



DAPHNE ORAM: A Tribute to a Pioneer

by Hugh Davies, 2003.

Daphne Oram, a pioneer of electronic music in Britain, died on January 5th 2003, aged 77.

She was the first woman to direct an electronic music studio (the newly-founded BBC Radiophonic Workshop, 1958), the first to set up a personal studio (1959), and the only woman to design and construct (with assistance) an electronic music instrument (from 1962). It seems likely that she was also the first woman to create music software for a desktop computer (1981).

For many readers today, the situation in which composers like Daphne Oram started out fifty years ago is virtually unimaginable. There were no synthesizers, computers or other devices designed specifically for use in sonic art, or, as the medium was then usually called, electronic music. Most practitioners were handy with a soldering iron, and often built or adapted simple devices for special purposes. She commissioned a set of interchangeable capstan wheels of different diameters that enabled the speed of a Brenell tape recorder to be altered, allowing a melody to be assembled note by note from a single sound source; she also used to describe how she once ran a very long tape loop (lasting a couple of minutes) around a standard lamp out in the garden.

Born in Devizes, Wiltshire, on December 31st 1925, Daphne Oram was educated at Sherborne School for Girls, and studied piano, organ and composition privately. Although she was offered a place at the Royal College of Music in 1943, she decided instead to start work as a music balancer for the BBC in London, one of many careers that had previously been denied to women, but were being opened up due to the unavailability of men of working age during World War II. In this job she worked with many leading classical

musicians, including Kathleen Ferrier, Myra Hess, Alfred Cortot, Solomon and Sir Adrian Boult, who in 1947 inscribed a miniature score of Elgar's Second Symphony to her "with much gratitude for great efficiency".

As a child Oram explored what we would now call piano preparations, and shared with her two brothers an interest in electrical equipment, building a simple radio transmitter. Her interest in the possibilities of synthetic sound was awakened in 1944 by reading passages in two books, Kurt London's **Film Music** and Leopold Stokowski's **Music for All of Us**, and with access to equipment at the BBC, she was able to start experimenting in 1948; including unsuccessfully building a tape recorder. When I helped to sort through all her belongings in the mid-1990s I came across in a shed a couple of German Magnetophon tape recorders (the first machine to incorporate a high-frequency bias oscillator; after World War II the new Ferrograph and Ampex tape recorders were based on it), which were so damaged by rust (I didn't know of any organisation or person who would be interested in them in this condition) that I very reluctantly threw them out; but the headblocks, which she may have used in her own machine, had been kept indoors.

Around 1956 her long-standing attempts to convince the BBC of the value of the new electronic music and musique concrète started to bear fruit: she assembled a temporary studio late at night after broadcasting had finished, sometimes with a like-minded colleague from the drama department, Desmond Briscoe, producing background music for several radio and television broadcasts. In April 1958 the BBC set up the Radiophonic Workshop, with Oram as its director. Because the support for its foundation had come from drama producers, and the music department was not involved, there was no requirement to produce concert works. After the BBC had sent her as an observer to the Journées Internationales de Musique Expérimentale at the Brussels World Fair early in October 1958, where she was able to hear recent works from several major studios (with many leading composers present), she decided to resign, cashing in her pension.

In January 1959 she moved to Tower Folly, a converted oast-house near Wrotham in Kent, where she installed a studio in a circular room at the base of the tower. Inevitably her output here was largely commercial, but covering a wider range than in the Radiophonic Workshop: electronic background music for theatre, radio, television, short industrial and publicity films and sonic environments: for the British room at the exhibition **Treasures of the Commonwealth** in London (**Pulse Persephone**, 1965) and a permanent display - in conjunction with a metal sculpture - at the Mullard showroom in Central London (**Episode Metallic**, 1965). But it also included electronic sounds for a major feature film (**The Innocents**, 1961; discussed below), several concert works (including **Four Aspects**, 1960 - also discussed later on - and **Broceliande**, 1969-70, as well as two works for piano and tape composed jointly with Ivor Walsworth, **Contrasts Esssonic**, 1967, and

Sardonica, 1972) and the ballet **Bird of Parallax** (1972) for the New London Ballet. **Pulse Persephone** was also subsequently used for a ballet, **Alpha Omega**.

