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An Interview with Gottfried Michael Koenig

by C. Roads

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Introduction

Gottfried Michael Koenig (b. 1926, Magdeburg, Germany) is one of the directors of the Institute of Sonology, Utrecht State University, in Utrecht, Holland.

Koenig's work as a composer includes instrumental as well as electro-acoustic compositions. From 1954 to 1964 he worked at WDR, the Cologne Radio station. Among other projects there, he assisted Karlheinz Stockhausen in the construction of his *Kontakte* (1960).

Mr. Koenig's compositions available on record include his *Terminus* (1966/67) and his *Funktion Grün* (1967) which features computer-generated control voltages regulating analog equipment. Both compositions are found on DGG 137011 (the Avant Garde Series). In addition, his *Funktion Gelb* (1967/68) is available on a small (7") disk from Wergo: WER 324.

Most recently, his concentrated *Übung für Klavier* (1969) was performed at the UNESCO Workshop on Computer Music in Aarhus, Denmark.

The Institute of Sonology is a center for contemporary electro-acoustic and computer music. Distributed among its five studios are several computers, including small-scale (LSI-11) and medium-scale (PDP-15) cpu's, as well as analog equipment. The Institute has its own technical department and staff.

This interview took place in Utrecht at the Institute for Sonology during the early afternoon of August 25, 1978.

Background

CBR Mr. Koenig, can you tell us, when did you first become involved with music as a composer? Can you tell us about your early development as a composer?

GMK I started in a music conservatory and studied besides music theory, acoustics, analysis and piano, also composition as a student of music; I started making or composing music as a child together with my piano education and developed that up to a certain level when it became necessary to study music profes-

sionally. After my studies in the conservatory I considered myself a composer until I met electronic music—which really meant to study anew.

CBR When did you first become involved in electronic music?

GMK It was about in 1951, 1952 when the first night programs were broadcast by the Cologne radio station.

CBR When did you first start to work with electronic music?

GMK I went to Cologne in 1953 and started working in the Cologne electronic music studio one year later in 1954.

CBR Is it not true that you also studied computer programming at one time?

GMK Yes, that was about ten years later: 1963 and 1964. Until then there was no need. There was a large field of electronic music; computers were barely known; and when computers came into my field of view, it took some time before I met people who really made me aware of the possibilities. And that was at the beginning of the sixties. I met somebody from the University at Bonn and started studying computer programming.

CBR When did you first get involved writing composing programs?

GMK Right from the beginning. In the computer programming class, exercises were given mostly in fields not related to music. When I said I would like to have some programming exercises in the music field, the teacher was very happy about it, of course. So I made little programs about making 12-tone series and some harmonic control and things like that. And after a couple of experiments like this, I started to write a larger composition program which later would be the PROJECT 1 program.

PROJECT 1 and PROJECT 2

CBR When was PROJECT 1 actually written?

GMK I suppose in the years '64, '65, and '66.

CBR Can you tell us about PROJECT 1 itself?

GMK Yes. The basic idea was to make use of my experience in serial music and also the aleatoric consequences drawn from serial music. I tried to describe a model in which certain basic decisions were described, and where besides that the user—the composer—would have some influence over the musical variables. In that way you could ask for any number of variants which would evolve from the same basic principle; you could compare them and see to what extent the musical characteristics laid down in the program were really experiential in music.

CBR And how did the PROJECT 1 program lead to PROJECT 2?

GMK Sometimes I call PROJECT 1 a closed program because the composer can exert very little influence on the program itself. In contrast to that, I wanted a program which would, according to the experiences gathered with PROJECT 1, allow a composer to fill in his own variables, not only with respect to the musical material—what kind of pitches or loudnesses or durations—but also with respect to compositional rules—the way the elements are put together to form a musical context. To that purpose I designed PROJECT 2, which is actually a questionnaire of more than sixty questions. According to those questions, which refer to the musical material and the rules, the program would combine or compose a piece.

CBR So you not only specify elements, you specify operations in PROJECT 2—predicates, as it were, for composition.

GMK Yes.

PROJECT 1, PROJECT 2, and VOSIM

CBR Recently you've combined your PROJECT 1 program with the VOSIM oscillators. Are the VOSIM oscillators a kind of ideal synthesis output for PROJECT 1?

