Net Literature and Radio: A Work-in-Progress Report

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"Speech and dialogue-based radio art concepts are nearly completely missing within artistic attempts to create interactive webbased audio works," Sabine Breitsameter wrote in 2001.[1]

In the meantime, however, there have been a few promising attempts to close this gap from the field of European Net literature. Between 2003 and 2005 there were productions for the Ö1 *Kunstradio/Art Radio*, in 2005 for the German-Polish artists' radio *Radio_Copernicus* and in 2006 for the Festival RadioRevolten in Halle.

This essay reports on radio-broadcasted Net literature projects which have taken up the challenge of working with the traditional medium of radio.

On the level of protocols, Internet and radio are quite close, or at least both use a lot of so-called "broadcasting" processes. For example, routing tabels are "broadcast" in the Net, and radio networks "broadcast" their SSIDs, their network names on the air, like radio.

And the Internet is likewise bi-directional on the protocol level. It has the feedback or communication channel that radio lost through the state monopoly on broadcasting, and which Bertolt Brecht demanded back vehemently in his 1932 theory on radio: "Radio must be transformed from a dissemination apparatus into a communication apparatus."[2] The link between Net literature and radio can, in line with Brecht's intention, open up the possibility for listener participation.

A Digression: Apple Games

Hence, it is fair enough to claim that Net literature is only an apple's throw away from radio, and this claim can be backed up with a short digression, which at the same time pays brief hommage to Reinhard Döhl, the Stuttgart author, artist, radio play and media sciences expert, and Net literature contributor. From 1996 until his death in 2004, I cooperated with him on numerous literature projects for the Internet.

The best-known work by Reinhard Döhl is the "apfel" (1965), an incunabulum of concrete-visual poetry. In this poem, the form of the fruit is produced by the repetition of the word "*apfel*." And in the middle of this apple picture is a word worm.

fig. Still from: "worm applepie for doehl", 1997

In 1997, I created a computer animation of Döhl's concrete poem as "worm applepie for doehl,"[3] in which the word worm eats up the apple picture, and thus sated, slowly digests itself back to its original size, only to start eating again. Admittedly, the "worm applepie" can perhaps still be seen as kinetic art or film, but the next step in the evolution of the "*apfel*" as a "codework" clearly has a close affinity to the computer and Net.

Concrete poetry is based on the elements of language. And "codeworks," whose program code provides the material of the artistic work, are based on the elements of digitalism, that is, the program code, the zeros and ones, which are always text:

> "For there is one thing . . . that the work of digital artists . . . has in common with concrete poetry and the experimental use of language for poetry: it is art as a form of aesthetic hacking, of dissecting structures and making them visible . . .
>
> Apart from Morse, the internet is the first modern medium—or rather the first modern information technology—which is based on a code. If one defines "text" in general terms as a succession of single (discrete) signs drawn from a finite repertoire (an alphabet), then 01 codes are also texts and all digital technologies are textual technologies . . . [This is] text which is written in computer languages and then transported, transformed and executed as digital writing code."[4]

Thus, the apple poem from 1965 can be translated in program code as:

> **$wurm = ($apfel>0) ? 1 : 0;**

This code,[5] written in the computer script language PHP, can be roughly translated into words as: *Ist der Apfel größer Null, is(s)t der Wurm. Ansonsten is(s)t er nicht.* If the apple is larger than zero, then the worm exists (eats). Otherwise it doesn't exist (eat).[6]

In addition to program code (in codeworks) and the computer screen (in "worm applepie for doehl" as film or kinetic art), Net literature also works with databases and Internet search engines.

In *appleinspace*[7] by René Bauer and Beat Suter, the stream of search terms being entered in the search engine "Fireball.de" hits a database which stores all of Reinhard Döhl's online texts. If one of the words entered in the search engine is contained in a Döhl text, then the relevant section of the text appears in the form of an apple on the screen. This is instant Net communication, interacting here with the text corpus of Döhl's work on the Internet.

The Net installation *appleinspace* was adapted for radio and expanded into a "multilayered auditive human-search-engine-cooperation."[8] The "noise" of the search engine terms as they hit Döhl's text corpus over and over again was made audible, acoustically commented by city sounds and collaged with further auditive material from the Net.

appleinspace – search the world was broadcast on November 7, 2004 by Ö1 *Kunstradio*, as the first item in the *curated by*[9] series *.ran*.

