ISCM WORLD MUSIC DAYS, STOCKHOLM AND HELSINKI

MAY 6-14, 1978

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Once each year since 1923 (except during World War Two) the International Society for Contemporary Music has held its World Music Days festival in a major cultural centre in Europe or the United States. This year the festival was shared by two cities: Stockholm (May 6-8) and Helsinki (May 9-14). The programme consisted of 15 concerts in which 69 works were performed, and, in addition, a three day computer symposium held in Stockholm, as well as the ISCM delegates' conference held in Helsinki.

The works performed during the festival were compositions selected by an international jury (Einojuhani Rautavaara — Finland, Brian Ferneyhough — Britain, Sten Hanson — Sweden, Almeida Prado — Brazil, Witold Szalonek — Poland, and Charles Wuorinen — USA) from evidently hundreds of scores submitted by the participating nations. Most of the compositions submitted were screened first in each country by a local jury (the members of the British Jury were Ronald Lumsden, Michael Nyman, Guy Protheroe, Tim Souster and Arnold Whittall), who then submitted five or so works to the International Jury for consideration. Composers who were not selected by their national jury for whatever reasons had the option of submitting directly to the International Jury for consideration. It was by this latter means that four of the five works finally chosen to represent Britain were submitted. This left one with the feeling that perhaps this year's British Jury was a little out of touch with the International Jury's criteria.

The works selected by the International Jury for performance in the festival were: Jonathan Harvey's *Inner Light III* (1977) for orchestra and four-channel tape (which was the only piece selected by the British Jury to be performed); Jonty Harrison's *Q for Five* (1976) for solo soprano saxophone and chamber ensemble; Nigel Osborne's *I am Goya* (1977) for baritone and chamber ensemble; Michael Finnissy's *Tsuru-kame* (1973), a chamber opera; and my *Sound Round* (1973) for large orchestra and live electronics. For technical reasons, Finnissy's piece could not unfortunately be performed. For similar reasons my orchestral work had to be replaced by another, smaller piece, *Inundations II: Willow* (1976) for soprano, piano and tape.

The Computer Symposium

The Symposium on Computer Music was held during the first three days of the festival in the excellent facilities of Stockholm's Electronic Music Studio (EMS).[1] The symposium was open to anyone who was interested in the most recent developments in this field, and about 30 to 40 of us attended. It was directed by a panel of leaders in the field which included Jon Appleton (USA), William Buxton (Canada), Jean-Claude Risset (France), Barry Truax (Canada) and resident composers at EMS, Stockholm: Tomas Ungvary (Hungary) and Tomas Sjoland (Sweden). The agenda was as follows:

Saturday, May 6	13.00	general introduction to computer music by William Buxton
	14.00-15.45	Demonstration of music language POD by Barry Truax
	16.15-18.00	Demonstration of EMS Interactive Music System by Tomas Ungvary and Tomas Sjöland
Sunday, May 7	10.00	Seminar on the present situation of computer music: Jean-Claude Risset
	11.00-13.00	Demonstration of digital instrument: Synclavier by Jon Appleton
Monday, May 8	09.00-13.00	Demonstration/concert of compositions introduced by William Buxton
		Summary and panel discussion with Appleton, Buxton, Risset and Truax

The computer symposium was extremely interesting and, for me certainly, one of the most profitable aspects of the festival. Since I have not been actively involved in computers since the early 70s, it was interesting to see some of the developments that have taken place. In former times a composer desiring computer assistance practically had to be an engineer in the field before he could use it effectively as a compositional tool (and certainly from listening to the arid music of that period, it does seem that they *were* mostly engineers). At any rate, it was interesting for me to see that now much of the work in the computer field is finally directed at making programming and equipment much more accessible to those composers with little other expertise than a good musical background.

Bill Buxton's introduction to computer music was an excellent synopsis of what is currently available to today's composer. He discussed the various systems and their advantages, disadvantages, flexibility, cost-effectiveness and ease or difficulty of programming. It emerged that there is no totally ideal system because of certain 'trade offs' between the advantages and disadvantages inherent in each system. The choice of system, in Buxton's phrase, '. . . is largely user/application dependent.'[2] (Around computer people one cannot escape the computer jargon which seems 'continuously programmed for real-time analog output of the user', no matter what the context. . . .)

