

Breege Brennan's Thesis

From WikiDelia

Breege Brennan's 2008 thesis, for her Masters Degree in Computer Music, Dublin, 2008, supervised by Prof. Victor Lazzarini, is a biography and analysis of Delia's life. It was based on Louis Niebur's book *Special Sound* and Breege's own interviews with Brian Hodgson, Mark Ayres, John Cavanagh and Drew Mulholland.

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INTRODUCTION

Delia Derbyshire was a British composer, and one of the earliest electronic sound synthesists.

Present-day electronic musicians such as the Chemical Brothers, Aphex Twin, Add N to (X) and Sonic Boom frequently name-check Derbyshire, who began composing at the Radiophonic Workshop at the BBC in the early 1960's. Delia Derbyshire was responsible for “realising” the “Doctor Who” theme tune, written by Ron Grainer. With her colleague and friend, Brian Hodgson, who created the sound effects for the programme, and engineer Dick Mills, she composed “to order” for BBC radio and television programmes for over 10 years. In 1973, she left the BBC to set up an independent studio with Brian Hodgson. Shortly after that however, Derbyshire turned her back on music for almost 20 years. In 1993, Mark Ayres, archivist of the BBC Radiophonic Workshop, got in touch with her for a film project. Later, he convinced her to attend a “Doctor Who” convention in 1998. She also began working again in the late 1990's. She started some work with Sonic Boom and had been approached by Ayres to compose for a possible event called Generic Quarry Sci-Fi, a music event inspired by 1970's British science fiction shows. Derbyshire, along with ex-colleagues

and friends – Brian Hodgson, Paddy Kingsland and Mark Ayres - were to compose for the event. Instead of making a contribution, the show was dedicated to her memory, as she passed away, suffering renal failure, in 2001^[1].

This thesis will trace the life of Delia Derbyshire, using recorded or written interviews with Ms. Derbyshire, including four interviews carried out by the author with friends and colleagues in the UK. (See appendix one for biographies of contributors.) Initially then, the thesis is roughly chronological. There is very little public information about the 20 years between 1973 and 1993.

In the section dealing with the recording process, it is necessary to introduce some strands from acoustics, the study of sound, and psychoacoustics, the study of human perception of sound. Following that, there is a short discussion about three pieces that Derbyshire was involved with – including the theme from “Doctor Who”, “Blue Veils and Golden Sands” and “Black Mass: An Electric Storm in Hell” which show Derbyshire's breadth of inspiration and ability as a composer. Unfortunately, due to issues around ownership and copyright, no samples of Delia Derbyshire's music can be reproduced for this thesis. Finally, certain issues arose which need, at the very least, to be acknowledged but a thesis of this length cannot hope to fully assess the impact of these issues.

CHAPTER ONE

The Early Years (1937-1962)

Delia Ann Derbyshire was born in Coventry, England, on 5th May 1937 into an “upper, working class Roman Catholic background”,^[2] to Emma ('Emmie', nee Dawson, d. 1994) and Edward (Ted) Derbyshire (d. 1965). She went to primary school at Barr's Hill Grammar School between 1948-56. During the Second World War, and immediately after what became known as the Coventry blitz in 1940, Delia, still quite young, was moved north to Preston, Lancashire, where her parents were from, for safety.^[3] Derbyshire had one sibling, a sister, her only sibling, who died young.^[4]

By her own admittance, she was very bright, and by the age of four, she was teaching others in her class to read and write in primary school. She lapped up information, and said “the radio was my education”.^[5] She wanted to learn a musical instrument. Her father suggested the cello, her school wanted her to play the violin, and she wanted to learn the piano. She took up the violin but didn't like it, and her main instrument became the piano. Her parents bought her one when she was eight, and she took lessons outside school hours for several years, and became quite accomplished.^[6] According to Clive Blackburn, Derbyshire's partner for over 20 years, she held a Licentiate of the Royal Academy of Music (Pianoforte, performer) and regularly travelled to piano competitions. Later, in 1961 or 1962, she took up the double bass and took lessons in Covent Garden once a week during her early years at the BBC.^[7]

Derbyshire pointed out that, at the time, students had to choose between pure arts or pure sciences for the ‘A’ levels.^[8] She chose mathematics, physics and theoretical mechanics. Then she was accepted by both Oxford and Cambridge to read mathematics, which she admits was “quite something for a working class girl in the ‘fifties, where only one in 10 (students) were female”. She chose Cambridge (Girton College 1956-59), one of the primary colleges in the UK for mathematics, received a scholarship^[9] and studied mathematics for one year. But apart from some success in the mathematical theory of electricity, she claims she did badly. However, she was permitted to move across to music, and two years later, left with an MA Mathematics Part 1 and Music Part 1,^[10] (specialising in mediaeval and modern music history).^[11] She approached the careers office at the University and told them she was interested in “sound, music and acoustics, to which they recommended a career in either deaf aids or depth sounding”. She applied to Decca Records but was told that they did not employ women in their recording studios.^[12]

In June 1959, Delia Derbyshire moved to Geneva, Switzerland. She taught piano to the children of the British Consul-General, and mathematics to the children of Canadian and South American diplomats. Still in Geneva, she began working on a conference with the International Telecommunications

Union, a UN agency with deals with radio and other telecommunications issues at an international level. Co-incidentally, every four years, the Plenipotentiary Conference of the ITU is held, which adopts underlying policies of the organisation and determines activities, structure and direction of the Union. Radio regulations were entirely revised at the 1959 conference. Radio regulations are a legal instrument for optimal international management of the radio spectrum. They are constantly updated at the World Radio Conferences, organised by the ITU. In essence, all radio stations are allocated a frequency by the ITU. Derbyshire worked as assistant to the Head of Plenipotentiary and General Administrative Radio Conferences, Gerald G. Gross, between September and December 1959.^[13]

Returned to England, Delia Derbyshire worked as a primary school teacher in Coventry between January and April 1960. She made some applications to the BBC and, after a short period at Boosey and Hawkes music publishers in London,^[14] finally joined the BBC in November 1960 as a trainee assistant studio manager.^[15] She worked on “Record Review”, a magazine programme where critics reviewed music. “Some people thought I had a kind of second sight. One of the music critics would say “I don't know where it is, but it's where the trombones come in” and I'd hold (the record) up to the light and see the trombones and put the needle down exactly where it was. And they thought it was magic”.^[16] Then she heard about the Radiophonic Workshop and decided immediately that that was where she wanted to go. This was received with some puzzlement by department heads in Central Programme Operations as typically, people were “assigned” to the Radiophonic Workshop.

Delia Derbyshire joined the BBC Radiophonic Workshop in Maida Vale in April 1962.

The “BBC Years” (1962-1973)^[17]

The United Kingdom was not untouched by what had been unfolding in post-war Europe, economically and culturally,^[18] forces that facilitated the establishment of the BBC Radiophonic Workshop.

According to Dr. Louis Niebur, “the first discussions about the creation of the Workshop on April 13th 1956, at an Entertainment Divisional Meeting of the BBC. Brian George (Head of Central Programming Operations) proposed setting up a small laboratory in order to experiment with electronic sound effects in radio productions”.^[19] A report was commissioned and staffing requirements, equipment and facilities were discussed. Initially meeting under the name “Electro-Phonic Effects Committee”, the name was changed to “Radiophonic Effects Committee” when it was discovered that the word “electro-Phonic” was associated with brain research. The Radiophonic Workshop officially opened its doors for business April 1st 1958.

Niebur outlines in great detail the genesis of the Workshop, “the original reason for the Workshop's creation arose from the need within the BBC's Drama Department to accompany...avant-garde radio plays”.^[20] According to Maddalena Fagandini, who worked at the Radiophonic Workshop between 1959-1966, the Workshop “provided producers with the possibility of creating sound pictures, which were not just a few effects and a bit of conventional music off a disc. The whole thing became more elaborate”.^[21] Dr. Niebur summarises from Donald McWhinnie “that sound effect(s) can act as storyteller, these new, more abstract sound effects worked in combination with dialogue to forge an atmospheric texture”. In January 1957, the first radio broadcast of “All that Fall”, Samuel Beckett's first English language play, was broadcast on the Third Programme, and produced by Donald McWhinnie, and “contained sounds previously unheard on British radio in domestic production, thus bringing to the attention of the wider public the potential for tape effects in drama”.^[22] (The name “Workshop” belies the drama roots of the Radiophonic Workshop. The previous quotation unwittingly highlights the battleground between the BBC Drama and Music Department which is important to Derbyshire's life and will be examined in chapter three.)

After a rocky start, it became clear that “the next generation of compositions for television and radio signature tunes...would direct the emphasis away from abstraction and into a more “musical” world, albeit far from the ivory tower of the contemporary classical world”.^[23]

Delia Derbyshire moved to the Workshop in 1962. Maddalena Fagandini said that “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 structure of certain sounds, she could put them together. I got into TV producing because I thought that the way things were going (in the Radiophonic Workshop), it did require far greater musical training. However wonderful the sounds were, it needed something extra. They really started making excellent music”.^[24]

The Radiophonic Workshop would combine techniques from the two existing, juxtaposed European electronic music traditions – *musique concrète* from France and *elektronische Musik* from Cologne, Germany. The Workshop equipment was in short supply, second hand, sometimes broken and quite often, borrowed overnight from another studio. The rooms in Maida Vale were small and inadequate, the equipment “second hand and ill-functioning”.^[25] To contextualise the conditions of production, Brian Hodgson said “there were no synthesisers, no computers, no samplers; just a few oscillators, crude filters, aged tape recorders, razor blades, miles of recording tape, an ancient microphone and a collection of noise-producing old junk – the piano frame rescued from a junk heap and liberated from its case, metal lamp shades, a

burst copper hot water cylinder, empty bottles of all shapes and sizes, mad ideas and lots of laughs”.^[26]

Delia Derbyshire composed “to order” using equipment made available by limited resources and support from the BBC. In short, any sound and music generated from within the Workshop, was created by recording either “found sounds” or an electronically generated tone from an oscillator, of which more in chapter two.

Delia Derbyshire is credited with “assisting” on the theme music for “Time on our Hands” and “Arabic Science and History” (1962) and “Know Your Car” (1963).^[27] In August 1962, Derbyshire assisted Luciano Berio^[28] at the Dartington Summer School. A telegram addressed to her, dated 20 August 1962, lists equipment borrowed or hired by her from the BBC, including amps, mixers, microphones, ribbons, stands, adapters, transformers, coils, attenuators, plugs, generators, tapes, ferrographs and oscillators.^[29] (In late 1959, William Glock was appointed Controller of Music at the BBC (Music Department). He was very supportive of contemporary music and composers, and he established the Dartington Summer School.^[30])

In 1963, BBC producer Verity Lambert needed theme music quickly and cheaply for a new television series. She considered approaching “Les Structures Sonores”, a French musical duo whose sound was appropriate. This did not materialise. Brian Hodgson recalls “[Delia] was asked to realise one of the first electronic signature tunes ever used on television. It was Ron Grainer's score for a new science fiction series, “Doctor Who”. Grainer had worked his tune to fit in with the graphics. He used expressions for the noises he wanted - such as “wind”, “bubbles”, and “clouds”. It was a world without synthesisers, samplers and multi-track tape recorders; Delia, assisted by engineer Dick Mills, had to create each sound from scratch. She used both concrete and electronic sources (sine- and square-wave oscillators), tuning the results, filtering and treating, cutting so that the joins were seamless, combining sound on individual tape recorders, re-recording the results, and repeating the process, over and over again. When Grainer heard the result, his response was “Did I really write that?” “Most of it”, Delia replied”.^[31] It was not the first electronic television composition, but it became one of the most recognisable, and, with reincarnation of the series and several feature films, while the tune has been revisited, reproduced and re-mastered several times, the essential BBC theme has remained the same.

