

# RADIOPHONIC LADIES

BY JO HUTTON

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In the early 1950s the world was gradually waking up to the 'musique concrète' of Pierre Schaeffer, and the tape manipulations and electronic music experiments of Luciano Berio and Karlheinz Stockhausen. The celebrated pioneer studios of electronic music share one common denominator: the word radio. Schaeffer worked at the Radiodiffusion Télévision Française in Paris; Stockhausen worked at Radio Cologne and Berio at Radio Audizioni Italiene in Milan. Significant developments in sound recording and reproduction technology for radio were a legacy of urgent wartime need for improved means of communication and a precursor to a new peacetime artistic obsession with the infinite musical possibilities of the tape recorder. This was a time when tape recorders were the size of a large fruit machine and movable by crane, when home studios were unheard of and budgets for this equipment could only be found in national radio stations.

Across Europe, post war depression had inspired a cultural revolution in the arts. In response to popular demand, the BBC began to commission plays from fashionable playwrights whose new style of writing demanded an added dimension in sound and music: the birth of the surreal in radio drama required a surreal ambience that could no longer be achieved satisfactorily from orchestral instruments alone.

'Radiophonics' was a term adopted by the BBC (perhaps borrowed from Schaeffer's "Essai Radiophoniques" in the early 1950s) to identify the nature of this new dimension in sound and music for radio drama. It referred to the collective endeavours of music composers and sound engineers who worked together with dramatic artists to optimise the stimulation of the listener's imagination. Among them were three women, Daphne Oram, Delia Derbyshire and Maddalena Fagandini who all worked under enormous pressure to meet deadlines, in an environment where the only rule was to satisfy the drama producer, with no guidelines as to how that was to be achieved. In the absence of digital ready-mades, they designed and built their own filters, effects units, and synchronisers including a special oscillator, the 'Wobbulator' and the 'Crystal Palace' a switching device that was used to create a chorus effect, and they devised their own unique composing techniques. Delia Derbyshire holds the record for the longest tape loop which extended beyond the studio walls and down the corridor.

Radiophonics used natural sounds, inspired by Schaeffer's 'musique concrète' and electronic music. It differed from other studios in Europe, because of the specific visual and psychological context imposed by the spoken word which necessitated detailed craftsmanship in the acousmatic placing of sounds. The drama of the piece remained the underlying force and purpose of its existence.

Daphne Oram was employed as a BBC 'music balancer' during the war. She was a skilled musician and trained engineer and by the early 1950s she had been promoted to Music Studio Manager. She campaigned persistently for equipment to be made available to develop new techniques for sound design and electronic music.

In 1957 Ms. Oram was asked to compose music for a play called 'Amphytryon 38'.

Using a bank of single sine-wave oscillators, a Motosacoche tape recorder and home-made filters, she composed the piece, the first of its kind at the BBC, from entirely electronic sound sources for her music. The piece received favourable reviews and during that year she and her colleague Desmond Briscoe, were inundated with demands for electronic compositions for new radio plays.

Samuel Beckett's "All That Fall" (1957) required specific sound creations to enhance its surreal atmosphere. Frederick Bradnum wrote "Private Dreams and Public Nightmares", subtitled "A Radiophonic Poem" which was the first play to include explicit instructions for sound montage within the script. Giles Cooper wrote "The Disagreeable Oyster", and "Under the Loofah Tree", both comedies. It became apparent that the increase in demand for the services of Briscoe and Oram necessitated more space and equipment to do the job. Within a year a budget had been found, and room Nos 12 and 13 at Maida Vale were made available. Daphne Oram was among the first studio managers of the Radiophonic Workshop.

She left a year later to form her own studio and continued to compose for film, TV, and perform electronic works live.

She also developed a career writing numerous articles and lecturing on electronic and concrète musics. She wrote a book, "An Individual Note" (Gaillard, 1971) in which she articulates a wealth of knowledge of electronics, as well as music and philosophy. In it she compares the human process of music composition to the processes and stimuli contained in electronic circuitry.

After leaving the BBC, she received a Gulbenkian Foundation grant to develop her 'Oramics'. This was her invention, where physical hand movements are imprinted onto transparent film strips and passed across electronic photo sensors from where they are converted into sound. It is a system of graphical notation on which are imposed the necessary components, such as pitch, duration, envelope shape, timbre, for representing audio waveforms to generate sound electronically. She thus became the first (and only?) woman to design and build an entirely new sound recording medium, which was used by, among others, Thea Musgrave, Tristram Cary and Hugh Davies. Its practical use was however superseded by the development of voltage controlled technology in sound synthesis. Oramics became redundant, but inspired later developments in computer software, such as Inook Choi's recent Interactive Virtual Notational System.