In the following descriptions I will attempt to keep the terminology to a minimum, and to give a layman's explanation of the subjects discussed by Bill Buxton both in his presentations and in his excellent article[3] sent to us for perusal before the symposium. Later some of the technical aspects of a new digital instrument (called the Synclavier) will be discussed in more specialised technological terms

for those interested. According to Buxton, the three main areas of computer composition available today are: (1) digital synthesis; (2) hybrid systems; and (3) mixed digital systems.

(1) Digital Synthesis

Very simply stated, digital synthesis means that every sound pattern can be converted to a series of numbers to represent, for example, pitches. The reverse is also possible: a series of numbers can be arranged (by a composer, for example), typed into a computer equipped with a special gadget called a 'digital-to-analog converter' (numbers-to-sound converter), and the numbers changed into sound. The sound is then recorded on a normal tape recorder just as one would take the sound from a synthesizer or other sound producing device. This method is the so-called 'classical technique' of making sound on the computer (sound synthesis), and was developed by Max Mathews in the 1960s at Bell Labs in the USA. It is also the technique used in his computer music programmes MUSIC IV & V (1969) — together with their derivative programmes which include MUSIC 4B & 4BF by Howe and Winham (1975) and MUSIC 360 by Barry Vercoe at MIT (1973 and 1975). Digital synthesis is also the basis for the systems of CEMA Mu of Xenakis, the IRMA system of Clough (1971) and the POD system of Barry Truax (1973).

The computers usually employed for this kind of sound synthesis are the large, general purpose ones such as the IBM 360 or IBM 370. These are often used by big institutions such as oil companies and large universities. What this generally means is that using these machines can be very expensive. You must share the system with other users, 'turn around time' is slow (you often have to wait until the next day before hearing what you have programmed), and generally you have to work in 'batch'. This means punching thousands of cards for the card reader. However, Stanford University, Buxton told us, has made improvements on many of these related problems.

Since the computers used for this kind of composition are very large, the possibilities are likewise enormous. However, these must usually be realised by some rather sophisticated programming. Though certain composers thrive on these systems, many have found this a rather unmusical and constraining approach. I know my own attempts at MUSIC 4B, MUSIC 4BF, MUSIC V and MUSIC 360 created a frustrating compositional environment which made me long for doodling on a synthesizer, collecting concrete sounds and writing for traditional instruments. Barry Truax's POD system, however, seems to be a much more accessible one and, while it is less flexible than MUSIC V and some of the others, it seems to encourage a more traditional 'musical approach' to the compositional process.

(2) Hybrid Systems

A hybrid system is a combination of computer and synthesizer. The actual sounds are produced by an instrument like a synthesizer oscillator (the sound producing device), but controlled by the computer. The names of some of these systems are: PIPER (Gabura and Ciamaga, 1968); GROOVE (Mathews, 1970; Mathews and Moore, 1970); the Yale Synthesizer (Friend, 1971); MUSYS (Grogono, 1973); and the EMS, Stockholm (Wiggen, 1972). The main advantage of this system is that a smaller computer can be used since it only has to control the sound, not produce it. In systems such as the GROOVE and EMS1 the composer specifies a sound and the computer plays it back to him: whereupon he can change or modify it if he wishes, as Buxton points out, 'analogous to the conductor's role in orchestral music'.[4] Smaller portable systems such as Ed Kobrin's HYBRID IV (Kobrin, 1975; Smith and Kobrin, 1977) and systems commercially available from Donald Buchla Associates (California) were created for live performance situations. The appeal of these hybrid systems, Buxton points out, is the ability to perform compositions in real time using complex control and timing functions, as well as patching sequences. The disadvantage of the systems is that since they use smaller computers which are attached to an analog source like a synthesizer, they are limited to the range and quality of that analog apparatus.

(3) Mixed Digital Systems

A mixed digital system is the same as a digital system, except that instead of having to wait for any period of time between programming and hearing the result, this process is immediate or, as it is known in computer parlance, 'in real time'. (This is made possible by converting an appropriate computer programme [software] into an appropriate solid apparatus [hardware]). These systems have the best of both worlds. They have the speed and convenience of an analog hybrid system and the accuracy and stability of digital synthesis. Buxton sees this type of system as 'perhaps the most promising in terms of the future of interactive computer music systems'.[5] Some of the mixed digital systems currently in use are Peter Zinovieff's VOCOM system (1972), the Dartmouth synthesizer (Alonso et al, 1975), the University of Illinois system (Beauchamp et al, 1975), VOSIM (Tempelaars, 1976), Chamberlain (1976), the IRCAM system (DiGiugno, in press) and the New England Digital Corporation's new Synclavier (Jones, Alonso, Appleton, 1978).

