for long stretches, not a single word was spoken. But when there was something to say, we took all the time [necessary], considering the discussion as part of the work at hand.

¹⁶ The pieces that Koenig produced as a composer at the WDR studio include: *Klangfiguren I* (1955), *Klangfiguren II* (1955–56), *Essay* (1957–58), *Materialien zu einem Ballet* (1961) and *Terminus 1* (1962). *Essay* (Vienna: Universal Edition, 1960) is published as a realization score. Hear the following CDs: BVHAAST 9106 'Acousmatrix 6', BVHAAST 9001/2 'Acousmatrix ½', and Edition RZ 2003–04 'Gottfried Michael Koenig: Portrait'. Koenig's analysis is 'Analytical Descriptions [1971]', <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015). See also Konrad Boehmer, 'Gottfried Michael Koenig: *Essay* (1957–58)', *Electroacoustic Music. Analytical Perspectives*, ed. Thomas Licata (Westport, CT: Greenwood Press, 2002), pp. 59–71.

¹⁷ Koenig wrote *Fantasie für Orchester* (1951–52) after his initial encounter with *elektronische Musik* at the Darmstadt courses in summer 1951. It was a collaboration with a dancer, though the collaboration ended in 1952 before Koenig could realise the piece in a studio. The score was provisionally notated with conventional notes and rhythms, which he intended to transform into electronic sounds in the studio.

¹⁸ Koenig helped Ligeti realise *Glissandi* (1957) and *Artikulation* (1957–58); Ligeti helped Koenig realize *Essay* (1957–58). See Ligeti, 'Musik und Technik', *Gesammelte Schriften*, vol. 1, pp. 237–65; and Koenig, 'Remarks on Composition Theory [1968]' <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

Ji: Tell me more about in the early 1960s, when you began to give lectures in the Netherlands and you became interested in computer programming. How did you decide to leave the WDR?¹⁹

GMK: There are three things. On the one hand, the relationship with Stockhausen deteriorated a little, because I was less available to him. I was a lecturer for composition, analysis and electronic music at the Musikhochschule in Cologne. Because there was no [electronic music] studio at the Musikhochschule, I took the students to the WDR where I was allowed to teach them electronic music. Also, I met my wife. When I was alone with Stockhausen, we often worked until 10 o'clock in the evening, 11 o'clock, 12 o'clock. It was no problem. And now came a time when I wanted to go home at 5 o'clock or 6 o'clock. He missed me a little, he said. Although I was concentrated on the [WDR] studio, I was also looking around for some other work in Germany or maybe abroad.

Second point was, in those days, that the WDR wanted to get rid of the freelance people by putting them in fixed positions. After having been paid uninterruptedly for a certain number of years you were entitled to tenure. So they started offering me contracts I didn't like, because the conditions didn't match the kind of work I had done all the years. It was a difficult situation. But luckily I had good relationships in the Netherlands where I [had] lectured since 1961 at the Gaudeamus Foundation in Bilthoven.²⁰ The Foundation ran a little electronic music studio in a garden shed on the Gaudeamus premises. There was a larger studio at Utrecht University, directed by the Dutch composer Henk Badings, who wanted to go to Stuttgart where he was offered a professorship. Walter Maas, director of Gaudeamus and having the ear of the University's Curatorium, asked me if I would like to become Badings' successor. I liked the idea of being the boss instead of being depending on people who would tell me what to do.

The third point was my interest in computers. I started working with computers in Bonn in 1963, and wondered whether it would be possible to continue it in the WDR radio station.²¹ But their computer was already used to capacity, and there was no interest in using it for the people of the *Hexenküche* [witch's kitchen], as the electronic music studio jokingly was called. And I don't think the computer would have been well equipped for sound generation. You'd need a D to A [digital to analogue] converter, and most early computers didn't have a thing like that. In any case, I believed that a university's mathematical centre would be better equipped for solving the problems of sound production.

¹⁹ The best account of this time period in Koenig's career – inside a very thorough history of electronic music in the Netherlands – is Tazelaar's *On the Threshold of Beauty*, p. 253–7.

²⁰ Koenig gave series of six lectures and directed a composers' course as part of the Gaudeamus Muziekweek in Netherlands in September 1961, and returned there in 1962 and 1963 (Tazelaar, *On the Threshold of Beauty*, pp. 219–26).

²¹ Koenig studied with Fritz Krückeberg at the Rheinisch-Westfälisches Institut für instrumentelle Mathematik at Bonn University; see Tazelaar, *On the Threshold of Beauty*, p. 253.