In the early 1990s, she was working on outdoor sound installations in private gardens prior to retirement. She left behind fifty years of pioneering activity at the frontline of technological developments in sound recording and music composition.

Maddalena Fagandini joined the Radiophonic Workshop in 1960. She worked in sound for about 10 years, before becoming a TV producer in 1965. The following is taken from an interview with her on 23rd March, 2000. In her explanations of how she created some of her unique sounds, she gives interesting, entertaining insight into what it was like working in the Radiophonic Workshop at that time and into the inter-relationship between music and drama.

MF: There was a tradition of using women as engineers and technical people in radio.

This happened during the war when all the gentlemen went off to fight the war. There was quite a cut back after the war when the surviving gentlemen came back and wanted their jobs, of course, naturally, but it was still thought that women had done well.

The 1950s was a time when radio really flowered like crazy. It was wonderful being in radio at the time. You could see things happening around you which had never been considered before or since. Daphne Oram was a music studio manager. Desmond Briscoe was a drama studio manager. They got together and created sound for "All That Fall" by Samuel Beckett. It was a series of noises, beautifully constructed to fit what the drama was about.

JH: Was it all music concrète?

MF: Yes it was all done using natural sounds.

I particularly loved doing spot effects, where you act the effects yourself in the studio with the actors. It works better live than on disk because you get the perspective right. You walk up and down. I fought with myself in a gravel pit at one point because there were two guys fighting in front of a microphone going 'ugh, ugh, ugh,' and I was scrabbling about in a gravel pit because they were on a beach somewhere. I saw the producer Michael Bakewell, laughing at me through the glass. In a pause in recording I went in there and said, "I'm sorry Michael, if I spot you laughing at me again I'm going home." He didn't.

JH: Did you create you own effects?

MF: You could see from the script what was needed and it was up to you to produce it.

There was a Raymond Rakes restoration play in which there were all sorts of doors.

Everything had to creak in some way. We had one of these big trolleys where you had 2 or 3 different doors on a box on wheels which you could move around if it needed to be nearer the microphone. I needed a really heavy creak . I said, "I'm sorry Raymond I just can't find another one. ' Raymond said - he was very experienced, "Try running a pencil along the perforated sound panels along the wall. It worked. You see, you can always find a creak, but is it the right one?

In another play, we were doing something about footsteps in the snow. I wasn't getting it right. Norman Swallow, one of the actors, said, "I tell you a way to do it dear. Get a large roll of cotton wool and just squeeze and twist it close to the microphone. It worked. It's the right kind of crunch. Even if in reality it might be slightly different it gives the listener the sound, tells them what is happening.

With music concrète you can use anything. You can break glass, record the wind outside the window or cars going by. I suddenly realised that what I had to do was to choose as little as possible and try and see what would come out of those sounds by changing speed and filtering and so on. How to get a good attack, how to soften it. You over-stretched the machinery, got it to make noises you wouldn't really want it to do in normal broadcasting. We got the old valves to whistle and screech.

JH: Did you ever break equipment?

MF: We had a really good old engineer called Dickie Bird. He was always prepared to repair things if we really overdid it. Occasionally he would put his

fingers in his ears and say, "I think that will work dear, just turn the levels down a bit."

Michael Bakewell came up with a production of Cocteau's 'Orphée', which was his adaptation of the film script. He took a risk and allowed us to do all the music as well as the sound effects. This too was all music concrète. Although we had begun to play with oscillators we had just one sine wave per oscillator so you had to really build up any note from scratch. It was really quite tricky to get the mix right. For the music for parts of this production, I went and researched all the Greek scales, I made a note of all of them and played around with them. They were all a bit too recognisable for me, except one which is very short, only four notes and three intervals, a tone and two semitones, which of course you can split apart by an octave or two. I confined myself to just those four basic notes.

We got the Steinway concert grand from the concert hall. I plucked the strings with the pedal down and just let it die. You got all the harmonics resonating from all directions because the other strings vibrate. Then you could play with that ad infinitum, literally.

Played it mostly backwards, let it rise and then fade quickly just before the extreme cut off.

Interestingly it wasn't me but the sounds themselves that were suggesting what to do. You learn that the secret is in the material itself and not a mathematical calculation in your head. Its there somewhere for you to listen and find it. It has its own rhythm. You push it around at your peril. You have to let it happen, let it be. Then you can play around with what you know about music to help construct sound which makes musical sense to people listening.