1964 was to prove particularly prolific. Derbyshire collaborated with Barry Bermange^[32] on “Inventions”, a 4-part series for radio broadcast between 1964 and 1965. The programmes were collages of sound and voices. “Within Dreams”, sometimes called “The Dreams”, was broadcast in 1964 and attempted to recreate the sensation of dreaming. “Amor Dei” was the second of the series – this time people were trying to describe good and evil in human terms. “[Bermange] asked her to create a gothic altarpiece of sound. She

composed this with snippets of archive and voices, again with only the simplest of equipment and facilities, often working through the night, for weeks on end”.^[33] “The After-Life” and “The Evenings of Certain Lives” completed the series and were broadcast in 1965. In most cases, the voices were recorded from life, they were not actors' voices. “The foreground speech was recorded from life, the recordings being subsequently edited and re-arranged though not in any way electronically treated. The composition of the music was done by electronic means using voices as a basic element”.^[34]

Derbyshire also worked with Roberto Gerhard (1896-1970), the Catalan pianist and composer who worked both at the BBC and his own studio in Cambridge. “The Anger of Achilles” by Robert Graves^[35], a play for orchestra and tape, was chosen for submission to the 1965 Prix Italia in Florence.^[36] According to Mara De Angelis, Press Officer at the Prix Italia, the Prix has “Official” and “Special” prizes in each category, but they are considered of the same importance. In 1965, “The Anger of Achilles” won the Prix Italia Special Prize, called the RAI^[37] Special Prize for Radio and Drama (literary or dramatic programmes with or without music). (Co-incidentally, in 1965, the Prix Italia Official Prize in the same category went to “Piano in the River” by Dan Treton for RTÉ.)

Delia Derbyshire continued to work for the BBC, turning out signature tunes for local or national radio, and television. In her time there, she was involved in many hundreds of recordings. However, she also started working outside the BBC, despite that fact that they “[were] usually so jealous of [their] servants”.^[38]

“Moogie Bloogies” was recorded with Anthony Newley (1931-1999), a high profile pop star at the time. “[He] told his label he wanted to do something electronic. So they got on to me. So I produced this...beautiful little innocent tune, ...and he made it into a dirty old raincoat song. But he was chuffed ... and rang up his record company saying “We want to move to a multi-track studio”. Unfortunately the boss...was on holiday and by the time he returned, Anthony had gone to America with Joan Collins,^[39] so it was never released”.^[40]

In 1966, Derbyshire and Hodgson, along with Peter Zinovieff,^[41] formed Unit Delta Plus to promote the use of electronic music in film, television, advertising and the arts. They were based in a shed in the garden of Zinovieff's house in Putney, London. Although short-lived, they were involved in a lot of notable performances. The Delia Derbyshire Archive at Manchester University has some documentation. For example, in March 1966, Martin Landau for Marlan Productions Ltd. in association with Brian Epstein presented “On the Level” at the Royal Court Theatre, Liverpool, with music by Ron Grainer. The electronic sound sequences were credited to Unit Delta Plus. John Arden's “The Business of Good Government” was directed by Ian Cotterell for Theatre 62, an amateur theatre production company based in

Kent. The programme credits run as follows: “soundscore composed by Delia Derbyshire (sic) of Unit Delta Plus”. A programme from a concert on 10th September 1966 at the Watermill Theatre, Bagnor, West Berkshire outlines that Derbyshire, Hodgson and Zinovieff played a concert there. According to the programme, Derbyshire performed “Amor Dei”, “Moogie Bloogies” and “Pot Pourri” on her own and, with Zinovieff, performed “Random Together 1”.^[42] Although lengthy, the following notes are from the concert programme are worth quoting to indicate just how little was publicly understood about tape manipulation and recording, and to highlight the composers' mathematical approach. (For full introductory text, see Appendix 3).

“Electronic music is made by recording onto magnetic tape, electronically produced oscillations, which, when played from the tape, are heard through a loudspeaker as sounds...There is complete control over all musical parameters such as pitch, timbre (harmonic content), loudness, duration, time interval, impact (rise and fall time), reverberation, echo, musical scale, if any, and so on. Even after these choices are made, there is control over the filtering, switching, and even over the probability (in a mathematical sense) of any or all of the parameters occurring.”

“[Random Together 1] is in three parts. The first and last will have light projection by Hornsey College of Art. The middle section will be heard in darkness and musically is derived from the other two sections. A limited number of sounds was chosen in each section and their order and coincidence were selected randomly. It was determined beforehand what the results of any such combinations might be. The levels of reverberation, the rise and fall times, and the mixing of a large number of these sounds, as well as their being recorded on one or more tracks, were also determined by probabilistic methods. The different quality of the first and last sections is due to the difference in pitch of the tones initially chosen and the probabilistic selection of time intervals, loudnesses and switching from track to track. In this way, the spatial structure is also varied.”

Unit Delta Plus also played two dates in the Roundhouse Theatre in Chalk Farm in London – the 28th January and the 4th February 1967. “The Million Volt Light and Sound Rave” also featured a piece by Paul McCartney. A clipping from the Delia Derbyshire Archive features a newsprint preview by an undocumented journalist, from an unnamed publication – “Paul McCartney prepared a tape of electronic noises, known as music in some circles, for use at a 'carnival of light' at Centre 42's Roundhouse next month. Carnival of light? This is a new art form combining sound with light coming mostly from 15 automatic projectors playing onto 60 foot high screens which changes colour according to the sound. There will be another five projectors developed from a Russian invention, which create patterns, blending and blurring vividly coloured shapes. They will be hand operated by artists and designers David Vaughan, Douglas Binder and Dudley Edwards, the three

men behind this form of entertainment. The occasion threatens to be one of those eye dazzling, ear splitting affairs that the trendy have already dubbed “psychedelic son et lumière”. Unit Delta Plus also delivered lectures about electronic music, at least two of which are documented by what unfolded at them. An American composer, David Vorhaus attended one at Morley College in London and introduced himself to Derbyshire and Hodgson after the lecture. He was to become an important figure in Derbyshire's life. Later, and according to Brian Hodgson, Unit Delta Plus had another lecture at the Royal College of Art, however “Peter had arranged a 'happening' [not a lecture] but didn't tell Delia or I. I walked off the platform and sat in the audience at one point. And the next day, we went over [to Peter's house] and said we wanted to break up the partnership and he said he wanted to do it as well, so that was it”.^[43] According to Mark Ayres, Zinovieff would later create EMS from the ashes of this endeavour.

However, by this time, Derbyshire and Hodgson had met David Vorhaus. This was to mark the next significant development in Derbyshire's career, and indeed, life, “there seemed to be a turning point in her life around David”.^[44] Within a week of meeting, the three had resolved to set up an experimental studio, “Kaleidophon”. The trio called themselves “White Noise” and began recording together. According to Vorhaus, the idea was to release a single, so they met Chris Blackwell of Island Records, one of the largest independent record labels at the time. Blackwell advised them to make an album instead and gave them an advance. They built a studio with the money. This also meant that they didn't have to use the BBC facilities, “it's common knowledge now that the first couple of tracks...were actually recorded in the BBC...they were unaware of us using the studio and equipment for our own ends”.^[45] The studio was established in a premises on Camden High Street in London and the rest of the album was recorded there.^[46] Combined with the fact that both Hodgson and Derbyshire continued their 'day' job at the BBC, the recording sessions were very time consuming. The album has seven tracks in total, one of which, "the Visitation", over 11 minutes long, took nearly three months to finish. A year after Blackwell had given the trio the cheque, his replacement at Island Records, Guy Stevens, had still not received the product. Island threatened legal action, and the album was promptly finished. “[White Noise] was very advanced for its time but it never quite “gelled” for me. It was just not part of the stream of things that was going on at the time, it went off at a tangent, and it became a cult album. Pity it didn't become one at the time! It was as if Island released it on the “secret list”.^[47] Kenny Everett began using parts of one of the tracks as a jingle for his radio show but as Mark Powell points out on the album notes, while “in hindsight, the influence of “Electric Storm” was significant on a generation of musicians such as ...Brian Eno,...Kraftwerk... influence did not bring great riches”. Time Out, a listings magazine in London, carried a scathing review of the album “the formula is simply electronic music mixed with vocals. Is that new? Stockhausen was

doing it in 1928 and Mimaroglu had done all that he had to do by 1950; as regards this album being revolutionary, it's about as revolutionary as "White Christmas" by Bing Crosby. .. On the whole there are the same old clichés with a slight twist here and there...however there are some successful electronic passages and these compromise the most useful pieces of the whole album. I did try to listen to the vocals and electronics as sympathetic units but I found it impossible....The lyrics on the majority of the tracks are I'm afraid spastic".
[48]

While recording "Electric Storm", Derbyshire and Hodgson, who'd been introduced to David Platz at Essex Music by Anthony Newley, began working on another "mood album" for Platz.^[49] However because Derbyshire and Hodgson were still at the BBC, there would have been contractual issues if they used their own names. "We went to a cocktail bar at the Cumberland Hotel ...and mulled over a few names. They were jokey names [not anagrams at all, but] people love to find motives and significance in things".^[50] And so Hodgson became Nikki St. George, and Delia Derbyshire became Li De La Russe. "Electrosonic" was number 1104 in the KPM series of library music albums and was re-released in 2006 by Glo-Spot.