One of the most interesting lectures during the symposium was Jon Appleton's demonstration and talk about the last mentioned instrument, the Synclavier. The instrument itself looks not unlike some of the small portable keyboard synthesizers currently on the market, but functionally there is, of course, absolutely no comparison. It is a very sophisticated digital computer, versatile and relatively cheap: only about £7500, which is nothing in terms of some computer prices.[6] It is quite easy to operate and can be used in live performance situations as well as in studios for composition. The following is some technical data taken primarily from New England Digital's publicity material which was presented to us during the symposium.

The Synclavier[7]

The Synclavier is the result of a five-year effort by Cameron Jones, Sydney Alonso and Jon Appleton (Dartmouth College, USA) to produce a versatile instrument for both live performance and studio composition. The Synclavier system includes a high-speed 16-bit digital computer plus a 16-channel digital synthesizer with frequency modulation and arbitrary wave capability. A 61-note polyphonic clavier with a 96-button control panel makes the system complete.

The 16-bit processor which is used in the system is of their own proprietary design. Cameron Jones, one of the co-inventors, explains in the publicity material that they needed a 'high speed processor that could support a wide range of asynchronous I/O devices. 8-bit microprocessors start to choke when computing complex waveforms and sampling both the clavier and the control panel. The most important consideration, however, was the 16-register architecture available in the Model A,[8] the designated name for their processor. The Synclavier is configured with 32,768 bytes of static semiconductor memory and two mini-floppy diskette drives. The main memory can be expanded up to 114,688 bytes, all of which are directly addressable. In addition to the main instrument, New England Digital also offers a line of analog-to-digital and digital-to-analog converters which can be added to the system. These additional units may be used to process 'live' signals from microphone, or to connect the computer to existing analog equipment.

The synthesizer uses Schottky digital technology to generate 16 independent channels using one multiplexed circuit. Their frequency generator (patent pending) provides 1000 steps per octave of frequency resolution. Frequency modulation is accomplished by using the output of one channel to modulate the phase of the second channel. Both the modulator and carrier waveshape may be complex functions with up to 256 harmonics.

The synthesizer can also do 'circular frequency modulation'. This is explained by Jones: 'Our digital synthesizer includes a special feature that allows the modulated output of one channel to in turn modulate the output of a third channel, and so on. The output of the fourth channel to be modulated in this manner can be used to modulate the original modulator channel. This circular arrangement of modulated channels provides an interesting feed-back effect that can be used to produce complex but quite controllable sounds.'[9] Frequency modulation techniques can be used to generate an

interesting class of sound with complex timbres and time-varying harmonic spectra. By changing the index of modulation, the 'richness' of sound can be varied either slowly or rapidly over the duration of the event. The index of modulation is one of the parameters that is used to control the amount of modulation in a sound. Jones goes on to say that 'digital techniques can be used to create virtually any sound the composer or performer can call to mind'.[10]

The Synclavier has a special control panel which is used in experimenting with new sounds. The control panel includes a four-digit LED numerical display that is used to set each of the different musical parameters. The current value of any parameter may be displayed by pressing one button on the panel. Resolutions of one millisecond and .1 Hertz are provided. By turning the control knob, the selected parameter may be varied over a wide range to determine the appropriate setting.

A second mode of operation is also available. High level language programmes may be entered into the computer from a hard-copy or video terminal. The 'software' is called Real Time XPL which is a subset of PL/I programming language. XPL is a modern computer language which incorporates new techniques of 'structured programming'. It is easy to use and is claimed by New England Digital to be more powerful than the popular language BASIC. 64-character variable names, floating point arithmetic and advanced logical functions (DO WHILE, etc.) are included in the language. Special statements in XPL can be used to control directly the digital synthesizer, the diskettes and other devices.

