

Bodies of evidence, singing cyborgs and other gender issues in electrovocal music*

HANNAH BOSMA

Alexanderkade 30, 1018 CL Amsterdam, The Netherlands
E-mail: mail@hannahbosma.nl
URL: <http://www.hannahbosma.nl/>

This article is part of PhD research dealing with gender issues in electroacoustic music, focusing on the voice. The first part of the article begins with a discussion of the musical material under research. Thereafter follows an elaborate overview of the number of male and female composers, vocalists and recorded voices in several series of CDs of electroacoustic and computer music. The gendered roles of the live, pre-recorded and synthesised voices are discussed and the musical couple of the male composer and the female vocalist emerges. The second part touches upon several issues raised by the results of part one: the roles of the performer and the composer, (dis)embodiment, femininity and technology. This is a preview into some of the remaining research. In section 2, other music than the CD series of section 1 is discussed as well. The gender patterns are interpreted in a broader context. The role of the female vocalist is many sided. Cyborg voices relate to old patterns as well as new possibilities.

1. BODIES OF EVIDENCE

My general impression after visiting electronic music courses, conferences, institutes, concerts and equipment shops, is that the world of electroacoustic music and music technology is dominated by men. To many people, this seems obvious, but my observation also meets with disbelief and denial, by outsiders who declare that such a gender imbalance cannot be true in our present culture or by insiders who mention some interesting women composers or who believe that music and technology are 'neutral' and have nothing to do with gender. Hence, I felt the need to scrutinise my supposition about the gender of music technology. How gendered is electroacoustic music?

We assign gender to persons in the first place. Many people play a role in this music: composers, performers, technicians, organisers, critics, listeners, students, etc. Few statistics are available regarding the gender of these groups, as Simoni (1995) remarks. A few facts: In the year 2000, eight per cent of the members of the International Computer Music Association were female (40 out of 499); at the International Computer Music Conference

2000, seventeen per cent of the compositions played at the concerts were composed by women (Conant and Osborne 2001). This is in line with some more general statistics for music composition and academia.¹

Such statistics deal with numbers of people. However, my focus is not so much on people, but on musical artefacts. Music relates of course to people; but compositions are my points of departure. Cultural artefacts can be gendered, by the practices that inhabit and surround these artefacts; but finding gender in music is often a risky and difficult business. Do sounds have a gender? Voices do, mostly. The voice is a good entrance to discuss gender in electroacoustic music.

1.1. Forms of existence

The ways to make music public are manifold: as a score, by way of a concert or live performance, on an audio(-visual) recording medium like tape or CD, perhaps transmitted by a radio or television broadcast. Concerts are transient, limited in time and space; contemporary art music concerts especially have a small audience. At a concert, the music is heard by a relatively small public, and cannot be listened to and studied 'on demand'. Scores and other performance material are mainly addressed to professionals. CD releases, however, are meant for a large public and are one of the most accessible and widespread forms of music in contemporary Western culture. CDs can be played frequently and carefully studied. A recording, like a score, is a far more convenient form to analyse than a volatile concert performance. And others can listen to a CD recording as well and form their own opinion about the music; thus, the analysis is opened to criticism and intersubjectivity. For these fundamental and practical

¹Degenhart and Osborne (1999) estimate that in Europe, the USA and Canada, less than ten per cent of the music composition teachers at tertiary level education (universities, colleges, conservatories, etc.), are female, with even less women in Western Europe than in North America. In 1987, 8.6 per cent of the tenure track positions offered in music composition in the USA went to females (Simoni 1995). In Western Europe, the number of female professors in all academic fields is somewhat less than ten per cent, while the average in the USA is higher: 'In 1997-98, women represented 46.8% of the assistant professors (the professions full time entry position), but only 18.7% of the full professors' (Degenhart and Osborne 1999).

*PhD research, University of Amsterdam and Nederlands Elektro-Akoestisch Repertoirecentrum (MuziekGroep Nederland).

reasons, my main focus in this study is on compositions released on CD. Scores and/or live performances serve as additional sources.

The ontological positions of the electroacoustic compositions available on CD releases vary. Some compositions are two-track (stereo) 'tape' compositions: the composition on the CD seems to be identical with the composition 'itself'. However, such a composition sounds different when performed in a concert hall on sophisticated audio equipment than played at home. Multitrack tape compositions are in any case essentially altered when published on a CD, because of the transference to the stereo format. There are also electroacoustic compositions for live performer and tape or live electronics (performing a score or improvising); on a CD release, we then find a recording of a live performance, or a studio recording of a would-be-live performance, or a mixture of these.² The primary form of a composition for live performer and electronics seems to be a concert performance, and it might seem strange to analyse such a composition via the 'secondary' form of a CD release of a recording of such a performance. However, the recording on CD is in general the most well-known form of the composition, since live performances of this kind of music are generally rare. From that perspective, the CD release is the main public form of the music; scores are production tools, and performances are special events.

1.2. A body of compositions

To investigate gender patterns in electroacoustic music, a representative body of compositions was selected. What is electroacoustic music, computer music, acoustic music, *musique concrète*, tape music, radiophonic art, sound art, soundscape? Definition of these (sub-)genres frequently gave rise to extensive discussions, for example on the international e-mail discussion list of the CEC.³ Most often, 'electroacoustic music' serves as a general term for these forms. I want to describe existing practices and therefore I am not interested in developing a new definition; nor do I wish to decide which compositions would be 'real' electroacoustic compositions. Therefore, my starting point is: electroacoustic music is what is named as such. (A quick description for the uninitiated could be something like: music in which the use of electronic equipment is essential, and which is not pop music; mostly without commercial success, and often related to universities, conservatories, art institutions or non-commercial radio stations.) Although 'electronic music' seems a very general term, it is mostly used to refer to the *elektronische*

Musik of Cologne (Stockhausen, F 1950s, or to popular synthesizer or electronic dance and ambient music) 'electroacoustic music' and 'computer music' for the domain of art/academic/avant-garde. I refer to the kind of music under investigation since at present nowadays nearly all electroacoustic music is made with the help of computer equipment, there is a huge overlap between these terms. Hence, I decided to consider compositions that are explicitly called 'electroacoustic music' or 'computer music'.

As a representative body of compositions, with works by many different composers, the following CD series were chosen: Computer Music Currents (from the record label Wergo); the Computer Music Series of the Consortium to Distribute Computer Music (from Centaur Records); and the series Cultures Électroniques, with the prize winners of the Concours International de Musique Électroacoustique in Bourges, France. Since nearly each CD of these series contains compositions by several composers, this is an efficient way to get a diverse and well-defined body of compositions. These three series are all well esteemed, have an international outlook and explicitly represent the genre I wish to investigate. The CDs contain different forms of electroacoustic/computer music: compositions of which the final form only exists on a sound recording medium ('tape music'), music for live performer and tape, and live electronics. A few compositions in the computer music series do not include electroacoustic sounds: the computer was used in the composition process while the music is performed solely on acoustic instruments. These compositions were included in the investigation. For example, I included Gottfried Michael Koenig's *Three Asko Pieces* (1982) for flute, two clarinets, bassoon, two trombones, saxophone, marimba, piano and string quartet (CMC2) in my count of male versus female composers; but not, of course, in the investigation of live and recorded voices.