Using the same pseudonyms, and this time working with Vorhaus and Dudley Simpson, Derbyshire and Hodgson recorded tracks for the Standard Music Library (ESL 104). Co-incidentally, a lot of this music was later used in a Thames Television series for children called "the Tomorrow People" broadcast on ITV. "Delia's Theme" from the album was also used in the film "Work is a Four Letter Word" (1968), directed by Peter Hall, with David Warner and Cilla Black. Derbyshire is generally credited with having assisted Guy Woolfenden with the electronic sounds for the film. The film was made by Calvacade Films and distributed by Universal Pictures. In 1973, along with Brian Hodgson, she worked on "The Legend of Hell House", directed by John Hough for Academy Pictures and distributed by Twentieth Century Fox. A script and some notes for the film can be found in the Delia Derbyshire Archive. There was also a collaboration with composer Yannis Christou, composer for "Oedipus the King" in 1967, with Christopher Plummer, Orson Welles and Cyril Cusack. According to Hodgson, Delia Derbyshire met Yoko Ono through David Vorhaus. "I did a film soundtrack for Yoko Ono...for the shorter film, which was the wrapping of the lions in Trafalgar Square".^[51]

Derbyshire and Hodgson also worked on some theatre productions. (When they worked together, Derbyshire was responsible for composing, Hodgson for special sound effects. "She did the more overtly musical things, and I did the more expressionistic things with the "voices".^[52]) As Kaleidophon, they did the music and effects for Tony Richardson's "Hamlet" at the Roundhouse, and "Medea", directed by David Thomson for the Greenwich Theatre.^[53] Also for the Greenwich Theatre, they did "Macbeth", directed by Ewan Hooper.^[54]

The production got some poor reviews but the sound was mentioned, not negatively. BA Young for “the Financial Times” wrote “the [characters] are of no period or place and the sounds around them are electronic and anonymous”.^{DD140920} Peter Lewis of “the Daily Mail” wrote in February 1971, “a great night for the noises off...a night of whistling and whinnying and the calls of whippoorwills, of electronic music for the witches' chants, of echo chambers and metallic vibrations from the back projected ghosts”.^{DD140834} Michael Billington, writing for an un-named paper, “[the] production gets nearer the centre of the play than more ambitious rivals. Liberally employing what Henry Reed once dubbed “reinforced concrete music” and setting the action on a tilted promontory suspended above two jagged edge rostra, it evokes the right atmosphere of eerie ambivalence in which nothing is but what is not”.^{DD140642} Derbyshire and Hodgson also worked on Peter Logan's “Mechanical Ballet” in March 1969 at the New Art Centre, London SW1. The RSC's “Macbeth” in Stratford on Avon, with Paul Schofield, credits “music by Unit Delta Plus and Guy Woolfenden”. They also did “King Lear” at Stratford. While there is no documentary evidence in the Archive, one tape has a sticker with the words “Dublin Macbeth”. With no small amount of research, it became clear that it was a radio production for RTÉ.^[55] “And that was going to be wonderful...we were going to [go] over and have a great party. The Bankers Strike was on at the time and nobody could get any money out of Ireland for months. It took nearly a year to get paid...we never got (to Dublin) in the end”.^[56] “Macbeth” was broadcast on RTÉ on 6th December 1970 as part of the “Producer's Choice” series. PP Maguire, head of Drama and Variety (Radio) adapted and produced the play. Aiden Grennell played Macbeth and Deirdre O'Meara played Lady Macbeth. Unfortunately, the article from the period is cut short but the RTÉ Guide at the time wrote “a special electronic soundtrack is being prepared by Kaleidophon, a studio specialising in work of this kind”.^[57]

The Next Step (1973-2001)

In 1972, Delia Derbyshire took some leave of absence from the BBC. And in 1973, Derbyshire and Brian Hodgson decided to leave the BBC together and work in his studio “Electrophon”. But as Hodgson recalled “the idea was that we were going to leave together and set up Electrophon,... she started dragging her heels about leaving. I left [and]...blew my pension on setting up Electrophon. And Delia was supposed to come with me...we did “the Legend of Hell House” together, but she was not mentally there much. She'd get enthusiastic for a minute or two and then lose interest. So that was a difficult time. At that point, Delia almost “disappeared”. That then led on to her leaving London and going up north to work on the pipeline”.^[58]

Speaking with John Cavanagh, Derbyshire said that “something serious happened around '72, '73, '74. The world went out of tune with itself and the

BBC went out of tune with itself". She left the BBC and took a job close to the Scottish border with company called Laings, who were working in conjunction with two French companies on a gas line. She had three transmitters and worked from a disused quarry, at least delivering the weather forecast in French every night.^[59] She married David Harpur briefly, a miner from the north of England. The marriage did not last and very little is known of him. Brian Hodgson pointed out "she'd got herself married, how long it lasted no-body really knows. The husband didn't reappear on her death. I don't think anyone really knew how to get hold of him, but there was enough publicity, if he wanted to make himself known, to have made himself known".^[60] They never divorced. She then worked and lived with Li Yuan-chia, (1929-1994) a Chinese abstract artist and poet. He was born in China, and lived in Taiwan and Italy before moving to Cumbria, in the north of England. As well as creating his own art, Yuan- chia made his home into an art gallery between 1972 and 1983, exhibiting works from other artists. His home was an "arts space" as there was a gallery, library, theatre darkroom and a childrens' art room. During this period, Derbyshire lived a "private" life, and details are quite sketchy. As Brian Hodgson said "I would get bits of what she wanted me to know about, she kept people in her life separate".^[61]

In 1978, five years after moving there, Delia Derbyshire left Cumbria and returned to London, where she met Clive Blackburn. It is unclear what she did during this two-year period but in 1980, she bought a house in Northampton, and Blackburn joined her there. In 1998, Mark Ayres persuaded her to attend a Dr. Who convention, and this marked another turning point in Derbyshire's life. She enjoyed being celebrated at the convention in Coventry and was subsequently approached by Sonic Boom to work together. In the late 1990's, a rumour started that Delia Derbyshire was terminally ill. She was diagnosed with breast cancer at the age of 60, and was later operated on. She proudly sported a pink ribbon in support of breast cancer awareness at the Dr. Who convention in 1998 and spoke about her experience on BBC Radio 4, Women's Hour.^[62] Derbyshire worked with Sonic Boom, who lived near her in Northampton.^[63] It is possible that two CDs, "Vibrations" (EP 2000) and "Continuum" (2001), recorded under his Experimental Audio Research project, features their work together.^[64] While preparing for Generic Sci-Fi Quarry, a multi-media event to celebrate 1970's British science fiction television, in which some of her music was to be presented again, Derbyshire passed away, suffering from renal failure due to alcoholism in July 2001.

CHAPTER TWO The Recording Process

All sounds and music attributed to the Radiophonic Workshop was generated either electronically or "found" but the Workshop was ill-equipped, and apart from a small start up allowance, did not receive any funding for nearly 25 years, until Brian Hodgson became Head of the Department in 1983, "I came

back to do a specific job,...to drag [the Workshop] into the twentieth century, because the train of thought [in the BBC] was “it's the ideas that matter, the equipment's not important”. But the equipment IS important. It's all very well, struggling on, being pioneers, but the place is nearly 40 years old, and it was c*** heap. So I was brought back to bring it up to date. I managed to get a budget for the Radiophonic Workshop for the very first time. We re-equipped it for the twentieth century and we ended up with the most sophisticated MIDI environment in Europe, possibly in the world. We [became] computerised and state of the art”.^[65]

However, in the sixties, the so-called “Golden Age of the Radiophonic Workshop”, the only source of electronic sound came from the 12 Jason valve oscillators, test equipment for electronic circuits – so all electronic sound depended on how the resulting tone was treated or modified. “They also had a couple of high-quality equalisers and a few other gadgets...a low frequency oscillator and a white noise generator...there were three Phillips tape recorders [which] did not run at the same speed...[and] the rulers we had read differently,^[66]...there was a BTR2...for mastering on, and a TR90 [tape recorder]...a Ferrograph [tape recorder] with an internal speaker,...an RGD...a 7½ inch reflectograph [tape recorder]...[a] Leavers- Rich 8-track machine which was a bit of a white elephant...a Hammond organ and an old upright piano... [The Workshop] started off with rooms 13 and 14 knocked together...then room 12...became “Delia's room”...I used to work it all out with my log tables, like the Pythagorean scale, the mean tone scale, adjust tuning...”^[67]

To fully understand and appreciate Derbyshire's musical and technical ability, it is useful to introduce some elements in the acoustics, the study of sound, and psychoacoustics, a related field, but more subjective, the study of human perception of sound. It is not known if she ever studied psychoacoustics, but she said “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”.^[68] And on leaving Cambridge, Derbyshire professed an interest in acoustics, “after my degree, I went to the careers office. I said I was interested in sound, music and acoustics, to which they recommended a career in either deaf aids or depth sounding”.^[69] There is not doubt that the way she produced sound would indicate that she had a very clear understanding of timbre, frequency and Fourier analysis.

In psychoacoustics, the notion of “timbre” is quite difficult to define but any note or sound that is mechanically produced, for example, when bowing a violin or blowing a flute, has a “timbre”, a distinctive “sound quality” by which we instinctively know it to be a violin or a flute. Within that this mechanical action, producing a single note, three distinct phases can be identified.^[70] The note is established during the “attack” phase and, although it is relatively short, is nonetheless important to “understanding” or “placing” the

instrument. The next, and longest, phase of a note is the “steady state” and the third and final stage, is called “decay”. The “attack” and “steady state” phases are most important to our perception of the sound. By removing any one of these parts, or by changing the order, the sound “character” changes. “My most beautiful sound at the time was a tatty green BBC lampshade,” Derbyshire recalled, “...it had a beautiful ringing sound to it. I hit the lampshade, recorded that, faded it up into the ringing part without the percussive start.”^[71] In an interview with John Cavanagh for BBC Radio Scotland in 1997, Derbyshire confirms she adjusted note timbre, “I’d cut the front off a sound”. When Derbyshire removed the “attack”, suddenly that note is no longer recognisable. Rather it is alien to the ear and the resulting sound totally subverts the listener’s expectation. Furthermore these edited sounds were modified on the tape recorders, as outlined below.