The rather shimmering piano strings sound was the music for the princess. For the wind, we got Jenneth Worsley, who has a good high soprano voice, to hold a note as steady as she could. Then we played with feedback and the tape going backwards and forwards until it just started to float. It has gone into the BBC effects library, and still gets used in many plays. She should have got paid, I feel, but 'staff, no fee,' as usual.

'Going through the mirror' was breaking glass played backwards plus some piano strings, from an old upright that was in our little studio. I just crashed against it so it was very jangling, and then brought to a sudden halt on replay. We decided to do the part where he is torn apart by recording separately each syllable of the author's name, 'J E ...A N.... C O C.... T E A U....' We played with pitch, feedback and tape echo so that each sound dies away slowly. It was very rough, deliberately because he was being torn to pieces and it worked.

JH: What do you think was important about the radiophonic workshop?

MF: It provided producers with the possibility of creating sound pictures, which were not just a few effects and a bit of conventional music off disk. The whole thing became more elaborate. When Delia arrived, a lot more possibilities were presented. She knew maths and was very organised from that point of view. She began to use the oscillators in a more structured sense because she could. She knew the harmonic structures of certain sounds, she could put them together. I moved when the Moog synthesiser came in. I got into TV producing because I thought that the way things were going it did require far greater musical training. However wonderful some of the sounds were, it needed something extra. They really started making excellent music.

Delia Derbyshire joined in 1963. She was trained in both music and mathematics, which she had read at Cambridge university. She came to the BBC as a trainee studio manager, and requested to spend her day off sitting in on sessions at the Workshop studio. Her style was not comic, brash or eerie, it was carefully structured, contemplative and very musical. As Roy Curtis-Bramwell explains,

"The mathematics of sound came naturally to her and she could take a set of figures and build them into music in a way quite different from anyone else....She stayed on to contribute an enormous amount of very beautiful - almost unearthly - and quite remarkable music." (Briscoe and Curtis Bramwell: 1983, p.83.)

The following is from an interview recorded on 24 February 2000

DD: I was always into the theory of sound even in the 6th form. The physics teacher refused to teach us acoustics but I studied it myself and did very well. It was always a mixture of the mathematical side and music. Also, Radio had been my love since childhood because I came from just a humble background with relatively few books and radio was my education. It was always my little ambition to get into the BBC.

*JH: How did you get into the BBC?*

DD: The only way into the workshop was to be a trainee studio manager. This is because the workshop was purely a service department for drama. The BBC made it quite clear that they didn't employ composers and we weren't supposed to be doing music.

*JH: What were you doing?*

DD: It was music, it was abstract electronic sound, organised.

JH: Desmond Briscoe said that when you joined in 1962 you brought a whole new way of composing music into the workshop. DD: Did he really say that?. Well you can't call it music, they would say. I was against doing anything that would put any musician out of work. I was more interested in doing complex sounds and complex probabilities and serendipities and synchronicities...

In his book, Desmond said that it's impossible to make a beautiful electronic sound....

That was his attitude, as a drama man.....Men are more into violence, action sounds, frightening sounds. I was much more into reflective sounds. Also I was doing intricate rhythm things - 11 and 13 time, in the early 60s. So he said that he changed his mind when I worked at the workshop. Big things started to happen in radio at that time - 'The Golden Age of the Radiophonic Workshop' is the chapter heading.

*JH: Is it your approach to get inside the electronics of equipment, find out how it all works first ...?*

DD: Yes, absolutely. I was teaching piano to a child in Geneva, and the first thing I did was to show the child what is happening inside, you press this, and the hammer hits the string and it bounces off again and what happens when you use the two pedals. As for synthesisers and presets, its only recently that I picked up a few devices very cheap, second-hand and I realised that what I thought was a problem with synthesisers was in fact a problem with people using them and that they're much more flexible than how people use them.

*JH: Did you ever use Daphne Oram's Oramics equipment.*

DD: Well I did manage to get invited to see it. It a was huge great mangle of all these tracks of film to be hand-drawn. I think my attitude was that the ear is a better judge of what it hears than the eye can be in constructing a sound.

*JH: Was that what she trying to do, to override the ear with visual image?*

DD: Oh yes, everything was done with waves and oscilloscopes and scanning the oscilloscope waves. OK it may be perfectly valid but I personally wouldn't approach making a sound from any visual parameters. I'd rather do it from mathematical parameters and then rely on the ear to change it. She had two lots of Gulbenkian grants and she was very keen for composers to use it but I don't know if many did.