The Computer Music Currents⁴ series dates from 1989–1995 and consists of twelve CDs with three to six compositions from different composers on each CD. A special thirteenth CD entitled *Historical CD of digital sound synthesis* contains seventeen short pieces and many sound examples⁵ and is accompanied by a 260-page booklet. Computer Music Currents is produced by the German composer Johannes Goebel in collaboration with the Center for Computer Research in Music and Acoustics (CCRMA) of Stanford University. The scope of the series seems general; but the seventy-two compositions come from institutes of the USA, Western Europe and Israel.

²For the sake of convenience, I will call the live vocal part that is recorded on a CD release 'live vocals'.

³CECDiscuss is at this moment described as having 400+ members in 20+ countries. See <http://cec.concordia.ca/>

⁴I refer to these CDs as CMC1, CMC2, etc. These CDs were released by Schott Wergo Music Media GmbH, Mainz, Germany; for the individual CDs and order information, see <http://www.wergo.de/>. I derived all information about this CD series from the sleeve notes.

⁵I only took into account the compositions, not the sound examples.

The Computer Music Series of the Consortium to Distribute Computer Music⁶ is founded by several university studios from the USA. In 1994, it became affiliated with the International Computer Music Association. In 2001, the production affiliates are studios from academic institutions from the USA, Canada, Europe and Japan. Hence, the CDCM series is predominantly American, with an international perspective. This ongoing series contains 160 compositions on the first thirty CDs, which were released from 1988–2000. The producer is the American composer Larry Austin.

The Concours International de Musique Électroacoustique in Bourges is an important international competition, collaborating with many music organisations and broadcasting corporations. The French composers Françoise Barrière and Christian Clozier are the directors of the International Institute of Electroacoustic Music of Bourges IMEB (formerly known as Groupe de Musique Expérimentale de Bourges), which organises the competition and produces the Cultures Électroniques CD series. The Bourges competition started in 1973, the CD series in 1986. According to the information in the sleeve notes, in the competition of the year 2000, 438 composers from forty-six countries (from Europe, North and South America, Asia, Australia, Israel) participated with 608 compositions; thirty-two radio networks, sixteen diffusion organisations and eleven centres for electroacoustic music and multimedia art collaborated, most from Europe (East and West), some from Canada, South America and Russia, and notably none from the USA. Among these organisations are the International Confederation for Electroacoustic Music and the Conseil International de Musique of the Unesco. Each year one to three CDs are released with the prize winners of the most recent competition and some older prize winners. The Cultures Électroniques CD series up to and including volume 14 (with the prize winners of the 27th Bourges competition of the year 2000, released in 2001) contains 159 compositions.⁷

Of course, there are more CDs with important electroacoustic and/or computer music than these mentioned, for example the CDs of the Canadian label Empreintes Digitales, the CDs of the French institute Groupe de

Recherches Musicales (INA-GRM) and the other CDs of Wergo's 'Digital Music Digital'. But these releases almost always dedicate an entire CD to one composer, and thus contain a less diverse body of compositions.

Another criterion for the selection of the body of compositions was the general or international scope of the series. The main portion of the compositions of these series comes from North America and Western Europe, but these series purport to represent electroacoustic and computer music in general. In contrast, CDs entitled 'Electroacoustic music from Sweden', 'Musica Electroacustica Brasileira', 'Columbia Princeton 1961–1973' or likewise, and CDs from national organisations like the Canadian Electroacoustic Community, the Sonic Arts Network of the UK, or the Dutch Producenten Elektronische Muziek, are explicitly regional.⁸ Moreover, under these headings, only a few CDs are released.

Although electroacoustic and computer music are genres unknown to most people, the area is vast and diverse. Of course, it is impossible to take into account all compositions, from all parts of the world and in all different sub-styles. Many compositions mentioned in older textbooks are simply not accessible. A lot of LPs are not re-released on CD. Some older CDs are no longer for sale. Some sampler releases only contain excerpts of compositions. The main part of my research, as discussed in section 1 of this article, is based on the three-CD series mentioned above, up to and including the year 2000; only in section 1.4, when discussing the number of male versus female composers, do I also take a look at other CD releases. In section 2, other music is discussed as well in this thematic preview.

1.3. Locating gender

But how to investigate gender patterns in electrovocal music, when studying compositions on CDs, and not people? What can be heard and seen on the CDs that relates to gender patterns?

The most obvious signs related to gender are the names of the composers. Often, there is also some biographical information of the composer, and sometimes even a photograph. Almost always the gender of the composer can be unambiguously inferred from the information which is part of a CD release, even if the first name of the composer is unknown or exotic for the observer. This information on gender is not only related to the level of production, helpful to map out a gender structure or gender pattern of location, answering the question: 'Who did what?' (Cockburn and Omrod 1993). Information on composers, performers and other producers, as they are mentioned in the sleeve notes, also has a symbolic function. All the names and biographies tell a tale of a world of creators and experts of electroacoustic music, and this probably influences the behaviour and

⁸Although the CEC and SAN do not always adhere to their nationality.

⁶I refer to these CDs as CDCM1, CDCM2, etc. The Computer Music Series of the Consortium to Distribute Computer Music is produced by Centaur Records Inc. For a list with all CDs and order information, see <http://www.music.unt.edu/CDCM/> and <http://www.centaur-records.com/>. I derived all information about this series from the sleeve notes.

⁷I refer to these CDs as CE1, CE2, etc. In several years, two CD releases appeared, with the same number, one with the regular prize winners and the other with the compositions of the 'magisterium' prizes for senior composers; I refer to these as CE3p and CE3m, etc. Each CD release contains one or two CDs. Volumes 1–6 are released under the label Le Chant du Monde; volumes 7–14 by Musique Média Mnemosyne. Volume 1 contains prize winners of the International Rostrum for Electroacoustic Music 1984 and from several Bourges competitions. For a list with all CDs and order information, see <http://www.imeb.asso.fr/>. I derived all information about this series from the sleeve notes.

thoughts of listeners, students, would-be-composers and experts. These producing personae are intertwined with the music, and are not only a mirror of an existing gender pattern, but also belong to the level of gender symbolism, of representations and meanings.

But composers are not the only people mentioned in the sleeve notes. Pop music albums are often accompanied by long lists of names of co-creators/-producers, performers, technicians, colleagues, friends and family ('thank you to:'). The pop star, not the composer, has a prominent position; but the small print shows that the music is a co-production made by a team of co-workers. In contemporary art music, far fewer people are mentioned. The composer is the main figure. Of all the other people that in one way or another must have contributed to the release of the music, only the performers are consistently credited (sometimes a technician, recording engineer or the CD producer is mentioned, or the writer of the sleeve notes). Therefore, I will base my account of the symbolic, represented gender pattern of production in electrovocal music on the representations of composers and vocalists.