By virtue of its physical properties, any object, when subjected to force (or excitation) will resonate, and that vibrating object will naturally pick out its resonant frequencies from various complex excitation patterns. For example, a pendulum has only one resonant frequency. But if one hits a mass connected to a coil or spring, the initial motion is complex, but a natural pattern will emerge, and the mass will bob up and down. This represents the natural or resonant frequency of the spring. Effectively, the spring has “filtered out” other frequencies. Within its natural frequency, most vibrating objects have multiple resonant frequencies, lowest of which is called the fundamental frequency. Similarly, in music, any “single” note has a fundamental frequency and other higher frequencies, called “overtones”. (Overtones can be harmonic or non-harmonic, depending on whether or not there is a relationship to the fundamental frequency.) A musical note, then is not “pure”, rather it has a vertical quality. When we hear a “C” for example, and although we are not aware of it, also present is “C” an octave above, and the “G” above that and so on infinitely.^[72] Although the listener is not aware of these overtones, they add to the richness of the note. Within this hierarchy, certain frequencies have a higher amplitude than others, and there is a fixed range of frequencies over which harmonics are emphasised.^[73]

French mathematician Joseph Fourier (1768-1830) made important discoveries regarding waveforms. In essence, a non-sinusoidal periodic wave^[74] can be understood as the combination of constant-amplitude sine waves, whose frequencies are harmonically related. As many musical instruments produce periodic, non-sinusoidal waveforms, this has profound implications for analysis of sound. The process of adding harmonics to create periodic, non-sinusoidal waves is called Fourier synthesis. Fourier analysis, a more complex mathematical procedure, is a process where the soundwave is decomposed into its constituent parts. Derbyshire clearly had the ability to dismantle and rebuild sounds, going on to replicate “found” sound electronically. Brian Hodgson recalls Derbyshire “would take an object, a lampshade, say, and hit it, muffle it and hit it again, hang it up and rub it so it

sang like a wine glass...she got all the tones she could out of it ...analysed the sound into all of its partials^[75] and frequencies, and took the 12 strongest, and reconstructed the sound on the...12 oscillators to give a whooshing sound”.^[76]

There were two main sound sources in the Radiophonic Workshop, the oscillators, or “found” sounds, usually junk from other BBC departments or the market nearby.^[77] The oscillators produced a tone - a simple sine or square wave which was recorded onto magnetic tape. This tone could then be speeded up or slowed down to create a new tone. Or the tones were altered using the pitch adjusters, and recorded onto tape. And Derbyshire used the sound of piano strings being struck by metal or wood. A sound could be used in its original state, or it could be modified - tape manipulation can transform a sound enormously. And Derbyshire used the human voice. For “Ziwzeh Ziwzeh Ooh Ooh Ooh”, she said “I got [the actors] to chant. The words they were singing were “Praise to the master, his wisdom...and his glory”. I turned it backwards first, then chose the best bits that sounded good backwards and would fit into a rhythm, and then speed changed the voices...I...used a single note [from another piece I wrote] and then did little glissandos^[78] on it and pitched it and treated it”. She also used her own voice in “Blue Veils and Golden Sands”.^[79]

The recorded sounds (whether “found”, electronically generated, or a combination) were slowed down, speeded up, clipped, spliced, reversed, split or turned upside down in the tape machine – anything that could alter sound, change the timbre, and alter listener perception. Mark Ayres points out “each note was individually hand-crafted...[then it was modified] by taking the piece of tape with the sound on and looping it. The loop was placed on a tape machine and its playback speed varied until the pitch was correct, then the sound was re-recorded onto another machine. This process continued until every sound was available at all the required pitches. To create dynamics, the notes were re-recorded at slightly different levels”.^[80] This gave Derbyshire a rich palette of tonal 'colours' to begin composing.

At that stage, armed with a bank of notes at different pitches, the Workshop members stuck individual notes together with slivers of sticky tape, in the right order, to create a “track”. Mark Brend notes that edits occurred as often as every inch.^[81] Multi-tracking was only possible by pressing “play” simultaneously on several machines, and recording the overall output onto another machine. Dick Mills recalls a now-famous incident when the Workshop was recording “Doctor Who”. “We ended up with differing reels of tape for music lines, all spliced together. We stood at the tape machines and said “one, two, three, go!”, pushed the buttons and hoped to God it all fitted. Which it didn't. There was a bum note in it. So we took the reels of tape into the corridor and laid them out side by side, and compared where the sticky tape editing joins were. And where one of them didn't coincide with the other two next to it, that was the bum note”.

The Music of Delia Derbyshire

(I) Delia Derbyshire will always be associated with the theme from “Doctor Who”. The show was about a mysterious time-travelling alien, known only as “the Doctor” who travels time and space, solving problems. It was first broadcast on 23rd November 1963 and was billed as a weekly children's series. The producer, Verity Lambert, requested a radiophonic theme, with a beat, “familiar, yet different”.^[82] The BBC hired composer Ron Grainer to write the theme tune. Grainer is reported to have given Derbyshire a sheet of paper with the bass line, some melody and some notes on his ideas – “wind bubble” or “clouds” to realise his composition. This brevity is ill-borne by some but Mark Ayres contests that Grainer was acutely aware of the workload involved in radiophonic realisation and so kept instructions to a minimum. Either way, Derbyshire, Hodgson and the Workshop technicians had a creative carte blanche and two weeks later, Grainer returned to one of the most recognisable television theme tunes ever. “One of the clever things about the “Doctor Who” theme is that it obscures its own technique. If you listen to a brass quintet, you know it's five brass players. If you listen to a cello sonata, you know it's a cello and a piano. If you listen to the “Doctor Who” theme, you just don't quite know what you're listening to. Because it's obviously not performed, in the conventional sense, and...there's no recognisable sound sources...it has taken on iconic status”.^[83] The theme is defined by the pulsing “twanging” bass line. This was achieved by tightening a string across a 19-inch jack-bay panel, which is slightly flexible.^[84] Derbyshire plucked the string with her thumb, recorded the sound, re-pitched it, and edited the pieces into the distinctive, rhythmic bass line. The theme is punctuated by “swooping” sounds which was achieved by Derbyshire or Mills turning a dial to adjust the pitch on an oscillator. The hissing noise comes from the white noise generator. When Grainer gave Derbyshire the original page with music and notes, he was responding to the graphics for the programme which had already been created. While the “Doctor Who” theme gained both Derbyshire and the Radiophonic Workshop fame, it merely marked the beginning of Derbyshire's own composing career. And arguably, the music became much more refined and elegant.

(II) In 1967, Derbyshire composed “Blue Veils and Golden Sands” for the television series “the World about Us”. The programme was about the Tuareg tribe who travel across the Sahara desert.^[85] According to Brian Hodgson, this was also one of Delia's own favourites. “It still haunts me. She used her own voice for the sound of the hooves, cut up into an obbligato rhythm, and she added a thin, high electronic sound using virtually all the filters and oscillators in the workshop”.^[86] “Delia was into ambient landscape...[and] is unique in the kind of sound she produced”.^[87] Niebur refers to the piece as having “a kind of exotic decadence” and points out that electronic music was perfectly poised to “fashion the unreal, the unusual”.^[88] When describing the piece for an interview on BBC Radio Scotland, Derbyshire said “I tried to

convey the distance of the horizon and the heat haze and then there's this very high, slow reedy sound. That indicates the strand of camels seen at a distance, wandering across the desert. That in fact was made from square waves on the valve oscillators...put though every filter I could possibly find to take out all the bass frequencies and so one just hears the very high frequencies. It had to be something out of this world".^[89] Steve Marshall points out that the "shimmering" effect was produced by slowly changing harmonics within a sound.^[90] The piece is just over three minutes long, and begins with percussive sounds that seems to fade in from the distance, almost like a church bell. This is followed by the central "theme", with the "shimmering" quality. The percussion is heard intermittently. There are other sounds "melting" in and the piece seems to meander aimlessly, and the piece does not achieve a climax. Neither the sounds (instruments) nor the melody are recognisable. It simply becomes, fills the space, at time piercingly so, and then ceases to become. Overall, the effect is of something slowly approaching, and then slowly moving away. "The boss man [at the BBC] had said that "it's impossible for electronic music to be beautiful...until Delia came along".."^[91]

(III) The next track comes from the underground album, "An Electric Storm" released in 1969 on Island Records. The album is the result of the artistic collaboration of Derbyshire, Hodgson and David Vorhaus, known collectively as "White Noise", in 1969. "Black Mass: An Electric Storm in Hell" is the final track on what would have been a two-sided album. The first five tracks are known as "Phase In". It has an upbeat, sixties "feel". The latter part of the CD, called "Phase Out", is much more dark and intense. Phase Out features "the Visitation" and "Black Mass: An Electric Storm in Hell". The track owes no small debt to Pink Floyd's "Saucerful of Secrets" from the album of the same name, or the album "The United States of America", both from 1968, but there is no doubt that "Black Mass" goes much further and is infinitely darker. There is another important difference - the tape manipulation skills of Derbyshire and Hodgson was central to "Electric Storm", the other albums used acoustic instruments and/or created sounds using electronic instruments, "like many Radiophonic Workshop compositions of the period, the White Noise album master tapes were an extraordinary complex and fragile succession of edits".^[92] The album took a year to realise, with "the Visitation", an 11-minute piece, taking three months to complete. "Black Mass: An Electric Storm in Hell" begins with an evenly-paced, closely-discordant male chanting accompanied by a "cello".^[93] An organ plays briefly, and then the drumming begins. The drumming fades in and begins to spin around, completely encapsulating the listener. Other electronic sounds come and go, tentatively at first, punctuating the drumming, itself becoming more frantic. Suddenly a voice bursts in, screaming across the stereo, before falling off into the distance. The drums continue and the voices keep coming, sometimes male, sometimes female. More gargled voices, and sounds, suggestive of people being thrown into an abyss, with "a clatter of freeform

drums, cavernous echo and chilling, animalistic screams”.^[94] The drumming is at once persistent, frantic and hypnotic. The voices seem to merge with electronic effects; where one ends and the other begins, is difficult to discern. Forty years on, this is still a powerful and evocative piece of music. “[The] album that reconciled pop music with the experimental avant-garde... resembled as much a scientific experiment as any conventional musical document... The result is a set of eerie, delightful songs that, for all their surface simplicity, shimmer with vestigial synthesiser swells, strange echoes, disembodied voices, and distant music-box trills”.^[95]

(Appendix four contains transcripts of notes from two directors who thank Derbyshire personally for her work.)

CHAPTER THREE The Issues

There are certain issues that arose again and again while researching for this thesis which need to be addressed. Clearly, the full impact of these issues cannot be assessed in any great detail – that would require more research – but it would be remiss to avoid addressing them. Additionally, a lot of these issues cross-fertilise, and appear under two headings.

“Composer” versus studio “assistant”

Was Delia Derbyshire a composer or a glorified sound designer? Is she defined by the product of her work or her contract? As the following section will attempt to show, on appointment to the Radiophonic Workshop, Derbyshire stood in the crossfire of related, but distinct artistic and bureaucratic battlefields. After the Second World War, the arts changed radically, influenced profoundly by two co-incident, Europe-wide strands music and drama, and the BBC was in the business of both. Also, public opinion was divided about the new electronic music emerging from Europe, added to which, there was deep division within that community. The final protagonist was the BBC itself, the wieldy bureaucracy making relentless demands on highly creative individuals.

Electronic music was mushrooming with the development of experimental studios in broadcasting centres in Europe - Radiodiffusion-Télévision Française in Paris (Pierre Schaeffer and Pierre Henry were creating “musique concrète” or concrete music, made by editing together and manipulating bits of pre-recorded magnetic tape from “found” or existing sounds such as voices or trains); Westdeutscher Rundfunk in Cologne (Karlheinz Stockhausen – making music using only electronically generated sound) and slightly later, Radio Audizioni Italia in Milan (Luciano Berio).^[96] Following a broadcast by RTF in October 1948, “the reactions of the unsuspecting listeners were fiercely divided, developing into a spirited controversy both in musical circles

and the general press”.^[97] This reaction was not unusual. "Le Voile d'Orphee" by Pierre Henry was broadcast in England in July 1954. Afterwards, an article in "The Times" newspaper read "It is capable of illustration...[but] is it music?..it is, on the contrary, a distortion, a perversion of basic musical laws, a style contrary to the nature of human hearing and feeling".^[98] The fallout from this debate was that the Musicians Union in the BBC took the stand that electronic music could not be called "music" and this would have ramifications for Derbyshire.