GMK I don't know yet. Maybe not, because the VOSIM system was designed for a very special task, namely for making speech sounds. They also offer the possibility of making a large variety of sounds not being part of any natural language. But still, it's not originally designed to replace an electronic music studio for instance. Now neither is PROJECT 1. PROJECT 1 actually is a program which designs instrumental music scores. But under certain conditions you could use this kind of structure also for electronic music; but there are restrictions in the program which are more on the side of instrumental music. I mean, I would personally

design electronic music completely different from the design of instrumental music.

On the other hand, if we don't talk about electronic music, then it's a question of whether we could try to use the VOSIM system to add a sound part to PROJECT 1 which would replace the string quartet or the piano or the orchestra. I think that that is theoretically possible, not at the present stage, but in the future when all those instruments are properly described and can be just inserted in the program. But at that moment I think I would lose interest, because if I would want a piano I would take one, and not try to imitate it with any VOSIM generator in the world.

So what I am expecting from devices like VOSIM generators is a new field of sound, not speech sounds, not instrumental sounds, but something which I've tried to achieve in the electronic music studio and towards which I will keep striving. The VOSIM generator is just a convenient means of having a sound output for PROJECT 1 because the VOSIM system was developed at this Institute and it's just there.

CBR Can you tell us about the relationship between PROJECT 1 and the VOSIM system through the program VOSACS? What is the VOSACS program?

GMK The VOSACS program is a routine which enables you to test the VOSIM variables, nine of them, at least in a small number of steps. There's a certain variable which can have about two thousand states or steps, of which the VOSACS routine only uses maybe four or eight spread over this range. Still, it gives a general view, and enables the composer to make up his mind what kind of VOSIM sounds he wants to use when playing a PROJECT 1 score.

CBR You said that PROJECT 1 was originally designed to make instrumental music. How about PROJECT 2?

GMK Yes, the same is valid for PROJECT 2. PROJECT 2 being kind of an extension to PROJECT 1 also was designed to make instrumental music. I have made scores with PROJECT 2 and the new version which is in preparation will also be given a VOSIM extension, so that the results of PROJECT 2 composition can be heard immediately.

Extensions to PROJECT 1 and PROJECT 2

CBR Are you planning a composing program to compose electronic music? And if so, what kinds of principles would it incorporate? How would it be different from PROJECT 1 and PROJECT 2 for instance?

GMK In instrumental music, my starting point is always the relationship to a well-defined musical material. You have the orchestral instruments, and all the division of labor that takes place in an orchestra, which results in harmony, in certain rhythmic patterns and even in the notation.

MAX
MSP
& Live
heute

Robert Henke

Electronic music is completely free from all those restrictions. So when I might in the future try to write a routine to make electronic music with a computer, I would not start with those traditional language-like features I just mentioned but from predescribed sound characteristics or ranges in which sounds could move. Then I would try to develop the grammar of the music according to the sounds and not the other way around.

Researcher and Composer

CBR In an interview with NUMUS-WEST (1973) you said that you were at that time a researcher, not a composer. Has this changed?

GMK Not really. I have been busy designing programs, correcting them, and testing them for many years besides other work I have had to do in these last years. I hope to become a composer again, maybe next year and the years after.

CBR Is this prompted by the new possibilities of PROJECT 1, PROJECT 2, and the sound synthesis systems here at the Institute?

GMK Actually I've waited for many years to put those programs to use. There were many interferences, not only because of my own work but also because of the computer development. Computers break down occasionally, and things like that.

SSP and "Non-Standard" Synthesis

CBR Can you tell us about your sound synthesis program SSP?

GMK Yes, this program uses what we call the "non-standard approach" to sound synthesis. That means not referring to a given acoustic model but rather describing the waveform in terms of amplitude values and time values. My first intention was to go away from the classical instrumental definitions of sound in terms of loudness, pitch, and duration and so on, because then you would refer to musical elements which are not necessarily the elements of the language of today. To explore a new field of sound possibilities I thought it would be best to close the classical descriptions of sound and open up an experimental field in which you would really have to start again. It would be the task of a later time or other people to map the new possibilities to the old experiences.

CBR What are the primary values of a non-standard approach (or synthesis-by-instruction) vis-a-vis a standard (or synthesis-by-rule) approach?