Another level at which gender patterns can be perceived is the voice. Most voices sound as if produced by a man or a woman, since the voice is a secondary sexual characteristic. Moreover, sometimes the sources of the recorded vocal sounds are credited in the sleeve notes. Thus, in most cases, voice sounds seem to have a gender. However, the human voice has a wide potential. It is possible to make all kinds of uncommon sounds, which often cannot be recognised as either male or female. Also, it is possible to manipulate or synthesise voice sounds with electronic means; thus sounds in between male and female, human and non-human can be heard. Since the voice is one of the important means to classify the gender of a person, ambiguity is perceived as a significant exception. Since most voices can be recognised as either male or female, it is possible to ask whether there are gender differences in the roles of these voices in electroacoustic and computer music. Do these voices sing, speak or vocalise in different ways? Do they utter different kinds of texts? Do they have different places and functions in the compositions?

1.4. Counting composers

On CDs 1–12 of the Computer Music Currents series, fifty-five compositions are published, which are composed from 1971 until 1990. Two of these compositions are by female composers and composed in 1985.⁹ Computer Music Currents 13 is a special edition, with seventeen short compositions from 1957–1966, none of these

by a female composer. Thus, in the complete Computer Music Currents series, three per cent of the seventy-two compositions are composed by women. Women composed eleven per cent of the compositions on CDs 1–30 of the Computer Music Series of the Consortium to Distribute Computer Music. The compositions by male composers date from 1962 onwards; compositions by female composers date from 1986 onwards. Eight per cent of the compositions on the CD volumes 1–14 of the Cultures Électroniques series were composed by women. The compositions by male composers are dated from 1968 onwards; compositions by female composers are from 1978 onwards.

Empreintes Digitales is a Canadian label issuing CDs with international electroacoustic music.¹⁰ Except for a sampler CD and two CDs with 'Electroclips', each CD release is devoted to one composer. Between 1990 and 2000, work by female composers was released on twelve per cent of these fifty-one CDs.¹¹ On the sampler CD *Excitations* (2000), twenty per cent of the excerpts are by female composers. 'Electroclips' are short pieces of about three minutes, commissioned by Empreintes Digitales. On the first CD, issued in 1990, eight per cent of these compositions are by women; in 1998, the second CD with Electroclips contains thirty-five per cent of pieces by female composers.¹² Up to and including the year 2000, Empreintes Digitales published compositions of seventy-three composers; twenty-one per cent of these composers are women. Four double CD albums¹³ of the Canadian Electroacoustic Community are compilations of (excerpts of) compositions of the international participants.¹⁴ Seventeen per cent of the compositions on these CDs are by female composers.¹⁵ This contrasts with the compositions of the fourteen top-scoring 'young and emerging' Canadian composers in CEC's *Jeu de temps / Times Play* competition on the CD compilation *Cache 2000*: one of these is by a woman.¹⁶

Several explicitly regional CDs do not show a more equal gender distribution. Some examples: On the double CD *Electro-Acoustic Music from Sweden*

¹⁰I derived all information on this label from the website <http://www.empreintesdigitales.com/>.

¹¹A double CD counts as two.

¹²When comparing their biographies on the website of Empreintes Digitales, it is striking to note the large difference in the number of male vs female composers born in the 1950s: six per cent of the composers born in the 1950s are female, whereas forty-five per cent of the composers born in the forties are female and thirty-eight per cent of the composers born after 1960 are female. Thirteen per cent of the female composers and sixty-one per cent of the male composers are born in the 1950s; whereas thirty-three per cent of the female composers and sixteen per cent of the male composers are born before 1950; and fifty-three per cent of the female composers and twenty-three per cent of the male composers are born after 1960.

¹³*DISContact!*, *DISContact! II*, *PRESENCE*, *PRESENCE II*.

¹⁴See <http://cec.concordia.ca/>.

¹⁵*DISContact! III* and *PRESENCE III* show quite similar numbers.

¹⁶*Cache 2001* and *Cache 2002* show quite similar numbers. It is tempting to speculate about the cause of this difference in gender representation in these CEC releases.

⁹When more than one year of composition was mentioned, for example '1981–1982', or when a composition was revised later, for example '1978, rev. 1985', I always took the last year as the year of composition.

(1988),¹⁷ all sixteen compositions are authored by men, none by women. One composition of eight compositions on the CD *Música Electroacústica de Compositores Latinoamericanos* (1995)¹⁸ is by a female composer. On the CD *Electro-acoustic music from the Netherlands 2000*,¹⁹ with twenty-nine short pieces by members of the association of Dutch producers of electronic music PEM, nine per cent of the pieces are authored by women.

An interesting exception to the predominance of male composers is the series *Radius*, with four albums of 'transmissions from broadcast artists'²⁰ created between 1986 and 1994. The label is based in the USA; the authors come from Canada and the USA. Of the fourteen pieces, six were by women, seven by men, and one by an ungendered 'they': 'Algojo' (Algojo) (which is in fact a pseudonym for Eric Letourneau, but nothing on this CD points to that). This is an almost equal gender distribution. Note that these CD releases are not named 'electroacoustic music' or 'computer music', not even 'music' (although some authors are known as composers of electroacoustic music). One might speculate that this is related to the seemingly higher number of women participating in the visual digital arts.

The world of electroacoustic and computer music, as it is presented on CD releases, is a world dominated by male composers. In more recent years, more compositions by female composers can be found – a promising tendency. The number of female composers is most often less than fifteen per cent – the region of 'tokenism', in which female composers are an exception and are too few to form a group identity (Kanter 1977, Allmendinger and Hackman 1995). On the Canadian CD releases, the number of international female composers comes at the transitional level (ten to forty per cent), enough to form a significant subgroup; and the research of Canadian Andra McCartney shows that Canadian women composers of electroacoustic music have a different approach than the mainstream (but since they don't form a homogenous group, 'difference identity' might be a better label than 'group identity'). So somehow the environment for women composers in electroacoustic music seems to be somewhat better in Canada than elsewhere. The prevalence of male composers in the CD series is probably a reflection of the gender structure of the electroacoustic music world. But this appearance might seem unattractive to a female public, reaffirming that technology is at odds with femininity; and probably this would not encourage women to aspire to a career as an electroacoustic composer, thereby perpetuating itself.

¹⁷*Phono Suecia PS CD 41* (1 and 2), produced by STIM (the Swedish Performing Rights Society), Stockholm, Sweden, 1988.

¹⁸*Leonardo Music Journal* CD Series Volume 4, 1995, MIT Press Journals, Cambridge, MA, USA.

¹⁹PEM CD 1; for information contact the Gaudeamus Foundation in Amsterdam, info@gaudeamus.nl, <http://www.gaudeamus.nl/>.

²⁰What Next Recordings, c/o Nonsequitur, PO Box 344, NM 87103 USA; WN0013, WN0014, WN0018, WN0019.

1.5. Counting vocalists

Composers of electroacoustic and computer music are thus predominantly male. But what about vocalists? One kind of electrovocal music consists of compositions for a vocalist, who is performing live from a score, and tape or other electronics. Several of these recordings of such performances are found on the CD series under investigation. Those credited are always the composer and the performing vocalist. What is the gender distribution with regard to vocalists performing this kind of electrovocal composition?