(The two main experimental laboratories in Paris and Cologne each believed their own methods of creating the new (electronic/concrete) music were superior to the methods of the other. At risk of reducing the philosophical debate between the German and French schools with ludicrous naivety, the electronic music divide can be located around the term "purity". The Germans believed that there was no "associative baggage" in electronically generated sound. By using existing sounds, they contested that "it was impossible [for the French] to create something totally new".^[99] And in 1951, "the...disagreements between the proponents of musique concrète and elektronische Musik began in earnest. The French and the Germans disagreed violently, and the Swiss criticised both for describing their work as "music"."^[100] However, despite the philosophical differences in the German and French "schools", they agreed that electronic music should not be used in television, film or radio, as "they considered this use an insult to the music,...and [it] would reduce the importance of the music, which would become the servant of the words or images it was meant to "support".^[101] This division between the European schools does not necessarily impact on the issue under discussion, but it characterises Derbyshire and her colleagues at Unit Delta Plus, Brian Hodgson and Peter Zinovieff. Contrary to the two main European "players", the particular remit of Unit Delta Plus, was to promote the use of electronic music across all media – television, film, theatre and advertising.)

European theatre and literature were influenced by publication of the essay "the Myth of Sisyphus" by Albert Camus in 1942.^[102] Influential playwrights such as Samuel Beckett, Jean Genet, Harold Pinter and Eugène Ionescu began writing plays that mirrored the absurdity of the central character, Sisyphus, who was doomed to a lifetime of pushing a boulder up a mountain, only to have it roll back down again as soon as he had reached the top. One of the ultimate theatrical realisations of absurdist theatre is Samuel Beckett's "Waiting for Godot"(1952)^[103] which illustrates a similar meaningless situation. It became clear that no orchestral accompaniment would suffice for radio dramatisations so in the late 1950's, in response to a need within the BBC Drama department for specialised sound effects, the Radiophonic Workshop was established. As Jo Hutton notes "the BBC began to commission plays from fashionable playwrights (sic) 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”.^[104] Desmond Briscoe^[105] and Daphne Oram^[106] had been monitoring the progress in Europe and persuaded the BBC to follow the lead of their European broadcasting partners and the Radiophonic Workshop opened its door in 1958. “The emergence and popularity of revolutionary avant-garde continental theatre in the mid-fifties, the Theatre of the Absurd,...combined the art of sound effect with the newly emerging electronic music techniques from Paris and Cologne, ultimately leading to the founding of the Radiophonic Workshop”. The formidable combination of Briscoe's sound effects background and Oram's musical training and experimental curiosity gave...a polish never before seen in a radiophonic production in England”.^[107] In terms of the issue under discussion, this is important, because in the early days, the Workshop created sound effects, principally for radio drama. By virtue of the needs arising from within the BBC, and by virtue of the talent employed in within, the Workshop moved increasingly towards music production, and towards the medium of television. The Workshop was attached to the Drama department, (the term “Workshop” in the title indicates its theatrical roots) and was not recognised as its own department until 1966.

Connected to this interdepartmental issue, the BBC had an impossible public mandate: “to cater to large audiences while at the same time “educating” the public in the repertoire of classical music. The upshot of this was a persistent middle-of-the-road approach to broadcasting”.^[108] The BBC employed, and continues to employ, talented, creative staff. Mark Ayres said that “one of the reasons the Workshop worked so well is because they filled it with very talented people who were willing to think outside the box and also work outside their hours. They were paid from 9-5 but the Workshop was always staffed by enthusiasts so they all worked beyond that, they worked stupid hours and half the time, they worked overnight”.^[109] The constant tension between the creativity in the Workshop and the BBC “middle-of-the-road approach” could only have been very wearing.

Delia Derbyshire joined the BBC in 1960, and the Radiophonic Workshop in 1962 by which time the Workshop was well-established. The official BBC line on the Radiophonic Workshop encapsulates the problem Derbyshire would face during her 13 years at the Corporation: “by radiophonic effects, we mean something very near to what the French have labelled concrete music. Not music at all, really.”^[110] Within the BBC, the Musicians Union took an unyielding stance. “The Musicians Union said that their members were the BBC Musicians so a lot of what the Radiophonic Workshop produced wasn't even allowed to be called music...[and]...they were also not allowed to be called “composers”. And that's why, for mega television themes, like the “Doctor Who” theme, they had to employ an outside composer”.^[111] The result meant that for the “Doctor Who” theme, Ron Grainer is credited as composer, and Derbyshire as arranger. “[Ron Grainer] 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".^[112] The BBC made it quite clear that they didn't employ composers and we weren't supposed to be doing music..."you can't call it music", they would say.."^[113] Within the BBC, the agreement was reached with the Musicians Union, "that if a sound could be notated, it would belong to the Music Department,...and was music...The opposite was also true. If the sounds were not notatable, they did not constitute music".^[114] Brian Hodgson is under no illusion - Derbyshire made "abstract, beautiful atonal music".^[115] And his feelings are echoed by John Cavanagh, "she had a great facility for long form melody. Yes, she was a composer".^[116] In an interview with Jo Hutton, Derbyshire states "it was music, it was abstract electronic sound, organised".^[117]

In summary, Derbyshire stood at a crossroads when she took up her job at the Workshop. Technically and legally, she was a studio "assistant". In reality, her work within and without the BBC illustrates that she was a proficient technician, a creative thinker, a talented sound synthesist and a brilliant composer.

Why did Delia Derbyshire leave the BBC?

This question arose again and again, and given that her musical output all but stopped when she left the BBC, leaving the Corporation is an important turning point in researching Derbyshire's life. In one interview from 2000, Derbyshire said "I still haven't worked out why I left - self preservation, I think".^[118] In another interview, three months later, she said "...I eventually left [because] I didn't want to compromise my integrity any further. I was fed up having my stuff turned down [by the BBC] because it was too sophisticated, and yet it was lapped up when I played it to anyone outside the BBC".^[119]

In May 1972, Derbyshire was given a six-month leave of absence from the BBC "to consider staying on at the BBC".^[120] According to Brian Hodgson, speaking about their plan to set up his studio, Electrophon, "Delia almost disappeared at that point. She'd left David [Vorhaus], it was like the dark ages...and that then led on to her leaving London and going up north to work on the pipeline".^[121] "[She] got married...I think that distracted her at a time when she really should have been settling down to work, and I think ...once she'd turned down a couple of opportunities, it became very difficult to [return to it all again]. I think she probably enjoyed the freedom of not having to meet deadlines. But I know she was always very frustrated". Mark Ayres is a freelance composer who met Derbyshire in 1993, and encouraged her back to public life. He is often contracted by the BBC, and highlights other contributing factors to her decision to leave, principally hinging on her frustration. "Delia was frustrated by having to be Desmond's [Briscoe] assistant. She was...frustrated by lack of credit. She was slightly frustrated by

the deadlines - she would have liked to have...been allowed to be very creative on her own terms, rather than having to get a theme tune done by Monday morning. She was probably frustrated by occasionally having to call on the help of somebody else to complete a job [because of what she called her "reverse adrenaline" - when a project deadline got closer, her output slowly enormously]. [And] when you have a room full of creative people, those people are quoting to be, in quotes, "personalities", and there are going to be some very strong, difficult personalities there. And there are going to be personality clashes. There's bound to be".^[122] Many who knew her, including Clive Blackburn, are under no illusion that if Derbyshire had gotten royalties from the "Doctor Who" theme, she probably would have made a lot of money.^[123] Without question, lack of recognition, lack of equipment and long hours in the BBC, must have impacted on Derbyshire's morale. And another factor which must be considered is the work, although undertaken voluntarily, that Derbyshire was doing outside the BBC – the theatre, albums, concerts and film – while working full-time at the Corporation. In the late sixties, synthesisers were being developed and technically, electronic composition took a step backwards. The EMS and Moog synthesisers could not be supported by the technology of the time, and the equipment was temperature dependant. But what struck at the heart of Derbyshire's career was the type music she composed. "[They] are not tonal works, they're atonal, pure sound pieces...she wasn't writing tonal music that was in a particular key...[but] they put a keyboard on [the EMS synthesiser] and suddenly dragged [electronic music] back to equal tempered scale again. So where the instrument promised that you could break away from tempered scale into pure electronic music, one, it wouldn't stay in tune, and two, there was a keyboard and they were back to playing 12-tone scales on it, dragging music back into tonality".^[124] Eventually when the equipment caught up with her ideas, Derbyshire, disillusioned, fell apart. "I managed to get her onto a composer's desktop programme. But she couldn't cope with it and spent most of the weekend in tears. I think probably realising just how much time had been wasted, how it was gone and she couldn't get it back".^[125]

"There was no one, real reason why Delia left the Workshop, there's no big schism, no blazing row or argument...I think it was just a combination of factors...there were all sorts of things going on. She was tired, she was frustrated and she wanted to be more creative on her own terms".^[126] In summary, it seems that Derbyshire left the BBC for a number of reasons. Her personal circumstances changed a lot, with the break up of some relationships and a marriage shortly after. She lost heart with the technology, which was not precise enough for what she wanted and seemed to be moving backwards, not forwards. She was frustrated with the BBC for a lot of reasons. And it is not impossible to imagine that after 13 years working inside and outside the BBC, Delia Derbyshire was exhausted.

The "Deification" of Delia Derbyshire

The "deification" of Delia Derbyshire, is a term coined, not cruelly, by Brian Hodgson, in light of the public perception of Derbyshire, particularly following her death. Crudely summarised, a brilliant composer gives up her job at the BBC, leaves music, and London, behind, makes a brief re-appearance in public, with the hint of much better things ahead, before passing away. And without subtracting in any way from the merit of Derbyshire's work, there are a few factors that facilitate this "deification" - her name, her persona, her life, her talent and nostalgia.