GMK That's difficult to say. Even though I wrote the program, I don't have enough experience (with SSP) at this very minute to make a judgement about that.

(pause)

Primarily I'm very annoyed with composers using the most modern tools of music-making like electronic music, voltage-control, even computers, and making twelve-tone series for instance, or trying to imitate existing instruments. That has, of course, its scientific value, but not necessarily a creative value in new music-making. But if a system is designed to produce twelve-tone series and instrumental sounds, then it is very difficult to avoid that. So just to be able to avoid that, to open up new fields of sounds you would not be able to produce or would not think of describing in classical terms, I have chosen this non-standard approach.

The Influence of Computers

CBR How have your compositional ideas been influenced by working with computers?

GMK Not so much. If I compare my own compositions of the pre-computer era to what I have tried to describe in my programming and what still fascinates me, then there is not so much difference. I mean I have gathered experience as a composer for many years, say twenty years, something like that. A program will not be able to describe twenty years of experience but only a week of it or maybe a month. That means that I try to influence my programming by my experience instead of the other way round. I try to lay down what I know about music and at this moment I think I know more about music than my computer program.

CBR Are your composing ideas influenced by the sounds that you're able to create with the systems at the Institute?

GMK Yes, especially in the field of electronic music. Then it's difficult to say. Have I chosen electronic music because of sound ideas or have I composed in a certain style because of the sounds possible in the studio? I think there is a mutual influence. I think that the compositional technique should be in a very narrow and strong relation to the sound sources. That's my interest in programmed music—to put possible sound sources into a program which combines them instead of instrumenting a piano score.

CBR One kind of artificial intelligence task is that of a program itself knowing what kinds of sounds that it's actually dealing with, and altering the program logic according to these sounds. Do you see this as a possibility?

AI/KI

GMK Not only as a possibility, I think it is even a necessity. My own programming does not take that aspect into account as yet because the programs were meant to be instrumental music programs; but as soon as sound production is involved, you need some kind of feedback or relationship between the musical language structure and the structure of the sounds produced.

Composers and Computer Music

CBR What directions being pursued by other composers are of interest to you?

Zwei **GMK** When we talk about computer music we have to distinguish between the act of composing and the act of sound production. In many cases, the modern means of sound production of the computer are used to make let's say, outmoded music to come into being, into sound. It's not always the most advanced structural design which is used in computer music. I think composers I admire most are not busy at this moment in the computer music field whilst what I have heard in computer music attracts me more or less in terms of technical procedures and not so much as aesthetic results.

My general feeling is that computer music has seen a very fine development in programming, software and hardware development, but composers have a strong tendency to instrumental music and sometimes it seems that they avoid computers. Maybe they feel that they wouldn't be able to express themselves the way they are able to with an orchestra using human beings and all the mechanical instruments of the musical past.

CBR Are composers afraid of the concept of programmed music?

GMK I think so.

CBR Why do you suppose that is?

GMK In the first place, in most musical institutions, composers are not prepared to think of music in terms of a set of given rules. I mean, programmed music is not a concept taught in most music schools. That's one point. They're used to thinking in terms of what they can do with their own breath and hands, with musicians and conductors, and all the given conditions of musical life. They have to fit in. That's the place where they will earn the money.

Computer music is something hard to sell to a larger audience. Composers who are not paid by the government but working freelance have to consider this condition.

The Institute of Sonology

CBR I'd like to ask a few questions about the Institute. Can you tell us a little about some of the other work going on at the Institute right now?

GMK Yes. The Institute is busy in different ways. On the one hand we have the development of studio and computer facilities. Secondly there's an annual course, the subjects being signal processing, computer techniques, logic, and practical exercises in the studio. In the third place, we have composers who make use of our facilities to produce music compositions. In the fourth

place, we have research in fields of musical structures and musical sounds—that means both analysis and synthesis of musical structures and musical sounds and of course the relationship between them. We organize a series of concerts every year both in Utrecht and Amsterdam including not only electronic music but also films in which modern music plays an important role. We gather documents—as many as possible, not only in the form of books and records, scores and periodicals, but also any kind of document which comes to our knowledge is filed and even stored on the computer for easier reference. We have our own electronic workshop to maintain the apparatus and also for new development of analog or digital hardware.