Those who grew up in the 1960s may have participated in the BBC Schools programmes **Listen, Move and Dance**, which included Oram's **Electronic Sound Patterns** (issued on LP), or may remember her catchy melody for the Nestea television advertisement. Apart from Walsworth, a few other composers worked in her studio; I did so briefly on two occasions, in 1962 and 1963, providing me with my first studio experience. The best-known visitor was Thea Musgrave, for whom Oram helped to create the tape parts for the ballet **Beauty and the Beast** (1968-69) and two compositions for solo instrument and tape: **Soliloquy** (1969) for guitar and **From One to Another I** (1970) for viola.

Oram also lectured widely on electronic music, usually in the form of a demonstration of basic studio techniques, invariably providing all the equipment herself. The venues included the Mermaid Theatre in London and the Edinburgh International and Bromsgrove Festivals. She also participated in several broadcasts. For some years she kept in contact with various studios abroad, and from some of them she received tapes of recent productions. For several years from 1959 Morley College in London sponsored residential weekend courses at Tower Folly, and between 1982 and 1989 she gave electronic music classes for one day a week at Christ Church College, Canterbury.

But there was a second string to Oram's bow, which has already earned her a small place in the early history of the medium. For me the closest comparison is with someone whose work has posthumously become better-known, the American band leader Raymond Scott, who, later in life, and with far greater financial resources than Oram ever had, concentrated entirely on studio work and for its production devised a substantial composition machine (my term for a specially-designed, usually one-off, integrated studio system which normally cannot operate in real-time; this limitation has been overcome in recent computerized equivalents). In 1944, on a sound engineering course, the students were shown how an oscilloscope could show the waveforms of sounds, and she asked if it might be possible to reverse the process and draw waveforms that could be converted into sound; this was denied. Intrigued nonetheless, it became her ultimate dream, which she later defined as a machine with which the composer could "convert graphic information into sound".

Based on experiments in this direction that she had made since the mid-1950s, she received a substantial grant from the Gulbenkian Foundation in 1962, with a second, smaller grant following in 1965. These enabled Oram increasingly to reduce her dependence on commercial work. In 1962 she began construction of the Oramics system, completing it in 1965, with

assistance in specialist aspects by electrical engineers such as Graham Wrench and Fred Wood. The basic mechanism of Oramics was patented in Britain and the United States. It was substantially more sophisticated than the earlier graphic composition machines constructed between the early 1930s and the late 1950s.

A large rectangular metal framework provides a table-like surface at which the composer works. Ten synchronous parallel strips of clear film (sprocketed 35mm stock) are divided into two groups of five; each strip serves for the notation of a single parameter. The composer draws on these with erasable ink or sticks cutout of black adhesive tape onto them, forming masks which affect the amount of light that is received from a bulb mounted above each strip by a photocell below (on the left side of the machine), thus modulating the photocell's output. For orientation purposes a calibrated board (normally 10 cm per second) can be placed below the strips. Pitch is notated digitally on the three strips at the rear with neume-like symbols, covering a range (including transposition) of seven octaves; two of these produce a series of basic frequencies set a fifth apart, and the third one provides any of the intervening semitone intervals; microtonal tuning is also possible. The remaining two rear strips operate switches for other devices, one internally and the other externally. The front group consists of strips on which analogue drawings control envelope, dynamics, vibrato, reverberation and timbre mixes. Interestingly, given the original inspiration for the system, the timbre section of Oramics consists of four cathode ray tubes, as in an oscilloscope, which scan removable glass slides mounted above them, on which waveshapes are drawn. The bank of filmstrips can be moved manually back and forth past the photocells to check the sonic results virtually instantaneously (with probable fluctuations only in durational aspects, not in frequency or timbre); for longer passages and completed work a motor carries out this function. Like all synthesizers up to the mid-1970s, the output is only monophonic, and multitracking is necessary for more complex textures. The whole system cost substantially less than any equivalent computer-based system would have done, and can be used by composers without specialist experience.