In the *Computer Music Currents* series are three compositions for soprano and tape,²¹ one for (female) contralto, boys' choir, boys' choir soloists, instruments and electronics, one for mixed chamber choir and computer synthesised sounds on tape, and no compositions for male vocalist and tape/electronics. The vocal parts are in a Western twentieth-century extended classical style, with lots of melisma, vocalise and high notes for the soprano soloists.

In the *Computer Music Series* of the Consortium to Distribute Computer Music, there are twelve compositions for female vocalist (mostly soprano) and tape or live electronics (sometimes in combination with acoustic instruments). Here also, the vocals are predominantly in a Western twentieth-century extended classical style.²² There is some variation, however: in Neil B. Rolnick's *Vocal Chords* (CDCM7), the singing style is jazz scat vocals. What most of these female vocals have in common is a substantial amount of non-verbal singing²³. Only in two pieces on volume 30²⁴ are some distorted female and male speaking voices perceived, with no singing. In one of the three compositions composed by a woman, Julie Kabat's *Child and the Moon-Tree* for vocalist & electronics (CDCM7), the female composer figures also as the vocalist, whereas in many other compositions the male composer performs the electronics. There are four pieces with a male vocalist and tape or live electronics. In those pieces, notably, the male voices are not singing but speaking. In *Help Me Remember* (CDCM14), it is the composer Rodney Waschka II himself who performs all parts: vocals, tape and computer music system. The vocals consist of a large amount of spoken text with a political meaning. Michael Holloway performs the vocal part of Salvatore Martirano's *L's G.A.* (CDCM22), 'for gassed-masked politico, helium bomb and two-channel tape recorder'. Some of the text

²¹One of these compositions, Richard Karpen's *Il Nome*, is released on *Computer Music Currents 7* as well as on *Cultures Électroniques 4*, both performed by Judith Bettina.

²²Larry Austin's *Variations ... beyond Pierrot*, being based on Arnold Schönberg's *Pierrot Lunaire* (CDCM28), contains a lot of *Sprechgesang*. I take this as Western twentieth-century extended classical vocal style.

²³The soprano part in Jonathan Berger's *Dyptich* (CDCM8) is not melismatic; the words are sung clearly, in a classical singing style.

²⁴David Roosenboom – *Music from – On Being Invisible II (Hypatia Speaks to Jefferson in a dream)*; Morton Subotnick – *It Begins ...*

in this piece is poetry by Michael Holloway. Again, the male vocals consist mainly of speaking text (although distorted) and other non-singing vocal sounds, with a political meaning, while the male vocalist figures also as author.

In the Cultures Électroniques series, five compositions for female vocalist and tape have been released. All vocals are for (mezzo-)soprano and sung with Western classical vocal technique, high, melismatic, with some coloratura. Some have *Sprechgesang* and a little bit of spoken text – a Western twentieth-century extended classical style. There are no compositions for male vocalist and tape in this series.

Outside these CD series, many more compositions exist for female singer and tape or electronics. Also with regard to these compositions, the general tendency is that non-verbal singing serves as a substantial element of the live female vocal parts. Most of these vocal parts are for soprano. Very few pieces for male vocalist and tape or electronics exist; and the male vocalist is mostly speaking, not singing.

1.6. Recorded voices

Compositions for live performing vocalist and sound tracks or electronics, are but one form of electrovocal music. Many electro-acoustic compositions contain pre-recorded, manipulated and (re)synthesised voices on 'tape' (or other audio storage medium) or as samples to be used with live electronics. What about these voices? Sometimes the source of these voices is credited, and it is easy to assign a gender to the voice. Even synthesised, 'inhuman' voices sometimes sound as gendered. However, some vocal sounds are ambiguous and sound neither masculine nor feminine. Some synthetic sounds have a more or less voice-like quality, without being clearly recognisable as vocals. Models inspired by the voice are used to analyse and synthesise electronic sounds, for example in IRCAM's program Chant and in Werner Kaegi's VOSIM; even in the earliest days of electronic music, theories and equipment from the science of phonetics were used for producing electronic music (Ungeheuer 1992).²⁵ Sometimes this results in more or less voice-like qualities, as with the use of formants.

When listening to the pre-recorded, manipulated and synthetic voices on the Computer Music Currents series, much more diversity appears compared to the prevalence of live singing female vocalists mentioned in the previous subsection. On nine compositions, pre-recorded or synthesised male voices can be heard; on eight compositions, similar female voices. Moreover, there is one composition with a pre-recorded boy's voice and another one

with children's laughter and a speaking choir of children's voices. The amounts of pre-recorded male and female voices that sing and speak are almost equal. An exception is that four male voices utter non-verbal sounds while not singing, while none of the female voices are doing this without singing too. Does this more or less equal gender distribution of the recorded voices mean that there is gender equality in the use of pre-recorded or synthesised vocals?

When taking the individual compositions into account, gender differences become clearer. All pre-recorded female singing parts are sung by professional vocalists in a Western classical vocal style for these compositions specifically.²⁶ The male pre-recorded singing voices are different. In Alain Savouret's *Don Quixotte Corporation* (CMC1), a male falsetto that does not sound like a classically trained voice sings theatrically; it is a persona in this programmatic composition. In Francois Bayle's *Le Sommeil d'Euclide* (CMC3) some sung vocals are part of a soundscape from an Indian village. In Charles Dodge's *Any Resemblance is Purely Coincidental* (CMC11) an already existing, famous historical recording of Enrico Caruso is used, with a high symbolic value. In Max V. Matthews's *Bicycle Built for Two*²⁷ (CMC13), the singing voice is artificially synthesised with a computer and sounds like a male voice. In Roger Reynolds' *The Vanity of Words* (CMC4), the speaking and singing voice is Philip Larson's bass-baritone. He delivers some wordless sung phrases (mainly heard in the background of the composition; Larson's reading of Milan Kundera's text has a more prominent place in the composition). This is the only composition in which the use of the male singing voice resembles the use of the female singing voices in other tape compositions.

In the CDs of the Computer Music Series of the Consortium to Distribute Computer Music, there are also many pre-recorded male voices: some thirty-one compositions with pre-recorded or synthesised male voices and sixteen compositions with disembodied female voices. Most of these gendered voices sound as a speaking voice type (with or without text), but there are also pre-recorded singing voices and other vocal sounds. With some other voices, the gender is indeterminable; most of these indeterminate voices are neither speaking nor singing voices, but consist of other vocal sounds like

²⁶David Evan Jones' *Scritto* (Catherine De Boer, CMC4), Michel Decoust's *Interphone* (Irène Jarsky, CMC4), Richard Karpen's *Il Nome* (Judith Bettina, CMC7), and James Randall's *Mudgett, Monologues for a Mass Murderer* (CMC13).

²⁷This popular song was written by Harry Dacre in 1892 and named *Daisy Bell*. The computer synthesis of the vocal part was done by John Kelly and Carol Lochbaum at Bell Telephone Laboratories (physical modelling synthesis, Roads 1996: 267); Max Mathews made the synthetic 'piano' accompaniment and is the arranger of this song (1961). Remarkably, although a collaborative effort with multiple authors, the computer song is often presented as Max Mathews', like on this Wergo CMC13 CD.