Computer Programming and Sonology

Jl: How did your serial musical experiences and your technical training interact with this new interest in computer programming?

GMK: I wanted to make use of computers because I knew already it would be possible to make sounds with computers.²² It was very cumbersome in those days. I had some examples on tape from the States, where things were developed earlier. On the other hand, it seemed very difficult to enhance the possibilities of the analogue studio as we were used to them. In my last Cologne years, since 1962 or so, I remember Stockhausen saying, 'We need a new studio, we will be allowed to make a new design, there will be money. I have to go on vacation. You could start making plans for the new studio'. I started making the plans but wondered whether some new machines or just more of the same kind would change a situation where the composer would, in front of a background of the most sophisticated equipment, just remain cutting and splicing tape. It didn't fit.

I knew what a computer is and what you can do with it – not very precisely but in general – and that it can open up into anything. It didn't have the limitations of the sine wave generator; a computer could be programmed. In the studio it took sometimes half an hour before the patch from the day before was re-established. I thought, instead of that, you could just load a computer program and start working. Furthermore, you could make all kinds of sounds, better described and better related to one another than you could with analogue means. I remember a certain production phase in Stockhausen's *Kontakte* where he used a sequence of impulses raw from the generator, which were spaced according to the values of a geometric series as used elsewhere in the piece. The recording was of considerable length and had to be transposed many octaves up before the expected fundamental was reached. Stockhausen thought, with this process – namely by using permutations of the impulse series – he could determine the timbre of the resulting sound. It was a time-consuming activity with little result, because the timbre of the sounds was foremost the result of subsequent filtering and multiple reverberation using a steel plate.

But that set me thinking, whether it would be possible to determine sound qualities and sound relationships by determining the sound wave itself. That we couldn't do with all the equipment we had; the only way out would be the computer. That is why I went to the mathematical institute at Bonn University to study computer technology. The first programming language that I used was Fortran 2, which had a 'do' statement, an 'if' statement, an 'assignment' statement, a 'go to' statement. So you could make a kind of recipe of

²² See Koenig, 'The Second Phase of Electronic Music [1965]', 'Complex Sounds [1965]', and 'Notes on the Computer in Music [1967]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

what to do under which condition. That's the 'if' statement. Depending on the outcome, you can use the 'go to' statement to go here, go there and go back. So it was very simple but you could describe anything with these few statements.

At Utrecht University, I began with a very little computer installation, an X1 from Electrologica. It occupied only a few rooms in a small building with a couple of staff members. Every user had to learn how handle it, just to get it running, to write programs, and to punch tapes. When I started there was no screen. There was only a Teletype machine producing your text on perforated paper and making a punched tape you had to feed to the computer. The work was cumbersome and time consuming. A few years later, a big computer came, situated in a large computer centre; I got an assistant to punch the tapes and to maintain contact with the computer people.

- Ji:** In *Project 1* (1964), you did not really work with programming to build sounds; you worked more with syntax in that piece.
- GMK:** There was a very simple reason for that. When I began to study computer technology, I said, 'I would like to make sounds with a computer'. The teacher said, 'for that you need the D to A [digital to analogue] converter, and that we don't have'. They had no plans to buy or build one. I decided therefore to describe the musical form instead of the musical sound. That is easier to check and is independent of the hardware. I can compose a string quartet or a piano piece and have it played, and know what the computer has done. With sounds it becomes more difficult; you have an algorithmic description on the one hand and a sounding result on the other hand, but it seems to be more difficult to see if a certain constellation of programming rules corresponds to a certain aspect of the perception of the sound. Before I had enough experience in describing musical contexts and forms with a computer program, I would not dare to describe sounds and their relationship in this way.²³
- Ji:** You've said elsewhere that music is quite formulaic;²⁴ your idea with *Project 1* was to try to better understand those formulas, and to use the computer to create rules that will result in music.
- GMK:** Yes, that came from the theory of music. Using a series for pitches and a series for durations and so on, and putting them together, is quite mechanical. You have to think up an environment in which this would really work.²⁵ I had noticed as early as 1951 in Darmstadt that there were sometimes problems that wouldn't fit [in the system]. You'd have to make corrections. It would have been nice to know what the piece would have been without the corrections. That was actually the starting point for *Project 1*. Trying out

²³ See Koenig, 'Construction of Sound [1963]' and 'Working with *Project 1*: My Experiences with Computer Composition [1990]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

²⁴ See Koenig, 'My Experiences with Programmed Music [1975]', <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

²⁵ See Koenig, 'Music and Number [1958]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015).

compositional rules uncorrected. The uncorrected versions were never played in Darmstadt, of course. The composer, explaining the serial structure of his work, would say something like 'At this point the system fails, so we have to make some corrections'. And I thought, 'Would it be possible to make a piece completely according to rules without being forced to make corrections after?'