Like virtually all analogue compositions machines, whether based on optical or other methods, Oramics was incapable of converting the graphical notations into sound in real time. Indeed in 1977, when I attended an early demonstration by Xenakis of the computer-controlled UPIC system during a festival in Germany, it took five minutes for a simple child's drawing to be converted into sound. UPIC did not become a real-time system until a decade later, by which time Oram had been working on her own computer system for several years.

As other pioneers discovered, one person working on their own, with either hardware or software, and however significant their product, could never

keep up with or compete with even the middle-sized manufacturers. Given its combination of specialised circuits and precision engineering, the Oramics system must always have been hard to maintain. Oram began work on a digital equivalent as soon as it became practicable, once desktop microcomputers with sufficient capabilities became available. A simple digital version, programmed with the help of Steve Brett, was completed in 1981 on the Apple II. Several other versions followed, assisted by grants from the R.V.W. Trust and the Arts Council. In 1987 Oram changed over to the newly-released Archimedes RISC computer, for which it appears that she taught herself assembly language. It has not yet been possible to investigate what she achieved on this second computer, working largely or wholly on her own. At the time it was the most appropriate computer for such work, and it is no coincidence that the original version of the Sibelius notation software was also written for it.



In the mid-1990s Oram suffered two strokes, after which she became unable to continue working, and spent the rest of her life in a nursing home. This sudden end to her creative work was especially sad for such an active person who relied on her brain and her imagination, and it was very distressing both for her and for her friends.

Because of her reluctance to publicise her work outside the purely commercial field, and the difficulties of doing so without organisational support, Oram's work has become much less well known than that of the other familiar name from the early years of the Radiophonic Workshop, Delia Derbyshire (who died eighteen months ago). Best known for the original version of the Doctor Who theme, many of the latter's compositions were issued on BBC LPs and are now being reissued on CD. In an article in *The Wire* on the Radiophonic Workshop (Feb. 1992) Mark Sinker described Derbyshire as "fairly legendary", and Daphne Oram as "even more legendary" (presumably meaning even less well known). She seems to have abandoned composition in the early 1970s; I have not found any tape dated after 1973, although some are

undated. Like the composers who temporarily abandoned composition for several years in the 1970s while they devised their own computer music software, Oram doubtless intended to return to it once her system fully met her requirements. Working alone and concentrating on the Oramics system (she was extremely secretive about this for fear of being ripped off) only increased her isolation from most of our burgeoning electronic music community during the 1970s (which culminated in the formation of SAN's earliest incarnation, EMAS). Her book **An Individual Note of Music, Sound and Electronics** (1972), which considers the medium in a highly individual, philosophical manner, contains detailed photographs of Oramics, but deliberately avoids any description of it. Technical descriptions can, however, be read in Alan Douglas's **Electronic Music Production** (1973, 1982) and Peter Manning's **Electronic and Computer Music** (1985, 1993).

Before dedicating herself exclusively to electronic music, Oram composed a dozen instrumental works between the early 1940s and the early 1950s that still survive; I have found evidence of only one performance, that of a song at a concert in London in 1954. One of the unperformed compositions is of especial interest, the half-hour-long orchestral work **Still Point** (1948-50); this contains passages in which prerecorded instrumental sounds are played back (from 78 rpm discs), sometimes at a slower speed or in reverse, and also involves live electronic treatments, using the equipment of a standard broadcasting studio. The orchestra is divided into two groups, one of which plays in a reverberant space and the other is surrounded by absorbent screens, to create as dry an acoustic as possible; a further variation in the different acoustic qualities is to be obtained by placing five microphones at different distances from the players, and the sounds picked up by them are processed using reverberation, loudness and tone (filter) controls. As far as I know, *Still Point* is the first work by any composer to feature real-time electronic treatments.