*JH: Was that because Voltage Controlled synthesis took over?*

DD: Well she argues that she invented Voltage Control herself . That's what she was doing, using an oscilloscope backwards.

*JH: What was it like all working in one room?*

DD: It started off rooms 13 and 14 knocked together. And then when I came, they had just built room 12, which became Delia's room. There were 12 Jason valve oscillators, with 8 electronic gating circuits, built in-house. The accurate oscillator was a Muirhead, which is used in research equipment. It was a switchable one used mainly for tuning, whereas the Jason was just swoopy, you know Dr. Who swoopy.

Of course now on the computer, one can tune in any sort of scale by just pressing a button, but at the time I used to work it all out with my log tables, like the Pythagorean scale, the mean tone scale, adjust tuning and I remember doing a whole lot of comparative tables for Ron Grainer.

I did the Dr Who theme music mostly on the Jason valve oscillators. Ron Grainer brought me the score. He expected to hire a band to play it, but when he heard what I had done electronically, he'd never imagined it would be so good. He offered me half of the royalties, but the BBC wouldn't allow it. I was just on an assistant studio manager's salary and that was it.... and we got a free radio times. The boss wouldn't let anybody have any sort of credit.

*JH: How long did you work there?*

DD: '62 - 73. A very short time, compared to those who made a career out of it.

*JH: ..That's a career isn't it?*

DD: Well I don't know, I still haven't worked out why I left - self preservation I think.

*JH: Were you the only woman there ?*

DD: We had some girls on 3 month attachments who didn't stay. Elizabeth Parker came much later.

Women are good at sound and the reason is that they have the ability to interpret what the producer wants, they can read between the lines and get through to them (the producers) as a person. Women are good at abstract stuff, they have sensitivity and good communication. They have the intricacy - for tape cutting, which is a very delicate job you know.... A producer once said



to me, "You must be an ardent feminist," ....I said "What!", I hadn't even thought in those words.

*JH: It seems there are certain sounds that a women wouldn't make... e.g. Dick Mills', 'Dr. Breakknock's stomach' from the Goon Show.*

DD: Well honestly, if I wanted a big dramatic noise, I would go and ask a bloke because it's their field. I never got into those big dramatic things at all. I used to do programmes to look at sculpture by... .

*JH: So..going back to the equipment at the Radiophonic Workshop..*

DD: Room 11 was the tape room where groups of women reclaimed tape, can you believe it. At that time, tape was regarded as a fire hazard, so we used to get the fireman coming round all the time to remove the tape. This (photograph of studio) is the advanced stage of room 12 where we had three remote-controlled, synchronised Phillips tape recorders. This changed the whole of our work because before that, not only did the machines not run at the same speed as each other, but the rulers that we had read differently. There was one wooden metre ruler and a plastic 12 inch ruler and so if one was doing intricate work, nothing would sync at all.

There was a BTR2, the big machine for mastering on, and a TR90 both EMI machines.

Everything was 1/4-inch mono the whole time I was there. There was a ferrograph, with an internal speaker, that just went up to 7 1/2 ips, used for timing, pip loops, click tracks. There was an RGD and a 7 1/2 ips reflectograph. It was all ips and cps in those days, before Hertz. We had one Leever-Rich 8-track machine which was a bit of a white elephant, It was an expensive variable speed 8-track machine on one-inch tape but it wasn't very good sound quality. There was a Hammond organ and an old upright piano.

*JH: Do you still play?*

DD: I took a great dislike to the piano, and took up the spinnet. At the time I had a little flat near the workshop and I got so addicted to the sound of the spinnet and the way the high frequencies fill your mind, that I'd walk home at lunchtime and just play Bach and Bach and Bach. It was only a small room but you couldn't hear the telephone ring while playing the spinnet because it totally absorbs the whole spectrum of the sound. Also it doesn't pass through walls or floors so nobody else can hear it.

*JH: What are you plans for the future?*

DD: Several people wanted to do a compilation of my little things, they appeal to different people. So I asked the BBC how much it will be to license certain tracks - half a minute long - and they just say "All tracks are £500 each!" So, I've put it all behind me.

It's the doing of it that was the pleasure really. I can still hear beautiful things in my mind, and I know how I can make more beautiful things too, that's the important thing.

Delia Derbyshire, composer arranger and pioneer of electronic music, 5 May 1937-3 July 2001

A number of recordings by Delia Derbyshire and Maddalena Fagandini are available on the Cadenza catalogue at the National Sound Archive Listening Department, at the British Library.

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