So I was very happy to make a program for producing instrumental music instead of sounds. Because the sound alone, I would say, is not music, actually. Music needs more than sound. Sounds have a relationship. It's not only the conception of sound, but also the building of relationships between sounds, which the composer is not used to. A [time] point is interpreted by the way in which something changes; the loudness maybe, or the timbre, or the pitch, or the chord structure. That can be done quite without sounds, just by applying certain theoretical concepts, which can be worked out in a computer program. The composer can think up the structure of the music beforehand; the computer would then do the application of the structure to elements, durations, and so on, in a very fast way. On the other hand, writing a program costs a lot of time, so it's not faster, just a completely different approach.

Jl: How did *Project 2* (1966) continue the work of *Project 1*? What does *Project 2* add?

GMK: *Project 2* allows you to apply more complex rules, and also to make more statements about the relationships between the parameters.²⁶ In *Project 1*, there is only one user-defined dependency between the size of a chord (number of simultaneous pitches) and its distance to the next chord (the entry delay). Other parameters such as instrument or dynamics follow freely their own rules, their relationship only being of a statistical nature. The duration of a chord, be it shorter, equal or longer than its entry delay, remains undefined. This gives the user a wide range for the 'interpretation' of the resulting score table. I also designed *Project 2* because I wanted to make a better definition of an instrument, so that you could make sure in a composition that it plays only in a certain time or pitch range, and to specify how durations should be related to entry delays. It is this kind of enlargement to go from *Project 1* to *Project 2*.

Jl: So *Project 2* gives the composer more controls that apply to the sounds.

GMK: Exactly, especially in terms of instrument definitions: ranges for pitches, durations, dynamics and so on. There is also a distinction between melody and percussion instruments. You don't have to define instruments like you find them in books on instrumentation; you could limit their qualifications

²⁶ See Koenig, 'Programmed Music – From the Composer's Viewpoint [1968]' and 'Use of Computer Programs in Creating Music [1970]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015). See also Otto Laske, 'Composition Theory in Koenig's *Project One* and *Project Two*', *The Music Machine: Selected Readings from Computer Music Journal*, ed. Curtis Roads (Cambridge, MA: The MIT Press, 1989), pp. 119–30.

to the necessities of your formal goals. The so-called hierarchy plays an important role. It determines the order in which the parameter values are chosen and hence the importance of their dependency. The latest version of the program allows the user to experiment with parameter constellations. The composer could produce the values for one parameter, freeze them and then, as often as necessary, insert those of another parameter in order to see which chance-controlled values would fit best. This process can be repeated as often as he wishes and with any number of parameters. So you see that *Project 2* not only enlarges *Project 1*, but also differs in new and wider possibilities for the description of the musical structure.

Ji: Eventually you were able to work with sound synthesis, right?

GMK: Yes, I made an SSP [Sound Synthesis Program] program [in 1971]. The principles I invested in *Project 2* are also used at the base of SSP.²⁷ They concern, in the first place, the way in which values, contained in a list, are chosen by different aleatoric functions. Without aiming at specific sounds or sound relationships, I really wanted to know if it was possible to produce sounds, categorize sounds, judge sounds, put sounds in a relationship, with the same means that are used to build up the form structure of an instrumental piece.²⁸ It was just an idea I wanted to try out. I was not sure it would deliver useful results, but by studying the possibilities, I hoped to learn more about the relationship between sound structures and formal structures, a theme which already had fascinated Karlheinz Stockhausen. Similarity, contrast, density, permeability: such distinctions played an important role not only in instrumental music composition, but seemed to be even more important in sound synthesis because of the absence of counterpoint, voice leading, polyphony, beat and related concepts.

Ji: We're talking now about the relationship between the micro-elements of the composition and the macroelements of the composition. What do you think is the ideal relationship between the micro and the macro?