²⁵Phonetic theories and models are mainly based on the male voice. Because of their high fundamental frequencies, women and children have few harmonics in the region of the first formant.

guttural clicks, or synthetic sounds with an indeterminate vocal quality. The most striking gender difference in the use of pre-recorded voices in the CDCM series is the prevalence of male pre-recorded voices: there are more than twice as many compositions with pre-recorded male than with pre-recorded female voices; but for each gender, the distribution of vocal types (singing, speaking, other vocal sounds) is roughly the same.

However, it is remarkable that most of the pre-recorded male singing voices are not from the modern-classical Western art music tradition, but are sampled recordings from other musical cultures.²⁸ Moreover, some male singing voices are 'computer voices' modelled on and sounding like a male voice.²⁹ Thus, the pre-recorded male singing voices are 'Others': either from other cultures than the Western art world, or non-human, artificially generated computer vocals. The pre-recorded female singing voices are less prominent and consist of some classical singing,³⁰ some traditional non-Western singing,³¹ and some other ways of singing.³² A 'choir' of 'singing' computer voices of mixed gender is found in Paul Lansky's *just-more-idle-chatter* (CDCM5).

In the Cultures Électroniques series, the gender distribution of the pre-recorded voices seems roughly equal: forty compositions with pre-recorded male voices and forty compositions with pre-recorded female voices, with almost equal numbers of compositions with speaking voices, text, and other voice sounds of each gender. Thirteen compositions contain pre-recorded male singing voices, eighteen compositions pre-recorded female singing voices. There are forty-four compositions with ambiguously gendered voice sounds, and ten compositions with pre-recorded children's voices.

Remarkable, however, are eleven compositions with pre-recorded female voices singing high and non-verbal vocals in a Western classical vocal style,³³ whereas only

in James Aikman and Armando Tranquilino's *Tragoida / Komoidia* (CE3p) some wordless Western-classical singing by a pre-recorded male voice is perceived. There are two compositions in which male singing voices from other cultures than the Western art music tradition are of central importance: tango in Pablo Cetta's . . . *Que me hiciste mal* . . . (CE8) and flamenco in Mario Verandi's *Figuras Flamencas* (CE9p); and one such composition with a female voice: Beatriz Ferreyra's *Echos* (CE14), with Argentinian and Brazilian popular songs sung by Mercedes Cornu. Singing male voices are also heard in citations of recordings with a strong symbolic cultural meaning (historical recordings and popular song).³⁴ Remarkable also are the many compositions in which a female voice delivers a poem or other stylised, written text.³⁵ A smaller number of recorded male voices deliver such texts.³⁶ Recorded speaking male voices are mostly speaking in a free style and are often found objects³⁷ (like radio and television broadcasts,³⁸ political speeches³⁹ or environmental recordings), or produced by the composer⁴⁰ or a talking culturally significant person.⁴¹

All in all, in the CD series under investigation, the

Karlsson and Jens Hedman's *Anchoring / Arrows* (CE7), Joseph Hyde's *Songlines* (CE8), Lars Gunnar Bodin's *For Jon: Fragments of a time to come* (CE9m), Mathew Adkins's *Pagan Circus* (CE10) and Jean-Claude Risset's *Invisible* (CE11m).

²⁸Historical recordings and popular song are found in *Maikäfer Flieg* by Lothar Voigtlaender (CE3p), *Andere die Welt, Sie braucht es* by Wilhelm Zobl (CE6m), *Klang, Kar and Melodie* by Mark Wingate (CE9p) and *Ys* by Yves Coffy (CE12); a female singing voice with such a function is found in Lothar Voigtlaender's *Maikäfer Flieg* (CE3p).

²⁹Like in Georg Katzer's *La Mécanique et les Agents de l'Erosion* with an un-named female voice reading text from a dictionary (CE2), Dieter Kaufmann's *Le Voyage au Paradis* with text from Robert Musil's *Der Mann ohne Eigenschaften* read by Gunda König (CE3m), Ricardo Mandolini's *Microrreflexiones* with Paul Elouard's 'La Phoenix' read by Anne Gilbert (CE3p), Francisco Kröpl's *Orillas* with Rodolfo Alonso's 'Orillas' read by Lucia Maranca (CE4), Eduardo Polonio's ChC with text from Plato's *Phaedre* (CE8), Love Mangs' *We, we the waves: an acoustic poem* with August Strindberg's 'Vagorna Sjunga' read by Helena Boström (CE11p), Lars Gunnar Bodin's *For Jon: Fragments of a time to come* (CE9m) and Philippe Blanchard's *Casimir* with the voice of Viola Kramer (CE12).

³⁰As in Ton Bruynèl's *Chicharra's* with a Spanish translation of a poem by Bert Schierbeek read by Lino Calle de Segovia (CE11p), Daniel Zimbaldo's *Cartas desde el real hospital de lunaticos* with text from 'Mrs. Caldwell habla con su hijo' by Camilo José Cela (CE9p), Justice Olsson's *Up!* with the voice of the composer (CE6p) and José Halac's *The breaking of the scream* with a poem by Pablo Anadon performed by the composer (CE14).

³¹Sounds as 'found objects' in a most literal sense are composed in Josh Levine's *Tel*, which is made from tape fragments found in the studio's wastebasket (CE2).

³²E.g. *Mobile* by Eugeniusz Rudnik (CE5).

³³E.g. *Andere die Welt, Sie braucht es* by Wilhelm Zobl (CE6m).

³⁴E.g. *Le Ciel et la Terre* by Dieter Kaufmann (CE3p), *Mr Frankenstein's Babies* by Klaus Röder (CE11p), *Hershe tube rundown* by Michael Jude Bergeman (CE12) and *The breaking of the scream* by José Halac (CE14).

³⁵Art historian William S. Hechkscher in Alicyn Warren's *Longing for the Light* (CE6), composer John Cage in Joseph L. Anderson's *ChAnGE'S MUSIC* (CE10) and artist Salvador Dali in Jonas Broberg's *Conversation in Cadaqués* (CE11p).

²⁸For example, blues in Andrew Milburn's *Elmore* (CDCM5) and Neil B. Rolnick's *A Robert Johnson Sampler* (CDCM7), Cuban song in Jon Appleton's *Homenaje a Milanés* (CDCM11), a South-American folk singer in Ricardo Dal Farra's *Tierra y Sol* (CDCM25), and the voices of chanting Tibetan monks, Japanese shamans and African natives in Mark Wingate's *Ode to the South-Facing Form* (CDCM20). A few non-Western male singing voices are also heard in Julie Kabat's *Child and the Moon-tree* (the singing of a Mongolian shepherd and the speaking-singing male vocals of the Japanese Noh theater, CDCM 7) and Bischoff/Brown/Erbe/Payne's *CCM Flotsam* (CDCM 17).

²⁹As in Larry Austin's *Max Mathews Episode* (CDCM15), in Charles Dodge's *In Celebration* (CDCM18) and in Richard Karpen's *Denouement* (CDCM12). Max V. Matthews' computer voice arrangement of *Bicycle Built for Two* is released on Wergo Computer Music Currents volume 13.

³⁰As in Michael Matthews' *In Emptiness, Over Emptiness* (CDCM25) and Yu-Chung Tseng's *A Little Ying-Yang* (CDCM27).