CBR There seems to be a great deal of collaboration among the people within the institute. This seems difficult to achieve at some other institutions. What are the ingredients of this collaboration? Is it simply a matter of survival for all of you, i.e., you have to work well together, or, are there organizational techniques that make this easier to achieve?

GMK Ja, in the first place the Institute has grown step-by-step. That means only people who were attracted to our way of working joined the staff. In the second stage of development we have tried to find an internal organization which optimizes the collaboration of the staff members and also everyone who comes from the outside.

CBR How is this actually implemented? Are there obligations and responsibilities that each staff member has? Must he or she fulfill a collaborative function within the group?

GMK Yes. We have three main committees which are re-elected every year or every two years, concerned with scientific research, artistic creation, and technology, that's one committee, the second committee sees to teaching, and third committee about public relations, information and publications. In that way, everything that is going on in those fields is talked over in the committee so that every subject can be examined from different aspects—it's a good coordination that way.

An Interactive Approach

CBR I notice one characteristic of the Utrecht studios seems to be that whenever you develop a synthesis technique you seem to have someone from the hardware section develop a device to carry out the synthesis. It seems that you optimize your computer resources towards interaction with composers, and leave the synthesis computation to the hardware generators. That seems to work well for you.

GMK Yes. We started with real-time synthesis without any hardware oscillators, but soon we reached the limits of that technique. It is still applied to certain approaches, but on the other hand the computer is just too slow to compute in real-time complex sound

TEAM!

Money

structures, especially if they are also embedded in a complex language structure. Hardware generators make it much easier to compute these complex structures. I want to point out that if there is a new technical design, before it's carried out it's talked over with the artistic and scientific people at the Institute, and also the other way around. So nothing is done without an agreement from all sides.

CBR All of the systems here at the Institute are interactive. Is this by design? Was there an agreement among all the people at the Institute?

GMK A silent agreement I would say, and then at a certain moment one talks about it, and recognizes its usefulness.

CBR Almost all of the systems have immediate sound feedback!

GMK Yes. That's possible because we don't share the computer with other institutions. We own our own computers, and in that way we have the computer at our disposal—twenty-four hours if necessary. That speeds it up; it's not necessary to make elaborate preparations in terms of programming and input data, then carry it to a computer center and wait for the output.

For extensive experimentation the immediate sound response is necessary, otherwise we wouldn't be able to carry out a large number of experiments which are necessary to develop programs which serve composers.

Future Projects

CBR What ideas are on the horizon for the Institute?

GMK One idea is to build hybrid studios, in which analog means and digital means are combined, up to a certain degree.

CBR This is already under way?

GMK This is already under way in one studio and I could imagine that we could follow that direction later on. The thing is, if you offer analog and digital means to composers, it's hard to know beforehand what they would turn to. I mean, there are composers who would prefer the analog audio studio even if you have the most modern computer facilities around, just because of their habit of music-making.

Analog versus Digital

CBR As far as sound synthesizers go, it seems to me that some of the new digital synthesizers will have much the same composer interfaces as the analog equipment—only everything behind the knobs and dials will be digital. Some people, however, draw a great distinction between analog and digital. What are your thoughts?

**Reaktor
Blocks
heute!!**

analog || digital?

GMK As long as only sound synthesis is involved I wouldn't bother so much— analog means are fine, digital means are sometimes better, sometimes not. All the precision you get from digital apparatus is not what every type of composer really wants. But still, then it wouldn't make much difference to the composer whether he handles analog apparatus or digital apparatus. But if you want to be involved at the same time in composing problems like programmed music or preconceived structural ideas, then I think the situation is slightly different because it affects the state of the mind of the composer and not only the state of the apparatus.

In that respect I think we need many years to develop computer programs for not only making sounds but composing structures, to develop things which are really attractive to composers and useful to composers so they can feel at home and express themselves.

Today, the composer who wants to work with preconceived structural ideas mostly uses his desk for that—not necessarily wanting sound immediately—but rather to put certain features, certain characteristics, certain items in certain configurations. But I could imagine a stage in which a computer would respond not only with sound but also with structures with such speed that the composer could have as many compositions to consider in real-time as he's now able to consider sound characteristics.

Composer as Selector

CBR So are you interested then in the idea of composer as selector—the computer generates a number of examples of either a sound structure or a musical structure and the composer selects from the possibilities generated by the computer?