Derbyshire said that the best thing her parents ever gave her was her name, "because the name has romance about it, it's alliterative,...it has time and place, and Delia is a slightly evocative name".^[127] Derbyshire left Coventry to attend Cambridge in 1956. "[This was] just on the cusp of...the Terence-Stamp-"Look-back-in-Anger" generation...it still was not acceptable to be from "up north", [to] have an accent that wasn't the Received Standard, [so Derbyshire and others such as Peter Whitehead],...went to Cambridge and...developed these syncretic personas...Delia's accent was completely her own creation, and none the worse for that. If it had been 10 years later, they'd probably have been much more of their own background. They wouldn't have developed these personas and they wouldn't have developed the cookie characters that we associate with Delia being "tickled pink, golly" and all the rest of it". Cavanagh is very emphatic that he is not referring to her music, but about Derbyshire "being a sort of "avant garde musical Joyce Grenfell" is a big part of it. If she'd been [born] earlier, she wouldn't have had the opportunity; if she'd been [born] later, she wouldn't have had the persona".^[128]

As outlined in chapter one, Derbyshire left the BBC in 1973 and moved to the north of England. Comparatively then, she moved from a public to a relatively private life, although she was not a recluse. She worked and lived with Li Yuan-chia, and then moved back to London in 1978. Subsequently, she bought a house in Northampton, where she lived for the rest of her life. She and Hodgson were out of touch until he went back to the BBC, and from then on, they spoke about every six months.^[129] "As the years passed, this vanishing act and her continued silence amplified her cult status. "Because she was no longer working," explains Ayres, "and few people knew what had happened to her, she was simply this evocative name behind these extraordinary sounds. She became a rather mysterious, romantic figure".^[130]

In 1993, Brian Hodgson intervened with Derbyshire on behalf of Kevin Davies, a documentary filmmaker, and Mark Ayres, acting as Davies' consultant. Davies was making a documentary called "Doctor Who – Thirty Years in the TARDIS" for the 30th birthday of "Doctor Who" and wanted to interview people who had been involved in the Radiophonic Workshop. Eventually, both Derbyshire and Hodgson were interviewed, although the interviews were not used on either the television documentary or the

subsequent video. However, they were used on the DVD boxset.^[131] Derbyshire and Ayres swapped telephone numbers and became “firm friends”.^[132] In 1998, with encouragement from Ayres, Derbyshire eventually re-emerged from private life and attended a “Doctor Who” convention in Coventry in 1998.^[133] She had become an intensely private person, and Ayres recalled that going to the Convention “was her first real foray into “Doctor Who” since the sixties...She really enjoyed herself although...she was very nervous and very tearful,...slightly fragile”.^[134] “...when she got attention at the “Dr. Who” convention, she enjoyed it, after years of neglect”.^[135] Derbyshire gave some radio and magazine interviews, which have been key to this thesis. She began working with Sonic Boom, and was planning to be involved with Generic Sci-Fi Quarry with Ayres and Hodgson. Despite a more public profile, essentially Derbyshire developed and maintained friendships by telephone. Drew Mulholland of Mount Vernon Arts Lab, and Glasgow University, recalls the first time he phoned Derbyshire to speak with her about a plan to re-release some of her music. “I phoned her one night at seven o'clock and she said “I'm busy now. Phone me back tomorrow at noon”. The next day, when I got through, it was a minute past noon, and she picked up the phone and said “you're late!”^[136] The telephone became Derbyshire's social outlet and conversations were notoriously long, and according to Ayres, a little puzzling at first. “It took me a while to realise what was going on - she'd ring up, she seemed to be talking at random, and then I realised she'd pick up a conversation exactly where you'd left off. I got used to this eventually, and I used to make a note of what we'd been talking about when we'd finished talking...”^[137]

John Cavanagh did not meet Derbyshire, but is clearly very proud of the “telephone relationship” they developed. He said that following her gradual re-emergence into the public eye, interest in Derbyshire was fuelled yet again by her death. On the night she died, internet searches and webpage “hits” skyrocketed. And he firmly believes that the lack of photographs in the public domain, her association with “Doctor Who”, her very obvious talent, her disappearance from public life in 1973, and the all too brief re-appearance, has made her a cult icon. The limited photographs of Derbyshire “...are beautiful...iconic pictures that show this young vibrant woman...chopping up bits of tape...working against the tide...she is crystallised as a young woman...she does not have the baggage of being seen later on... she is, in essence, one of those people who is captured in a time capsule, in the way that she would have been, had she died young [like Kurt Cobain]”.^[138]

As concluded earlier, when Derbyshire left the BBC, it was for several reasons - she had reached a crossroads in her a personal relationship, she was deeply frustrated with her life in the BBC, and was doubtless, exhausted. And as Mark Ayres concluded, “when she retired, she did what she felt she had to do”.^[139] Equally, perhaps she did not see moving from the BBC as necessarily moving out of sound. In conversation with John Cavanagh^[140], she applied for

the job at Laings “as soon as she saw the word “radio” [in the advertisement].”^[141] The job was even more attractive because it was away from London and meant she would speak French, which she loved. Perhaps Derbyshire's “deification” can be attributed to nostalgia. “Doctor Who” first aired on 23rd November 1963. “This [was] the BBC and this [was] a brand new thing”^[142] - television was new, the genre was new and the sounds were new. “When people...heard the theme music for the first time, they would never have heard those sounds before, not in the natural world and they wouldn't have been aware for tape echoing sounds unless they'd known about European avant garde music - to have all that at five o'clock on a Saturday afternoon, [this] would very much have been a cultural moment. [Added to that, President] Kennedy was assassinated the day before... People would still be reeling from that”^[143] And according to John Cavanagh, the assassination of Kennedy led to the Beatles playing in the US in February 1964, and to “Beatlemania”.^[144] Hodgson understands the depth of the cultural resonance – “distance lends enchantment to the music and the television programme”.^[145]

Finally, Derbyshire worked and composed in the BBC for 13 years, and the complex issue of rights and royalties is still being worked through, according to Mark Ayres. There is no question that Delia Derbyshire was a composer, there is no doubt that she probably deserved royalties from the work she did there. Unfortunately, the Radiophonic Workshop was a product of its time, and right or wrong, Workshop members were called “assistants” and not “composers”. What is deeply regrettable, is that given the opportunity work with Hodgson at “Electrophen”, Derbyshire was eventually unable to commit.

Gender, Feminism (and Post-Feminism)

This is an incredibly complex issue, which this writer is ill-equipped to handle but it would be remiss not to include some elements and quotations around gender and feminism that came up in researching this thesis. Unfortunately, they ask more questions than they answer, but indicate that this is an area which ought to be assessed more fully in relation to the work of Delia Derbyshire. (For the purpose of this thesis, I understand “gender” to mean whether one is female or male, “feminism” as a stance on women's social and political rights, and “post-feminism” as a belief that feminism is passé as all the aims of feminism had been met.)

Delia Derbyshire was a woman working in what Niebur refers to as “so-called ‘men's jobs’”.^[146] As Maddalena Fagandini pointed out, this was not unusual – “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”.^[147] However, Niebur is unequivocal about how women were received – “there can be no doubt that in the 1950's, women in so-called "men's" jobs at the BBC faced a great deal of, if not outright prejudice, then condescension, from many of the more old-fashioned male staff”. He goes on “Delia

Derbyshire, for example, when she was resident at the Workshop, is reported to have worked only after the “suits” had gone home to avoid having to deal with the “wonder” they faced at the prospect of an attractive woman doing a job traditionally identified as masculine”. If this is true, and if we accept a previous thesis that one of the reasons Derbyshire left the BBC was because she was exhausted, then this may have had implications in her life.

Playwright Nicola McCartney wrote “Standing Wave”, a stage production about Derbyshire's life. According to her, Derbyshire and her friend, writer Angela Rodaway attended a Womens' Liberation rally in London in 1970.

Derbyshire said “directors who came to see me work used to say, “you must be an ardent feminist” - I think I was a post-feminist before feminism was invented!”^[148] Mark Ayres is of the opinion that “Delia wasn't a feminist...and I think she would have been uncomfortable [with that label]. She was a woman who was bloody good at her job. It's strange that by doing her job and doing it well, she becomes a feminist icon. She wasn't a feminist in that way. A lot of writing is about women in electronic music. And I think Delia would have felt uncomfortable about that approach actually. Because I think she wasn't a woman in electronic music, she was just in electronic music. I think she would find that an odd distinction”.^[149]

The issue of gender is important. Derbyshire clearly thought about the issue of men and women in her workplace, observing various strengths and weaknesses - “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”.^[150] The issue of gender in electronic music cannot be underestimated and will involve studies beyond music and sociology. However, it is sincerely hoped that merely transcribing select quotations to defer to this topic does not minimise the issue, or deter future study of gender in relation to the life and music of Delia Derbyshire. Rhetorically, how might things have been different if she were a man? “I think if that work had been done by a man at that age, he would have been snapped up by the European avant garde and been given a department in Düsseldorf”.^[151]

Facts and Fiction

There is a sense of “what if” with Derbyshire's life and one incident in particular has gained momentum with the publication of Paul McCartney's 1997 biography, “Many Years from Now” written by Barry Miles. According to Miles, McCartney had listened to a lot of electronic music, and “loved” it.) The book states that McCartney said “it occurred to me to have the BBC Radiophonic Workshop do the backing track to [“Yesterday”] and me just sing

over an electronic quartet. I went down to see them. The woman who ran it^[152] was very nice and they had a shed at the bottom of the garden where most of the work was done...It would have been very interesting to do, but I never followed it up”.^[153] As outlined clearly by Mark Brend though,^[154] while Derbyshire and McCartney DID meet, given the location McCartney speaks of, the meeting was after the release of “Yesterday”.^[155] The “shed at the bottom of the garden” refers to the studio in Peter Zinovieff’s house in Putney, home to Unit Delta Plus – Derbyshire, Hodgson and Zinovieff – who formed in 1966, a year after the release of “Yesterday”. So at most, McCartney could only have been talking about a re-release of the song. Derbyshire herself confirms that they met at Zinovieff’s and that she played him some of her music, “he never did come to the Workshop, he came to Zinovieff’s studio and I played him some of my stuff, that’s all”.^[156] Derbyshire and McCartney met again, at the “Million Volt Light and Sound Rave” at Chalk Farm in 1967. On this occasion, McCartney sent a tape to Brian Hodgson, a sound collage called “Carnival of Light”, a 14-minute experimental exercise in overlaying sounds, music, and shouting, for inclusion in the concert.