³¹As in Bischoff/Brown/Erbe/Payne's *CCM Flotsam* (CDCM17).

³²As in Larry Austin's *La Barbara: The Name, The Sounds, The Music* (CDCM13) and Judith Shatin's *Three Summers Heat* (CDCM29).

³³For example, in Francis Dhomont's *Chiaroscuro . . . ou les yeux d'ambiguïté* (CE3m), James Aikman and Armando Tranquilino's *Tragoida / Komoidia* (CE3p), Richard Karpen's *Il Nome* (CE4), Eugeniusz Rudnik's *Mobile* (CE5), Ake Parmerud's *Alias* (CE6p), Erik Mikael Karlsson's *La Disparation de l'azur* (CE7), Erik Mikael

gender distribution of the pre-recorded voices is much more equal compared to the use of live voices, and the use of pre-recorded voices is much more varied than the use of live voices in this genre. Moreover, pre-recorded voices are often manipulated, sometimes dissolving or bending the gender of the voice. However, some gender patterns also appear. Pre-recorded female voices often sing in a Western classical vocal style. Pre-recorded male singing voices are mostly different from the Western classical vocal type; and there are some singing 'male' computer voices. Thus, male singing voices are the voices of 'Others'. Also, there is a tendency that pre-recorded male speaking voices are quite often the voice of the composer or poet, or of another culturally significant person, or sampled from radio, television or recordings. Pre-recorded female speaking voices are often by vocalists or singers who perform a text by someone else, specifically for the production of the composition. Like in the mixed genre for vocalist and electronics but somewhat less clear, in pre-recorded electronic music ('tape music') a gender pattern of location is reflected: composers are far more often male than female, but women are prominently involved in the production as vocalist, whether performing in a concert or in a studio during the production process.

1.7. A gender pattern

A musical partnership of a male composer and a female vocalist is typical of electroacoustic music. This stereotype relates woman to body, performance, tradition, non-verbal sound and singing, and man to electronic music technology, innovation, language and authority. It resonates with the tendency in contemporary Western culture to associate singing with women, not with men (Cusick 1999), while technology is seen as a man's world (Benston 1988). More generally, it reflects the dualistic opposition of masculinity versus femininity and mind versus body that is so prevalent in our culture.

2. SINGING BODIES AND STUTTERING CYBORGS

The gendered voices in electroacoustic music are not only an effect of gendered production processes, but also have symbolic significance. How do they relate to other cultural phenomena? How could we interpret these voices? In the second part of this article, some issues are discussed that are related to the gender patterns found in section 1. The character of this part is thematic, and several compositions from the three CD series as well as other works serve as examples, not only CD recordings but also performances and films. These issues are more extensively dealt with in the rest of the research project.

2.1. Embodied voices

Kaja Silverman (1988) found in classical Hollywood cinema a link between the female voice, the body and impotence, while the male voice was more frequently disembodied and powerful. The impotence of female film characters plays on different levels. It appears in the story, where women are often confined, shut up in small rooms or threatened with death. This weak position is coupled with the female cry, the scream of fear or death – the non-verbal expression of impotence. Silverman states that, thanks to synchronisation, the female voice in classical Hollywood film is always attached to an image of a female body. The 'voice-over', a voice that speaks without having a physical persona in the film, is reserved for the male voice. The voice-over has a special status, which can be compared to the voice of God: the voice-over speaks from a superior position and knows more than the characters in the film, and is usually male. Such a male 'voice of authority' speaks also often in documentaries and radio and television ads.⁴² Michel Chion (1999/1982) calls the bodiless voice in cinema an *acousmètre*, a powerful master who can only be heard and who often sees and knows all. Embodiment makes the voice belong to a living, mortal, vulnerable, human being. Women in classical cinema are closely related to the body, to a lack of power and to a lack of language: the ultimate form is the scream of death. As Chion notes, male personae sometimes scream too, but with an animal, territorial, structuring scream of power.

Joke Dame (1994) notes that Michel Poizat (1992/1986) found a similar pattern in nineteenth-century opera. According to Poizat the scream of the female character in opera is central to the *jouissance vocale* of the male opera lover. This scream, often a scream of death, is formed by the soprano's high, wordless singing. Cathérine Clément (1988) described how the female protagonists in libretti from well-known nineteenth-century operas usually die. Poizat shows that throughout the history of opera, women's arias have become steadily higher; and at high tones the words become unintelligible. Through melismatic singing and coloratura the word is fragmented into sound. For male operatic roles, however, there has been an increase in spoken language. 'In this evolution, the [female singer] is tending to disappear as a subject and become purely a voice, simply an *objet-voix*' (Dame 1994: 153). Poizat argues that, for the typical opera lover, this musical cry is a vocal object: it is 'pure sound', an autonomous object detached from the body, transgressive and beyond language. In that sense, it resembles abstract vocal sounds in computer and electroacoustic music, like in Elzbieta Sikora's *La tête*

⁴²In a 1991 study of ten Vancouver radio stations, the spoken male voice was overwhelmingly dominant in over 75% of the ads, while only 11.3% of the ads consisted of a female speaking voice; the male-female voice combination occurred in 11.5% of the ads (Truax 2001: 197).

d'Orphée / Orpheus Head (1981, on CE13), in which a female scream merges with synthetic sounds. But for Poizat, the liveness of the musical cry is essential. 'However advanced the technology is now or may become, what the opera lover ultimately preserves in the precious recordings of his idolised diva is a degraded residue' (Poizat 1986 [1992]: 95). So also in opera, the female voice is related to the cry and to non-verbal vocals. Moreover, although the high non-verbal operatic singing voice may seem detached from the body, the bodily presence of the singer is in fact very important.

There is a parallel between these gender patterns in film and opera, and the gender pattern in electrovocal music: in all these genres there are many embodied female voices uttering non-verbal sounds. Relating women to their bodies is a cultural stereotype. A remarkable example is Zoltan Pongracz' *Mariphonia* (1972, on CE5), a tape composition based on the non-verbal sounds and the physical dimensions of his wife's body. In the narratives of opera and film, the voice and the female body are linked with impotence. But is therefore the live embodied singer herself powerless? Carolyn Abbate (1993) argues that singers have power *because* of their impressive bodily presence on the stage. She only spends a few words on electronic sound technology, in a negative way: 'operatic performances are in fact exaggeratedly pure in their liveness, since no technology (amplification) is supposed ever to interfere' (Abbate 1993: 234).⁴³ The star singer in Jean-Jacques Beineix' film *Diva* (1981) impersonates a similar idea. She considers the recording of her voice a threat to its essence: 'liveness'. But how is the position of the female singer in the live performance of electroacoustic music?

2.2. The work of the vocalist

Sometimes live performances of compositions for singer and tape give the impression that the singer is confined by the rigidity of the sound track and that the singer has to work extremely hard to produce the right notes at the right time. Some freedom in timing that a singer has when performing with piano or orchestra, is gone: the pianist or the conductor is able to adapt to the singer,

⁴³ Abbate uses the term 'technology' in a narrow way as 'electronic apparatus' or 'high tech'. Gender and technology studies criticise such a concept of technology as excluding women, and shift the attention from high tech pieces of apparatus and their inventors to 'women's sphere' technologies and to the practices of production and consumption (Wajcman 1991).