GMK Yes. It's hard to describe. I think he should not only select but also have some influence on the agents which prepare the selection options. But then I am asking myself whether the composer has not always selected, through the centuries, among given items like instruments and instrumentalists.

One should either offer the composer a wide variety of compositional means, in terms of programs and programming languages, or on the other hand, should educate him in such a way that he would be able not only to select among means but also create his own means.

Ausbildung!!

But that's an educational problem. That depends not only on the psychology of the composer but also on society in general, on the role music plays in society. And that's changing.

CBR How is it changing?

(continued on p. 29)

takes is the combined result of the overlapping individual activities of all the parts with the coordinating influence of the data exchanged between computers.

Since mistaken concepts and "bugs" seem inevitable, and plans of any complexity usually break down, it is heartening to note the mystery that where several errors intersect they very often make an interesting pattern.

But how do you get three modern composers to work together? Micros with their simple structures provide an answer. On the other hand large computer facilities and large electronic music studios seemed to be an extension of the

Vizzies
&
Beap
?
M4L

older romantic idea of the individual composer writing notes in isolation of audience and other musicians.

The structure of a circular system satisfies the desire for a symmetrical interactive network where the flow of influence emanates evenly from each point in the system.

Because musicians, since time immemorial, have been playing together, music has developed into a wide variety of "naturally occurring" parallel processing systems.

We created an interesting creature and spent an evening, in public, listening to it.

parallel processing =Regelungstechnik

(continued from p. 15)

GMK Faster sometimes than technology, I think. It takes years to develop electronic music studios according to the demands of a given time and then its always too late! The moment the studio is developed up to its original standards, the composers are miles away.

CBR What programs and technical devices need to be built? Exactly what systems then do composers need today?

GMK The composers of the past, by that I mean the last ten or twenty years, would not have been able to build their own hardware, or design their own studios, or to write their own software. So they had to accept anything that was prepared in their respective studios and institutions. But in the future, composers will be educated in a different way or at least will have other possibilities of being educated, in terms of mathematics, sound synthesis techniques, linguistics, artificial intelligence, or what have you. Also the prices of digital hardware are decreasing. So I could imagine a future situation in which a composer would not wait for the Institute of Sonology to make things, but would rather buy his own computer, to design their own software in a much faster time period than the past. Even the technology of designing programs is progressing.

CBR Do you then see a situation of decentralization?
Dezentral wie Prozess Informatik!!

GMK I think so.

Collaboration Amongst Computer Music Centers

CBR What about an intermingling among centers for computer music now? Do you foresee any of this? What are the difficulties or advantages of collaboration?

GMK But music is made by individuals. Composers compose alone. They don't form teams. Places like IRCAM or this Institute or others are more-or-less centered around individuals who design the basic principles.

CBR And yet is not musical research--by the definition of what is scientific--socially communicable? Is it not something that should feed together to create a

common body of knowledge that everybody can draw from?

GMK That's a very steady but slow-growing process; everybody talks about better communication between studios--one should come together more often, have conferences, and the like. The computer music conference is now established but it's in only one place in the world, and for Europeans it's harder to get to the States. On the other hand, if it were held in Europe it would be the same problem. You can't telephone all day to everybody, its too costly and you don't have the time. So its a theoretical wish that people have--to get together more frequently to exchange ideas and knowledge. I would think that its not really that necessary to make an effort to bring people together more often, because certain ideas lie in the air, so to speak. Some things are developed independently of each other at different places. You discover that it wasn't really necessary to consult because you know actually what the present-day problems are.

Geschichte

OOP/OOA

On the other hand the exchange is difficult. Even the exchange of computer programs seems to be difficult. Systems are different and approaches are different. So collaboration is a little hypothetical.

The nice thing about different institutes is that you can have different approaches to the same problem. Suppose we would try to imitate what the French are doing in Paris, or they would try to imitate what we are doing here. Then you would have the same institute twice. On the other hand, if you are an individual walking in your own direction then you want to know what's around you but you don't want to follow the others. Exchange is sometimes necessary but it doesn't always solve your own problems.

CBR You see more of a collaboration on the level of ideas?

GMK Yes, and there are periodicals in which ideas and developments are described. If you really are in need of certain knowledge, then you can do as people have for centuries--just travel to the place and study the problems there.

Musiker sind Individualisten