The Legacy of Delia Derbyshire and the Radiophonic Workshop

The Radiophonic Workshop was producing in-house, “below-the-line” music for the BBC for nearly 40 years – television and radio theme tunes, sound effects, and local radio signature tunes – which were heard all over the UK. In the Workshop, the music was produced quite cheaply, this is especially useful for programmes that do not have a budget, such as schools programmes – “[this] edgy, experimental music which, because of its cheapness to the BBC, had been pumped into the ears of...school children...the development of electronic music was...informed by the “Doctor Who” theme and radio sig (sic) tunes or backing music to read letters over, stuff from the Radiophonic Workshop...this is a cornerstone and really led the way for all to follow “.^[157] “It was pumped into people’s homes”.^[158]

“Doctor Who” and the Radiophonic Workshop marked “the beginning of people being able to accept electronic sounds and electronic music. And for the first time, it stopped people saying “oh, it sounds like an organ” or “it sounds like this”, they started to listen to the sound for its own sake and stopped trying to find what it sounded like,... they stopped trying to relate it to what they knew, and to appreciate it for its newness”.^[159]

Niebur has little doubt that the Radiophonic Workshop influenced a generation of musicians, “the Workshop’s function as an introduction for millions for people to the sounds of electronic music cannot be underestimated...through [“Doctor Who”] and hundreds more [programmes] like it, electronic music reached an audience unimaginable in the United States, encouraging young musicians in Britain to compose and popularise electronic music. This small island has led the vanguard of popular electronic

music, from progressive rock in the 1970's, to the new romantics in the 1980's, to contemporary techno and downbeat as I write. This is the true legacy of the Radiophonic Workshop...”^[160]

A few British electronic artists name check Derbyshire – Portishead, Orbital, and Sonic Boom. Adrian Utley of Portishead speaks of Derbyshire in the BBC documentary “Alchemists of Sound”, Orbital play the “Doctor Who” theme at their concerts, “...the single most important piece of electronic music. It still sounds as fresh as a daisy today. I listen to it and I still can't work out how she did it, after nearly 20 years of messing around with electronics. The secret died with her”.^[161] Blur re-interpreted it for a recording and Sonic Boom's 1997 album “Forever Alien” contains a track called “Delia Derbyshire”.^[162] A similarly titled track can be found on “L'Illustration Musicale”, the 2003 album by the King of Woolworths.^[163] Iddod have a MP3 track called “For Delia”^[164] as has Spectrum (“Delia Derbyshire”) and Acidage (“Tribute to Delia Derbyshire”).^[165]

Reeling and Writhing Theatre Company in co-production with the Tron in Glasgow produced a stage production of Nicola McCartney's play “Standing Wave: Delia Derbyshire in the Sixties”. The play featured Abigail Davies as Delia Derbyshire/Hunter, and Luisa Prosser as Delia Derbyshire (the younger), with Gary McInnes, who played the male parts. The play was directed by Katherine Morley and was presented in October 2004. The production was positively received by Derbyshire's friends and colleagues, those who knew her best. “It was a very good approach - they had the older Delia onstage, in an attic with a bottle, and a younger Delia downstairs in the studio. It allowed you to get into the psychology a lot more and was about her lost dreams”.^[166] The play used extracts from “Doctor Who”, “Blue Veils and Golden Sands” and “Your Hidden Dreams”. As part of the production, seven composers were asked to compose in response to Derbyshire's music. Additionally, the BBC did a radio play about Derbyshire called “Blue Veils and Golden Sands” written by Martyn Wade, with Sophie Thompson as Derbyshire. The play was directed by Cherry Cookson, with ex-Radiophonic Workshop employee, Elizabeth Parker composing and arranging. This play was less well received by Derbyshire's friends. “The problem with the radio play is that it portrayed Delia as this dippy drunk, and a bit silly. Everyone is a bit silly at times, and undoubtedly Delia drank too much. But she wasn't dippy...I know there were often times we spoke when she had been drinking but she was always very intelligent, very intuitive”.^[167] “[In the radio play,] “Delia” sounded downtrodden and embittered. A lot of the time when Delia had something to say, about the BBC or whatever, it was always with a bit of a wink and a nudge. And the [radio] play [focused] on the booze”.^[168]

There are at least two tribute websites for Derbyshire^[169] and someone also maintains a MySpace page for her.

The Delia Derbyshire Archive

When the Radiophonic Workshop closed, composer Mark Ayres was called upon to rescue the tapes which the BBC were throwing everything in a skip. “I spent the next couple of years of my life... locked in Maida Vale... basically putting labels on boxes”. Ayres rescued some 9000 reels, and keeps them in the BBC. “I put together a basic database of what exists. And the deal was that the BBC would give it shelf space, but I would look after it. But it’s not an acquisitioned library and it doesn’t appear on any BBC database or catalogue. I look after it”.^[170] When Derbyshire left the BBC in 1973, she emptied boxes of papers and tapes from her office into her car. They remained untouched in her attic for years because “she was always living in suitcases, she never really unpacked”.^[171] Following her death, Brian Hodgson suggested to Clive Blackburn, Derbyshire's partner, that Ayres be appointed to catalogue the almost 300 tapes.

Ayres returned to the Radiophonic Workshop Archive anything that belonged to it. However, that was just the beginning of a long, unfinished process. The problem was two-fold. On any one tape, there were pieces from separate, and usually different projects. Secondly, the tapes were improperly stored, and the sticky labels fell off. So any one box could have 30 tapes and hundreds of labels in the bottom of the box. There were nearly 300 tapes and the cataloguing alone would take at least six months. Then Ayres got a call from Dr. David Butler at Manchester University, who wanted his department to be involved with the Radiophonic Workshop as an academic exercise. But the tapes belonged to the BBC so that was out of the question. However, it became clear that there was work to be done on Derbyshire's tapes. “The idea of getting a PhD student for four years was a win-win situation. We get to catalogue the tapes and somebody gets a PhD”.^[172]

The Delia Derbyshire Archive contains a box of papers from Derbyshire's attic, including theatre programmes, headed paper, and notes on projects she was working on. While all her tapes are present, the music has been transferred onto computer. The Archive is a phenomenal resource for anyone interested in the life and work of Delia Derbyshire.

CONCLUSION

Delia Derbyshire was a sensitive and deeply intelligent composer, who not only worked hard, but applied her skills to the thing she loved most. Her determination and single-mindedness is apparent in her personal life and oeuvre. Her influence on electronic music is unquestionable, profound and probably unquantifiable.

Delia Derbyshire stood at the crossroads of the sixties, with the assassination of President Kennedy, Martin Luther King and Malcolm X; the “space race”

and the dawn of television; Motown, the Beatles, the Rolling Stones, Bob Dylan and Pink Floyd; the counter-culture - the establishment of the civil and women's rights movements; the advent of widespread social drug use; Vietnam and the anti-war marches and it would be interesting to catalogue the work and assess how, if at all, we can see the sixties and seventies in her music, and how her music reflects the time it is from.

And there is no question that more research should be done on Delia Derbyshire and her music.

Notes

1. ↑ Ayres said that he and Derbyshire had spoken by telephone, and he agreed to send a letter with full details of the proposition. Ayres sent the letter but Derbyshire had been admitted to hospital, and she died shortly after.
2. ↑ Delia Derbyshire in a recorded conversation with John Cavanagh, 4th October 1998. Copy of CD in possession of author. When Derbyshire says this phrase, it is said jokingly, as if to imply her parents wanted to believe they were upper working class. Later in the conversation, Derbyshire refers to her family simply as "working class". The class issue is brought up later by Cavanagh on page 28.
3. ↑ According to Clive Blackburn, most of Derbyshire's surviving relatives still live in the Preston area.
4. ↑ According to Clive Blackburn.
5. ↑ Delia Derbyshire in conversation with John Cavanagh, 4th October 1998.
6. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared "Surface" magazine May 2000.
7. ↑ Delia Derbyshire in conversation with John Cavanagh, 4th October 1998.
8. ↑ A qualification taken by students in the UK, in the optional final two years in secondary school.
9. ↑ In conversation with John Cavanagh, she said she helped out on a theatre production there, and that was her first time to work with taped sound effects. The play toured, possibly to Europe..
10. ↑ According to Blackburn, Derbyshire left with a Masters. degree
11. ↑ Mark Ayres' website.
12. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared "Surface" magazine May 2000.

13. ↑ Kristine Clara at the ITU in Geneva could not locate Derbyshire's name in their Archive. A comprehensive search would necessitate a visit to Geneva. She also confirmed that Gerald G. Gross was the Secretary-General in 1959.
14. ↑ According to Blackburn, Derbyshire worked as an assistant in the Promotions Department, dealing with advertising and publicity material, May-October 1960.
15. ↑ It is unclear if Derbyshire's job title was "Programme Operations Assistant" (as per Clive Blackburn) or Trainee Assistant Studio Manager (Derbyshire in conversation with John Cavanagh).
16. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared "Surface" magazine May 2000.
17. ↑ This title is for shorthand only – clearly, Derbyshire was in the BBC prior to these dates, and while she was there, she did other, non-BBC work.
18. ↑ In the final chapter, I address some of the elements in the arts and within the BBC, which gave rise to the Radiophonic Workshop.
19. ↑ Niebur, LJ, "Special Sound": Electronic Music in Britain and the Creation of the BBC's Radiophonic Workshop", (PhD Thesis, University of California, Los Angeles, 2004), 153.
20. ↑ Niebur, Ibid, (x).
21. ↑ Hutton, J., "Radiophonic Ladies" (Sonic Arts Network, 2000, Diffusion: 2).
22. ↑ Niebur, Ibid, (115).
23. ↑ Niebur, Ibid, (204).
24. ↑ Hutton, J., "Radiophonic Ladies" (Sonic Arts Network, 2000, Diffusion: 2).
25. ↑ Niebur, Ibid, (182).
26. ↑ "Doctor Who at the BBC Radiophonic Workshop: Vol. 1". 0094631206221 ©2005 BBC Worldwide Ltd., under exclusive licence to Mute Records Limited.
27. ↑ "BBC Radiophonic Workshop 21" by BBC Records and Tapes, REC354 (1979).
28. ↑ Italian composer (1925-2003), known for pioneering electronic music in Italy, in Radio Audizioni Italiene, Milan.
29. ↑ From the Delia Derbyshire Archive at Manchester University.
30. ↑ Niebur, LJ, "Special Sound": Electronic Music in Britain and the Creation of the BBC's Radiophonic Workshop, (PhD Thesis, University of California, Los Angeles, 2004), 177.

31. ↑ The Guardian, obituary for Delia Derbyshire by Brian Hodgson, 7th July 2001.
32. ↑ Poet, playwright and composer (1933-).
33. ↑ The Guardian, obituary for Delia Derbyshire by Brian Hodgson, 7th July 2001.
34. ↑ From programme notes of the Unit Delta Plus concert in the Watermill Theatre, Bagnor, Sept. 1966, where Derbyshire performed “Amor Dei”. Text thanks to Delia Derbyshire Archive, Manchester University.
35. ↑ Based on Graves' 1955 “The Greek Myths”.
36. ↑ The Prix Italia are annual awards from an international jury of TV, radio and web producers and companies, promoting quality, innovation and creativity in TV, radio and web in drama, documentary, performing arts and music. http://www.prixitalia.rai.it/2008/pdf/vincitori_edizionipassate_en.pdf
37. ↑ Radio Audizioni Italiane.
38. ↑ The Guardian, interview with Derbyshire by Kirsten Cubitt, Sept 3rd 1970, from Delia Derbyshire Archive.
39. ↑ Anthony Newley was married to Joan Collins from 1963-71.
40. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared “Surface” magazine May 2000.
41. ↑ Zinovieff designed the first British synthesiser, the EMS VCS3.
42. ↑ The Archive contains a note from Derbyshire to the BBC seeking permission to use “Amor Dei” outside the BBC, and a return note in August 1966 from Barry Bermange saying he had no objection.
43. ↑ Author's interview with Brian Hodgson 4th August 2008.
44. ↑ Author's interview with Brian Hodgson 4th August 2008.
45. ↑ Attempts to contact Vorhaus for the thesis proved unsuccessful. Information and quotations taken from the sleeve notes of “An Electric Storm”, Universal/Island Music Ltd 2007 (9843197).
46. ↑ Headed paper in the Delia Derbyshire Archive gives the address as 281-3 Camden High Street, NW1, London.
47. ↑ Author's interview with Brian Hodgson 4th August 2008.
48. ↑ Review written by “PW” for Time Out magazine and held at Delia Derbyshire Archive.