Likewise, it is possible to consider operatic singing, architecture and acoustics as technology. An important goal of these technologies of opera is amplification. Vocal amplification of the higher formant frequencies (the 'singer's formant') causes the singers to be heard above the orchestra (Sundberg 1987). This requires a special singing technique and years of training. The opera voice is very artificial. The necessity for opera singers to be heard in a large room above an orchestra without electronic amplification, is in my opinion often at the expense of the 'liveness' of the sound: a lot of timbres and voice types cannot be used and a lot of vocal details cannot be heard.

but the tape not. (At a discussion on the Feminist Theory and Music 4 conference in Charlottesville, University of Virginia 1997, vocalist Kristin Norderval said that for her the most difficult part of performing with tape is the rigid timing.) In addition, the electronically created sounds can swamp the voice of the female singer, like in Arthur Sauer's *Parallel cases from under the peartree* (1993) for soprano, computer and synthesizer, performed by Jannie Pranger, 6 November 1993 at De IJsbreker in Amsterdam.

On the other hand, a female singer performing live often makes a powerful impression with the sound of her voice, her vocal virtuosity and her physical presence. She is not only performing the composers' work, but is interpreting and creating, and is responsible for the music. When performers know the tape part well, they often have developed a very precise feeling for the timing. Some performers like the predictability of the pre-recorded sound tracks.

In the performance of compositions for female singer and tape, both options are possible. Janice Jackson's performance of Jean-Claude Risset's *L'autre face* (1983) at De IJsbreker in Amsterdam on 15 December 1994, differed markedly from her earlier performance of the work at De Kikker in Utrecht on 19 October 1994. In Amsterdam she gave a short introduction to her performance by saying what the work meant for her (rather than by outlining what the composer had in mind). In this way she positioned herself as a subject, a discursive and creative authority. She called the piece a sound sculpture and compared it to a river that always changes colour; whereas Risset indicated in the sleeve notes of the CD and in the performance programme that this composition is lyrical and expressive. Jackson's performance impressed me as introverted and concentrated, with varying timbre, often soft. Instead of a vocalise with a lot of notes (which was my impression of her earlier performance, and also of the recording of the performance by Irène Jarsky on CMC7), Janice Jackson seemed at that concert to sing a 'sound painting'. Now the tape was a source of inspiration rather than a confining structure.

The abundance of live singing female vocalists versus the lack of male singers in electroacoustic music is a gender pattern that both male and female composers adhere to. Singers are performing artists, and as such have less cultural status and power than composers. However, as performers, they are actually presenting and manipulating the music, and they can draw the attention to their vocal art and interpretation. A performer always adds musical aspects to the composition and completes the work. Many composers have worked closely together with a vocalist, and often used their voice on the tape part, too (for example in *Il Nome* [1987, on CE4 and CMC7], composed by Richard Karpen, with the voice of Judith Bettina). The voice, skills and artistic conceptions of the singer often influence a composition

to a large extent. There might be another reason for the large amount of compositions for female singer and tape/electronics: the presence of some very qualified and active women vocalists, interested in new music, who initiate or commission new compositions.

2.3. Stereotypes revisited

Ellipsis (1989–1993) is a composition for female vocalist and tape by the Canadian composer Wende Bartley.⁴⁴ Often, as on the CD, it is performed by Fides Krucker, but others might perform it as well. For this version of the composition,⁴⁵ Wende Bartley worked together with Fides Krucker and also used her own experiences of studying the voice with Richard Armstrong who was part of the Roy Hart theatre ensemble in the late 1960s and 1970s. At an earlier stage, the composer was influenced by the vocal performance art of Meredith Monk and by written accounts of ritual singing created by women during birth and death rituals. She developed the composition in a series of stages with various singers as well as through her own vocal improvisations. The singing style of *Ellipsis* is not a traditional belcanto approach, but rather an ‘embodied’ style. For Wende Bartley, this embodiment refers to a sound that resonates deeply in various areas of the body, and a play with sound colour instead of pitch contour or structure.⁴⁶

The singing part of *Ellipsis* does not have any text and consists of extended vocal techniques such as a rapid repetitive series of glottal attacks, multiphonics and vocal fry, with much chest voice. The vocal phrases and the voice sounds are closely related to the breathing of the singer and contain glissandos, long sustained pitches and repetitions of pitches and melodic motives, with changing timbre. The tape does not seem to be a coercive structure and the singing appears to come from within the singer herself. On stage, Fides Krucker performs the piece without a score, in a simple theatrical way with a strong bodily presence (Montreal 1995). Because she is accompanied by pre-recorded sound tracks (‘tape’) instead of piano or instrumental ensemble, the singer has more room to move and an opportunity for a more theatrical performance. Fides Krucker vocalises as an embodied subject.

Ellipsis is, according to the program notes, based on lunar mythology, with ‘the unfolding of the lunar cycle, with its three stages of waxing, full and waning moon, traditionally [...] associated with three images of woman: virgin, mother, and crone. *Ellipsis* [...] creates another three-fold story of woman, [...] the spiritual and

psychological empowerment of woman’s collective consciousness as it evolved through time: The Age of Darkness, Creating a New Space, and The Age of Resonance’. These three parts can be recognised in the way the vocals evolve throughout the piece: descending vocal lines in the beginning, becoming more and more varied, articulated and energetic in the middle, and ending with long resonating tones, full of overtones. Thus, meaning is ascribed to the non-verbal vocalising.

Singing, non-verbal vocalising, embodiment and lunar mythology are features associated with femininity. But the singing in this composition differs from the Western classical singing style (the composer told me once that a classically trained singer had problems, while an actor was doing very well when rehearsing this piece). And the embodiment is not a visual display (as in the films discussed by Kaja Silverman), but the resonance of the vocal sound in the body, a singing style. As for the vocal part, I would relate this composition to the feminism of ‘difference’ that revalues and elaborates on femininity⁴⁷ (this contrasts with female composers who deny that gender has anything to do with music and subscribe to the liberal feminism of ‘equality’ that is mainly concerned with equal rights and opportunities and the avoidance of discrimination). However, most of Wende Bartley’s compositions involve electronics. In her programme notes, she does not elaborate on that aspect. But in my view, this makes her a cyber-feminine-feminist composer, combining explicitly feminine themes with the masculine domain of electronic music, and body with technology.⁴⁸

2.4. Cyborg voices

When comparing the gender pattern of the use of live female vocals in electroacoustic music with the use of electronically pre-recorded or synthesised voices, this last category of ‘cyborg voices’ is much more varied with respect to gender and voice types. The hybrid combination of voice and music technology stimulates the use of more divergent vocal identities than the classic concert situation. But still, gender patterns are inscribed in these electronic voices, as shown above in section 1.7.

Since there exist so few compositions for live male singer and tape/electronics, the difference between live and pre-recorded voices in electroacoustic music is the most remarkable for male voices. Is there a relation with the powerful disembodied male voices in film? The ‘voice of authority’, the voice of a composer, poet, artist or politician, indeed occurs in electroacoustic music, but

⁴⁴On *Claire-voie*, Empreintes Digitales IMED-9414-CD.