Apart from Oram and Briscoe (who succeeded her as director of the Radiophonic Workshop), between 1954 and 1957 four other British composers began working with electronic music, largely producing background music rather than concert works. The other pioneers, all of whom set up modest private studios, were the composers Tristram Cary (who did not feel that the medium was suitable for concert works until the late 1960s) and Roberto Gerhard, and two men whose background was in other media: the dancer/choreographer Ernest Berk and the writer Desmond Leslie. Of these six pioneers, only Cary (now based in Australia) and Briscoe are still alive today. By 1967, when I compiled my **International Electronic Music Catalog** (in the next year or two it is hoped to make a revised, but not updated, version of this available on the internet), Britain was the fourth most prolific producer worldwide of music in the medium, but, unlike elsewhere, nearly all of this was background music.

Oram's most significant concert work from the period, and probably the most interesting of the earliest British compositions for tape alone, is **Four Aspects** (1960), recently recorded for the first time, initially in a substantial extract on the double CD accompanying **Not Necessarily 'English Music'**, the British issue of Leonardo Music Journal 11 (2001), and also released separately by EMF; the complete work will be included in the second double-CD set in Sub Rosa's **Anthology of Noise & Electronic Music**, currently in preparation. Quite coincidentally, its principal thematic material and atmosphere of slowly evolving cyclical patterns uncannily anticipates Brian Eno's first recorded ambient work, **Discreet Music** (1975). In the context of the European avant-garde at that time, the piece must have seemed rather elementary, but quite avantgarde to inexperienced listeners; but with today's ears we hear it very differently. The similarity with Eno's ambient approach illustrates Oram's musical position rather well; in 1960 it would have been almost impossible to develop further towards what we now know as ambient music, and indeed for musical reasons she would probably not have wished to do so. But her feminine sensibility clearly separated her from what male composers were interested in.

A typical example of the way in which her work has been largely unnoticed is with the electronic sounds and treatments she provided for the feature film **The Innocents** (1961). Based on Henry James' story **The Turn of the Screw**, it has been described on the internet as "one of few genuinely frightening ghost films of all time" and "the most bone-chillingly creepy ghost story ever filmed". The instrumental music, by Georges Auric, only occasionally evokes a sinister mood; everything else is achieved by varied combinations of images, weather changes (sudden gusts of wind, thunder and lightning), conventional sound effects, sudden silences, unseen voices (sometimes with differing reverberations, sometimes treated electronically) and electronic sounds. Yet Oram's name is missing from the credits, so that commentators generally assume that Auric's music is the main vehicle for the dramatic effects. A videotape of **The Innocents** was released by 20th Century Fox in 1996, but unfortunately only in North America, in the NTSC format.

Peter Forrest, in Devon, now owns the Oramics system, which is currently in need of restoration. I house the archive of Daphne Oram's paper, tape recordings and computer disks; so far I have only investigated part of this. Some of the information in this tribute may need to be revised once everything has been studied. It is likely that a recording of her electronic compositions will be released in the future.

In conclusion, another unattributed contribution of Oram's was the rediscovery of a now frequently-quoted passage from Francis Bacon's *New Atlantis* (1624) that is an uncanny anticipation of the techniques and

equipment of sonic art. She often quoted it herself, and it could stand as her epitaph:

"Wee have also Sound-Houses, wher wee practise and demonstrate all Sounds, and their Generation. Wee have Harmonies which you have not, of Quarter-Sounds and lesser Slides of Sounds. Diverse Instruments of Musick likewise to you unknowne, some sweeter then any you have; Together with Bells and Rings that are dainty and sweet. Wee represent Small Sounds as Great and Deepe; Likewise Great Sounds, Extenuate and Sharpe; Wee make diverse Tremblings and Warblings of Sounds, which in their Originall are Entire. Wee represent and imitate all Articulate Sounds and Letters, and the Voices and Notes of Beasts and Birds. Wee have certaine Helps, which sett to the Eare doe further the Hearing greatly. Wee have also diverse Strange and Artificiall Eccho's, Reflecting the Voice many times, and as it were Tossing it; And some that give back the Voice Lowder then it came, some Shriller, and some Deeper; Yea, some rendring the Voice, Differing in the Letters or Articulate Sound, from that they receyve. Wee have also meanes to convey Sounds in Trunks and Pipes, in strange Lines, and Distances."

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