49. ↑ As quoted by Brian Hodgson on the sleeve notes of “Electrosonic”, (2006) Glo-Spot Music Recorded Library, under licence from KPM (KPM 1104, 1972).
50. ↑ As quoted by Brian Hodgson on the sleeve notes of “Electrosonic”, (2006) Glo-Spot Music Recorded Library, under licence from KPM (KPM 1104, 1972).
51. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared “Surface” magazine May 2000.
52. ↑ Author's interview with Brian Hodgson 4th August 2008.
53. ↑ The Delia Derbyshire Archive contains the “Medea” script, with a newspaper clipping of a positive review at the back. The script has pencilled notes, in one case, when the character Medea is speaking “from side speakers”.
54. ↑ The Archive contains a note from Hooper dated 23rd March 1971, saying thanks for their work on “Macbeth” sound.^{DD135529}
55. ↑ National broadcaster of Ireland.
56. ↑ Author's interview with Brian Hodgson 4th August 2008.
57. ↑ With grateful thanks to John Glendon in RTÉ for his help locating this.
58. ↑ Author’s interview with Brian Hodgson 4th August 2008.
59. ↑ Delia Derbyshire in conversation with John Cavanagh 1998.
60. ↑ Author’s interview with Brian Hodgson 4th August 2008.
61. ↑ Author’s interview with Brian Hodgson 4th August 2008.
62. ↑ A radio programme on BBC Radio 4, dedicated to women's issues.
63. ↑ Born UK, 1965, aka Peter Kember.
64. ↑ Efforts to contact Sonic Boom for contribution to this thesis were unfruitful. “Vibrations” Rocket Girl CD, Rgirl18, Dec 2000; “Continuum” Space Age CD, Orbito26CD Dec 2001.
65. ↑ Author’s interview with Brian Hodgson 4th August 2008.
66. ↑ One metric ruler, one imperial.
67. ↑ Hutton, J., “Radiophonic Ladies”, (Sonic Arts Network, 2000).
68. ↑ Hutton, J., “Radiophonic Ladies”, (Sonic Arts Network, 2000).

69. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared “Surface” magazine May 2000.
70. ↑ Not all instruments have three stages. Plucked or hammered sounds do not have the “steady state”, and immediately transition from “attack” into “decay”.
71. ↑ The Observer, interview with Brian Hodgson, March 17th 2002.
72. ↑ Where 'f' is the fundamental frequency, the harmonic series of any note is - f, 2f, 3f, 4f and so on.
73. ↑ Known as a formant, and considered important to timbre.
74. ↑ Where a sine wave is the most basic type of wave form, containing a single frequency, non- sinusoidal waves contains multiple sine waves of different frequencies and include square, sawtooth or triangle waves.
75. ↑ The words “partials” and “harmonics” are often used interchangeably in music.
76. ↑ The Observer, interview with Brian Hodgson, March 17th 2002.
77. ↑ Marshall, S., “The New Atlantis”, Sound on Sound, April 2008, 80.
78. ↑ A sliding effect.
79. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared “Surface” magazine May 2000.
80. ↑ Mark Ayres’ website.
81. ↑ Brend, M., “Strange Sounds: Offbeat Instruments and Sonic Experiments in Pop”, (Backbeat Books, 2005), 76.
82. ↑ Mark Ayres’ website.
83. ↑ Author’s interview with Mark Ayres 5th August 2008.
84. ↑ An audio patching unit.
85. ↑ The Tuareg were principally, but not exclusively, nomadic. Up until the middle part of the twentieth century, they primarily existed by providing trans-Saharan trade routes, carrying goods between the cities of the southern and northern Sahara. By extension, these trading routes served the cities of Europe or the sub-Saharan continent.
86. ↑ The Observer, interview with Brian Hodgson, March 17th 2002.
87. ↑ Author’s interview with Mark Ayres 5th August 2008.

88. ↑ Niebur, Ibid, (10).
89. ↑ Delia Derbyshire, interviewed by John Cavanagh, broadcast BBC Radio Scotland 1997, “Original Masters” series.
90. ↑ Marshall, S., “The New Atlantis”, Sound on Sound, April 2008, 84.
91. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared “Surface” magazine May 2000.
92. ↑ Brend, M., “Strange Sounds: Offbeat Instruments and Sonic Experiments in Pop”, (Backbeat Books, 2005) 80.
93. ↑ Apparently this was actually a double bass, but the effect was speeded up, and sounds like a cello. Attempts to reach Vorhaus were unsuccessful.
94. ↑ Louis Pattison, BBC, on re-release of “Electric Storm”. 2007
95. ↑ Louis Pattison, BBC, on re-release of “Electric Storm”. 2007
96. ↑ The equipment was so large and expensive that only radio stations could afford house these experimental studios.
97. ↑ Manning, P., “Electronic and Computer Music”, (Oxford University Press, 2004) 9.
98. ↑ The Times, “Musique Concrète – Tyranny over Sound”, London, 12th July 1954, 4.
99. ↑ Niebur, Ibid., (32).
100. ↑ Manning, P., “Electronic and Computer Music”, (Oxford University Press, 2004) 28.
101. ↑ Niebur, Ibid., (34).
102. ↑ The essay is about a futile search for meaning in a meaningless, Godless world.
103. ↑ The now famous review of the day read “[Beckett] has achieved a theoretical impossibility - a play in which nothing happens, that yet keeps audiences glued to their seats. What's more, since the second act is a subtly different reprise of the first, he has written a play in which nothing happens, twice”. Irish Times, 18th February, 1956.
104. ↑ Hutton, J., “Daphne Oram: innovator, writer and composer”, Organised Sound, Vol. 8, Issue 1, Apr 2003, pp49.
105. ↑ (1925 – 2006) Sound engineer and studio manager.
106. ↑ (1925 - 2003) Composer, sound engineer, studio manager and inventor.

107. ↑ Niebur, Ibid., (76).
108. ↑ Niebur, Ibid., (161).
109. ↑ Author's interview with Mark Ayres 5th August 2008.
110. ↑ Briscoe, D., and Curtis-Bramwell, R., "The BBC Radiophonic Workshop – The First 25 Years", (BBC 1983).
111. ↑ Author's interview with Mark Ayres 5th August 2008.
112. ↑ Listings magazine.
113. ↑ Hutton, J., "Radiophonic Ladies", (Sonic Arts Network, 2000).
114. ↑ Niebur, Ibid., (163).
115. ↑ Author's interview with Brian Hodgson, 4th August 2008.
116. ↑ Author's interview with John Cavanagh, 9th August 2008.
117. ↑ Hutton, J., "Radiophonic Ladies", (Sonic Arts Network, 2000).
118. ↑ Hutton, J., "Radiophonic Ladies", (Sonic Arts Network, 2000).
119. ↑ Interview with Delia Derbyshire, conducted by Sonic Boom, appeared "Surface" magazine May 2000.
120. ↑ Programme notes "Standing Wave" by Nicola McCartney 2004. Programme courtesy of Drew Mulholland.
121. ↑ Author's interview with Brian Hodgson, 4th August 2008.
122. ↑ Author's interview with Mark Ayres 5th August 2008.
123. ↑ As gleaned by filmmaker Kara Blake in conversation, "The Delian Mode", Philtre Films. For release 2009.
124. ↑ Author's interview with Mark Ayres 5th August 2008.
125. ↑ Author's interview with Brian Hodgson, 4th August 2008.
126. ↑ Author's interview with Mark Ayres 5th August 2008.
127. ↑ Author's interview with Mark Ayres, 5th August 2008.
128. ↑ Author's interview with John Cavanagh, 9th August 2008.
129. ↑ Author's interview with Brian Hodgson, 4th August 2008.

130. ↑ The Observer, March 17 2002.
131. ↑ The documentary finally appeared as “Masters of Sound” on the “the Edge of Destruction” disc in the “Doctor Who – the Beginning” boxset.
132. ↑ Author's interview with Mark Ayres, 5th August 2008.
133. ↑ The convention was in Coventry, PanoptiCon '98: 2nd-4th October 1998.
134. ↑ Author's interview with Mark Ayres, 5th August 2008.
135. ↑ Author's interview with Brian Hodgson, 4th August 2008.
136. ↑ Author's interview with Drew Mulholland, 9th August 2008.
137. ↑ Author's interview with Mark Ayres, 5th August 2008.
138. ↑ Author's interview with John Cavanagh, 9th August 2008.
139. ↑ Author's interview with Mark Ayres, 5th August 2008.
140. ↑ Author's interview with John Cavanagh, 9th August 2008.
141. ↑ Delia Derbyshire in conversation with John Cavanagh 1998.
142. ↑ Author's interview with Drew Mulholland, 9th August 2008.
143. ↑ Author's interview with Drew Mulholland, 9th August 2008.
144. ↑ Author's interview with John Cavanagh, 9th August 2008.
145. ↑ Author's interview with Brian Hodgson, 4th August 2008.
146. ↑ Niebur, *Ibid.*, (222).
147. ↑ Hutton, J., “Radiophonic Ladies”, (Sonic Arts Network, 2000).
148. ↑ Interview for Boazine with John Cavanagh 1998.
149. ↑ Author's interview with Mark Ayres, 5th August 2008.
150. ↑ Interview for Boazine with John Cavanagh 1998.
151. ↑ Author's interview with Drew Mulholland, 9th August 2008.
152. ↑ In the previous paragraph in the book, the “woman who ran it” is identified as Derbyshire.
153. ↑ Miles, B., “Many Years from Now”, (Henry Holt and Company, 1997) 207.

154. ↑ Brend, M., "Strange Sounds: Offbeat Instruments and Sonic Experiments in Pop", (Backbeat Books, 2005), 78.
155. ↑ "Yesterday" was recorded for the album "Help!", which was released in 1965.
156. ↑ Interview for Boazine magazine with John Cavanagh 1998.
157. ↑ Author's interview with John Cavanagh, 9th August 2008.
158. ↑ Author's interview with Drew Mulholland, 9th August 2008.
159. ↑ Author's interview with Brian Hodgson, 4th August 2008.
160. ↑ Niebur, Ibid., (268).
161. ↑ The Observer, 17th March 2002.
162. ↑ <http://www.sonic-boom.info/discography/>
163. ↑ L'Illustration Musicale, Mantra Recordings, MNTCD1032, 2003.
164. ↑ <http://www.iddod.co.uk/fordelia.htm>
165. ↑ <http://www.acidage.co.uk>
166. ↑ Author's interview with Mark Ayres, 5th August 2008.
167. ↑ Author's interview with Mark Ayres, 5th August 2008.
168. ↑ Author's interview with John Cavanagh, 9th August 2008.
169. ↑ Efforts to contact the webmasters on two of these proved unsuccessful.
170. ↑ Author's interview with Mark Ayres, 5th August 2008.
171. ↑ Authors interview with Brian Hodgson, 4th August 2008.
172. ↑ Author's interview with Mark Ayres, 5th August 2008.

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