⁴⁵There is an earlier version for string quartet and voice.

⁴⁶This paragraph is based on personal e-mail correspondence between Wende Bartley and HB, 18 December 2002 and 8 March 2003.

⁴⁷This femininity-centred feminism is also called cultural feminism and is related to eco-feminism; theorists are Susan Griffin, Mary Daly, Adrienne Rich, among others; it has been accused of essentialism.

⁴⁸For extensive discussions on the three kinds of feminist approaches, see Wajcman 1991, Buikema and Smelik 1993, Braidotti 1994, Gill and Grint 1995, a.o.

often with a twist: distorted or ironic. The explicit, marked use of music technology causes a distanciation of the vocal delivery, that leads to a critical recontextualisation of the sound bites of politicians,⁴⁹ or to a mysterious, cryptic concealment of an authoritative voice within the distorted sound.⁵⁰ This distanciation also gives room for a male scream⁵¹ and for male singing voices, albeit mostly from other cultures.

In Stanley Kubrick's film *2001: a space odyssey* (1968), Computer HAL 9000 is an *acousmètre*, who sees and knows all (Chion 1999/1982); his all too gentle, effeminate voice and often invisible eyes are everywhere. He takes over the power in the spaceship and murders the human crew. The last astronaut in the spaceship goes into the computer and shuts it down by taking out the memory modules. The computer knows what the astronaut is planning to do, and wants to prevent this: HAL tries to appeal emotionally and empathically. When the astronaut takes out the modules one by one, HAL repeats: 'I am afraid' and 'my mind is going, I feel it'; and we hear the computer slowly 'die', its voice becoming lower and slower like a failing tape recorder. Regressing to his 'youth' while dying, the computer starts to sing a song he learned from his maker: a reference to Max Mathew's computer-synthesised version of *Bicycle Built for Two*.⁵² At first, HAL is a disembodied, all-seeing, all-knowing voice. When the astronaut goes into the computer and takes out the memory modules, the body of the computer is brought into view. With this embodiment, HAL becomes vulnerable and dies. HAL's singing is related to embodiment, regression and dying, but also to the artificiality of this cyborg male voice, its freakish, transgendered, dangerous and unpredictable nature.

Music technology also offers the possibility for a different kind of hybrid: the extended and recorded voice of the composer-vocalist. Due to the use of sound technology, some vocalists have become composers and vice versa. Composer-performers like Diamanda Galas extend and multiply their voice on stage and on recordings; Joan LaBarbara built *Sound Paintings*⁵³ with recorded layers of her extended singing. Composer Wende Bartley used her own voice as the basis for her

eight-track composition *Dreamspin* (1999).⁵⁴ Whereas the line of approach of these women is from the direction of vocal performance art and singing, men like Jaap Blonk and Trevor Wishart tend to come from the traditions of sound poetry or music technology.⁵⁵ But they all combine voice and electronics, performing and composing.

The star singer in the film *Diva* tried to avoid the recording of her voice with all her might. But it turned out that what she had to fear was not so much the recording technology itself or the loss of the essence of her voice, but the men in charge of the music industry. In the final scene, the star singer experiences that sound recording technology makes it possible to hear herself in a different way and to get a different perspective on her own voice: 'But I've never heard myself sing', she utters in amazement. And her lover-fan, who 'stole' her voice, gives his secret recording back to her, tenderly.

3. CONCLUSION, AND BEYOND

Female composers of electroacoustic music are a small, but rising, minority when compared to their male colleagues. On the other hand, there are many female vocalists in this genre and few male singers. In the classic concert situation this pattern is most extreme, with many compositions for live soprano and electronics, singing mainly in a modern Western classical singing style with much high and non-verbal elements, and almost none for a live singing male vocalist. The use of pre-recorded and synthesised voices in this genre is much more varied, but here too the work of female vocalists has a prominent place. This gender pattern can serve as a frame of reference for interpreting individual compositions and opens questions about the role of the vocalist, about embodiment, about language, about the use and subversion of gender stereotypes and about authorship.

By focusing on voices and vocalists in electroacoustic music, more female influences can be discerned in this genre than by focusing only on composers. The importance of the authorship of the composer has been contested in musicology, to give more room to (female) listeners, performers and other interpreters (Citron 1993, Dame 1994). Gender and technology studies, instead of exclusively focusing on the, often male, inventor, also pay more attention to workers and users as producers of technological practices (Wajcman 1991, Cockburn and Omrod 1993); in doing so, more female participants and female influences are perceived. Authorship may not seem to be a gender issue at first sight; but it is, when considering the large number of male composers versus

⁴⁹Like in *Andere die Welt, Sie braucht es* by Wilhelm Zobl (CE6m).

⁵⁰For example, the voices of Pauline Oliveros, Jerry Hunt, Morton Subotnick and David Tudor in Larry Austin's *SoundPoemSet* (CDCM16), and the voice of Salvador Dali in Jonas Broberg's *Conversation in Cadaqué* (CE11p).

⁵¹The 'animalistic' scream in José Halac's *The breaking of the scream* (CE14).

⁵²Released on CMC13, see 1.6 n24. Note that the song in the film is a reference and not identical to Mathews' version. HAL's song is actually sung by a human actor (Roads 1996: 267), and apparently this recording is modified but still sounds less artificial than Mathews' version. These two versions are quite different: Mathews' version sounds mechanical and more up tempo and higher than the version in the film, which is very low and slow and without accompaniment.

⁵³Lovely Music CD 3001.

⁵⁴Personal e-mail correspondence between Wende Bartley and HB, 18 December 2002, and previous contact.

⁵⁵See the article by Theda Weber-Lucks in this issue of *Organised Sound* and Bosma (1997).

the large number of female vocalists in electroacoustic music.⁵⁶

The prevalence of male composers of electroacoustic music combined with singing female vocalists, is a manifestation of a hierarchical dualism: masculinity is connected to composing, the work of the mind, authority, language, reason and innovation, and opposed to femininity, performing, the body, non-verbal vocal sound, emotion and tradition. Many feminist studies argue that such a Cartesian dualism is pervasive in our Western culture. Masculinity is stereotypically seen as active and superior and related to the mind and to subjects who are 'doing' or 'having'; while femininity is considered passive and inferior, 'matter', 'being', an object of desire. There are three kinds of feminist responses to this stereotypical dualism: (i) to strive for women to obtain masculine rights and opportunities; (ii) to revalue femininity; (iii) to deconstruct and challenge this dualism altogether, paying attention to both the construction of femininity and masculinity. These three approaches often go together, for example when composer Wende Bartley works with electronic technology (i), and makes the revaluation of femininity an important theme in her compositions (ii), and by working with femininity in a masculine domain and by using her own singing voice in her electronic compositions, upsets the gendered dualism (iii). Yet another example of the confusion of gendered boundaries is the work of female and male composer-performers, who use their bodies as well as technology.

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⁵⁶I have elaborated on issues of authorship in relation to gender and electrovocal music elsewhere (Bosma 1996a, 1998a, 2000).

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