A Summary of the Symposium

In addition to Appleton's demonstration of the Synclavier there were also very interesting talks and demonstrations by Tomas Ungvary and Tomas Sjöland about what EMS Stockholm are doing, and about their interactive music system. Barry Truax had just finished installing POD in the EMS computer and gave a demonstration of the language's capabilities (and its limitations). Jean-Claude Risset talked about the current situation of computer music and the work that is under way (slowly) at IRCAM (Paris), where he is involved in the development of their computer facilities. The final day was devoted to a kind of mini-concert of computer pieces selected by Bill Buxton to demonstrate the variety of work being done in the field. The programme included G.M. Koenig's very Germanic *Übung für Klavier* (1970), Jon Appleton's rather disappointing new work composed on the Synclavier, *Syntrophia* (1977), the first of John Melby's *Two Steven's Songs* (1975), William Buxton's *For Dance* (1975), Tomas Ungvary's interesting *Akonel II* (1977) for flute and tape, Bill Schottstaedt's very funny one-and-a-half-minute *New Music Liberation Army* (1977), his less amusing *Death by Drowning* (1977) and an excerpt from Joe Olive's kitsch computer opera, *Mar-ri-ia-a* (1974).

What I found disappointing in the works of this programme and find, in fact, in most of the computer works I know, is a rather similar and predictable 'sound' and timbre. There seems to be a very definite and unmistakable 'computer sound' and, like the 'synthesizer sound' of the 60s and 70s, it has quickly acquired its own repertoire of cliches. The computer is toted as being able to produce any sound imaginable, so perhaps all I am really saying is that I just have the misfortune of knowing lots of composers with similar imaginations. It also seems that in most cases the technology still directs the aesthetic too much, at least for my taste. One gets the feeling that most of the computer composers have not yet really mastered the subtler regions of their instrument, and certainly none have yet plumbed the deeper depths of the technology they are exploring.

For me the only interesting music I have heard recently in this field is by Tomas Ungvary and Jean-Claude Risset. In the past few years their work has resulted in some important music, not just important computer music. However, with continuing easier access to this tremendous compositional tool for composers with perhaps less technological interest and background in computers (but greater musical talents) the computer field is becoming much more interesting, and the club is expanding rapidly. I would agree with the composer David Behrman who once pointed out in a lecture[11] that the computer is the sleeping giant of new music, and its future. The 1978 Symposium on Computer Music held in Stockholm was an excellent report on its progress.[12]

The Stockholm Concerts

The main concerts began on Saturday night after a wonderful reception dinner in a chandeliered hall of the Stadshuset. We were transported to an island at the end of Riddarfjärden which is one of the many large expanses of water around which Stockholm is built. The evening's concert consisted of just one large work: a gigantic environmental composition called *Stockholm Fireworks & Water Music 1978* composed and organised by Lars-Gunnar Bodin, Sten Hanson, Bengt Emil Johnson, Arne Mellnäs, Jan W. Morthenson and Leo Nilson, with the aid of the Stockholm Police Force and various departments of the city government.

The work took place over a large triangular area of water, each leg of which was nearly a mile long. Two giant speakers were placed on the islands to our right and left, so that it was like sitting in a gigantic concert hall with the 'stage' a couple of square miles of water and the stereo separation over a mile. Bonfires lit the speaker locations in the far distance. Suddenly the piece began with some thundering electronic sounds booming across the water. The volume level was shattering and, considering the distance, absolutely amazing. Fireworks exploded along the various banks and in the water, daylight flares illuminated the skies, rockets shot across the bay and steamship whistles blew in the harbour. A dancer on a sea barge performed like a tiny water bug out in the middle, and a large balloon attempted lift-off while a gigantic organ behind us blasted chords out across the bay. The piece should have been fantastic, but unfortunately not everything happened as it should have. The co-ordination problems and lack of rehearsal time with the hundreds of people involved were evidently too great. It was a pity, because in spite of many misfires (for example, only about a third of the fireworks exploded), it was nevertheless an exciting spectacle. The real marvel for most of us, though, was the tremendous sound system. Hanson and Nilson told me that it consisted of two sets of large speakers with specially built exponential horns which amplified the signal to between 60,000 and 80,000 watts! Nilson told me later that they were planning to make a similar system embedded in ice for a 'performance' in one of the echo canyons of Lapland in the winter. One can scarcely imagine what an experience that will be (or what it might do to the environment).