GMK: That is difficult to say. I thought we could consider a piece of music, whether electronically made or by an orchestra, as just one single sound, well articulated and sometimes interrupted. The question is: where is the difference between the piece and what we call sound? The piece is made of sounds, but I can also say that well-articulated sound is a piece. SSP is meant as an experimental stage of this kind of investigation. I make use of form-defining means for producing sound. On the other hand, I could consider the sound as a kind of a recipe. If I stretch it to 10 minutes, it could also give the

²⁷ See Koenig, 'Composition Processes [1978]'. <http://www.koenigproject.nl/indexe.htm> (accessed 15 July 2015). See also J.D. Banks, P. Berg, R. Rowe, and D. Theriault, SSP. *A Bi-Parametric Approach to Sound Synthesis* (Utrecht/The Hague: Institute of Sonology, 1979).

²⁸ This thinking recalls the preoccupations of the so-called spectral composers such as Grisey, Murail and Saariaho, who in many cases had sound synthesis experiences at IRCAM. Koenig did not have a dialogue with the composers in the spectral group, however.

structure for the whole piece. What would the piece sound like if it were considered a sound, and how could the sound be considered a piece? I thought there was something in the relationship that wasn't well established in instrumental music.

Aesthetics and Ideas

Ji: Our conversation shows that you trust your mind perhaps even more than your ear. Why do you work so hard to refine the idea?

GMK: Because I am afraid that my taste will come to the fore and change my judgment. I don't know where my tastes come from. I know what I want, but taste is quite a different thing. It's what you are used to, which has evolved over the years into something you don't make decisions about anymore. So I am a little afraid of my own taste.

The composer listens completely differently from a music lover, even a music player. Music is something that the listener feels as if it was telling him something. Music doesn't tell me, I tell the instruments what they should do. It's a different relationship. It's great fun to compose a piece of music, an adventure. A music listener, in most cases, doesn't want to listen to a piece of music as an adventure, but as something he's heard before and likes; he wants a repetition of a former experience.

Ji: What is the relationship between your writings and your composition? Does theory spur the composition, or are your writings *post hoc*?

GMK: In the first years in Cologne, nobody knew electronic music; nobody liked electronic music. If electronic music was played in a radio broadcast – mostly just before midnight – or in a concert hall, people didn't like it, didn't know what to do with it, hated it even. Musicologists were at that time only historically interested. Critics writing for the newspaper were many times musicologists, not always of course. Actually, some were willing to find out about the actual musical situation, especially after the Nazi time and the war and so on; but as Stockhausen said, 'Nobody has anything to say, or knows anything about what we have done. We have to do it ourselves'.²⁹ And so Stockhausen started writing about music, and not only about himself. He wrote about Debussy, about Mozart, and other composers,³⁰ not only in order to explain his own music but also his own music as a part of music as such, in general. He started to explain why he composed, how he did it, what to think about it, just to give some documentation, which you cannot have by only

²⁹ This attitude was pervasive amongst the European avant-garde; Boulez, Eimert, Ligeti, Koenig, Cage and others wrote prolifically about their own work. Journals such as *Die Reihe*, *Darmstädter Beiträge*, *Gravesaner Blätter* and *Incontri Musicali* were founded to allow composers to control communications, instead of relying on journalists, critics and musicologists.

³⁰ See Stockhausen, *Texte*, vol. 1 (Cologne: DuMont Schauberg, 1963).

listening to the piece. He also made experiments with other young people. He would play the first or second *Studie*, and stop the tape and ask people, 'How should it go on? What do you think?' He would listen to their answers and then say, 'Let's listen to what the composer did'. We felt we had to defend what we did, but also to explain it. That was the reason for making public statements about music in radio talks, lectures at schools, and so on. I thought it was the right approach, and I have always been interested in theories and philosophy.

My work is always a mix of both thinking and doing things. At the beginning, I was doing things and thinking afterwards, putting things together. Stockhausen did the same when he wrote *wie die Zeit vergeht*.³¹ His reflection on ideas about the relationship between time and timbre came after [many compositional experiments], not before. Later on, when my thinking had achieved enough structure and direction, I tried to realize my insights and ideas by doing, by having the music flow along the channels of my thinking.

But thinking about music had also a very practical side. There was the teaching at the *Musikhochschule* in Cologne, then the courses in Bilthoven, and finally the regular meetings with Sonology students at Utrecht University. I went to Canada and the States in 1965 on a lecture tour and was many times invited to give speeches at international congresses. This means I had to think about music and to formulate my ideas in a way that was plausible for my audiences. But in the end, you can't compose without thinking, and thinking results, after a certain amount of modification, again in wordless thoughts: music.

³¹ Published first in *Die Reihe*, 3 (Vienna: Universal Edition, 1957; English edn, Bryn Mawr, PA: Theodor Presser, 1959), 10–40.