The first indoor concert was held in the Kulturhuset the following afternoon and was broadcast live throughout Scandinavia. The programme included the Canadian Micheline Coulombe Saint-Marcoux's *Miroirs* for harpsichord and tape, which was totally destroyed by the malfunction of the right speaker and no amplification for the harpsichord; the Finn Paavo Heininen's nondescript *Discantus III* for solo saxophone; and my own *Inundations II: Willow* for soprano, piano and tape. I would have stopped this performance because of the faulty speaker. However, it was a live broadcast and after a few minutes I finally did manage to get a mono signal through both speakers. After the interval there was the Swede Mikael Edlund's trite theatre piece for chamber ensemble called *The Lost Jugglery* and the Frenchwoman Graciane Finzi's *Toujours plus* for harpsichord and organ: which hardly came off as the '... psychological study of note-alterations to rediscover the emotional relationship existing between the major and minor keys without ever returning to a music which is tonal' which her programme note proclaimed.

The Swedish Radio Symphony Orchestra's concert that evening was much more interesting and the performance level certainly higher. The excellent young Finnish conductor and composer Leif Segerstam gave the four composers on the programme well-rehearsed, first-rate performances and directed the orchestra with precision, charm and insight. The two pieces in the first half were the Frenchman Gerard Grisey's delicate *Partiels,* which ended with an elegant touch of theatre beautifully executed by the conductor, and the Finn Herman Rechberger's *Consort Music* for recorder and orchestra, beautifully played by Claes Pehrsson with some nice intertwining of live and pre-recorded recorder sounds. The second half of the programme consisted of the set of romantic *Love Charm Songs* for voice and orchestra composed by the Finnish Salvador Dali look-alike, Järmo Sermila (excellently sung by Iwa Sörenson), and Jonathan Harvey's complex 28-minute *Inner Light III* for orchestra and four-channel tape.

Although I felt that Harvey's work could have used about a five-minute cut in the first third of the piece, it had a kind of insistent drive that made it galvanising when it began to move toward the tremendous climax at the end. It is always a shame that everyone cannot sit in the middle of the space when there is a four-channel tape. Sitting on the periphery must surely have changed many people's perception of the work.

The final concert in Stockholm was held the following afternoon at the performance media centre, Fylkingen. The programme began with the American William Hellermann's meditative 'Debussy-Terry Riley-twelve-note' piece (if you can imagine what that sounds like), *Row Music: Tip of the Iceberg*, nicely played by the German pianist Kristine Scholz. The Frenchwoman Nicole Lachartre's charmless chamber work *Il y a mille et mille soleils* was next, followed by a video composition, *The Poem* by Barbara Syke, Tom Defanti, Drew Browning and Bob Snyder (all from the States), which Fylkingen added to the festival as an example of current video work. I never seem to be able totally to get into video because of the primitive means of showing it: TV monitors with their everyday tics, distortions and crummy little speakers. What an awful way to entertain an audience in a concert hall! It is like listening to the *Hammerklavier* on a studio upright. Anna Maciejasz-Kaminska from Poland followed the video piece with her violent little theatre work *Mobile* for a groping cellist/contortionist. The final work on the programme, *Inharmonique* for soprano and computer tape by Jean-Claude Risset was, however, beautiful even though it was sung none too securely by the soprano Kerstin Stahl.

With the afternoon concert over, we all boarded buses and were transported to a luxurious Baltic Sea ferry for a lovely overnight cruise with dining and dancing as we sailed through the picturesque islands to Helsinki. In the morning a band in full uniform played as we disembarked. It was wonderful.

NOTES:

[1]Electronic Music Studio, Kungsgatan 85, S-111 43, Stockholm.
[2]William A. S. Buxton, 'A Composer's Introduction to Computer Music', *Interface* Vol 5, No. 2 (June 1977), p.65.
[3]Ibid., p. 65.
[4]Ibid., p. 68.
[5]Ibid., p. 68.
[6]When I was recently in New York I spoke with David Behrman about the system he was building using a new very inexpensive mini-computer called the KIM I. It retails for only about £110.
[7]The Synclavier is the trade name of the new digital instrument manufactured by New England Digital Corporation, P.O. Box 305, Norwich, Vermont 05055, USA, tel. (802) 649 5183.
[8]New England Digital Corporation. This is publicity material available from the above address.
[9]Ibid.
[10]Ibid.
[11]David Behrman, 'The Brains, the Brawn and the Booming of New Music', lecture delivered at The Ohio State University faculty lecture series, March 30, 1972, Columbus, Ohio, USA.
[12]For a discussion of the First International Conference On Computer Music which took place in conjunction with the 1976 ISCM Festival in Boston, see Stephen Arnold's review in *Contact 17* (Summer 1977), pp. 35-37. We hope to publish regular commentary on the computer music scene in the future. (Ed.)