The five-part series *.ran [real audio netliterature]*,[10] broadcast between November 2004 and February 2005, was an attempt to bring together various approaches of Net literature with the medium of radio.

.ran deliberately did not focus on the issue of listener participation but looked instead at the other possibilities and themes relevant for Net literature in radio, such as code, montage/collage, questions of authorship, text-visuals-acoustics indifference, human-machine cooperation. I will take up these questions later.

Death of the Author and Compulsive Control

One question these apple games have not anwered is as to who is writing—the author or the reader or the computer? Ever since the appearance of hyperfiction in 1996, this major question has been repeatedly raised. The postmodern argument ran as follows: in the Internet every reader is also an author, since he or she can determine the form of the text through the links clicked. The reader collages the text while reading and in fact produces the text in the process of reading. According to Benjamin Whooley, "everyone is an author, which means no one is an author: the distinction from the reader disappears. Exit author . . ."[11]

Does the phenomenon of the Wreader (meaning of the reader who is also an author or writer) really mean the click of death for the author? This question has quite rightly been anwered with a "no" by Uwe Wirth, among others:

When hypertexts forgo structure or internal coherence so that they are completely open to whatever the reader decides to do with them, then the line between interpretation and use is no longer evident. A completely open text is thus completely uninterpretable."[12]

Or, to phrase it differently: an open hypertext is meaningless. A hypertext which is meaningful to read still requires the author, at least as a director who sets limits for the different readings and is thus to a certain extent in control.

However the question is not merely as to whether the author has control of the text. There is also the question of whether the author has control over the computer with his or her concept—or whether the computer has control of the author with its structures, its programming logic, with the potentials and limitations of its interfaces, with the power of the screen.

Given in particular the seductive, overwhelming power of the display, it seems fitting to apply Duchamp's rejection of "retinal art" to the computer screen. "Retinal" was the term Duchamp used for art which drew its aesthetic appeal from the surface, from the pictoral composition, from optics, and not from an underlying idea or artistic concept.[13]

Ben Fry's data visualization, in which data like the gene code in "genome valence"[14] are translated into an arbitrary optical show, seems to me a good illustration of the problematics of "retinal" computer art.

Without going into the matter any further at this point, one could nevertheless ask whether in blogging, for example, the author has not in fact lost control of the text to the logic of programming.
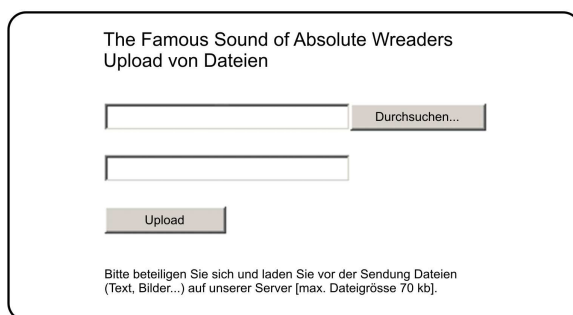
In *The Famous Sound of Absolute Wreaders*, I made questions about the control of text, work, and machine the artistic subject. *The Famous Sound of Absolute Wreaders* is comprised of two parts—firstly, a radio production for Ö1 *Kunstradio*,[15] broadcast on September 7, 2003, and secondly, a Net project.[16] Since this was the first work to attempt to link Net literature and radio productively, as far as I know, I will thus present it in more detail.

The material used as the basis for the radio program and the Internet consisted of the texts of six Net authors (Reinhard Döhl, Sylvia Egger, Martina Kieninger, Oliver Gassner, Beat Suter, Johannes Auer), who were asked to write about certain selected Net projects carried out by the others. The only requirement was that the texts had to be printable on paper and recitable.

The text for broadcasting was collaged out of these texts and performed by the two speakers, Christiane Maschajechi and Peter Gorges, in the studio of Ö1 *Kunstradio*. The program broadcast consisted of four ten-minute-long sections.

The first part called *Collage* was based on a text selection carried out by me, in other words it was under "human control." In the second part, *Remix*, the speaker's text was randomly put together by the computer and was thus "computer-controlled." The text basis for the third part, *Dialog*, was created in the same way, but this time the speakers had the task of commenting on the text spontaneously and thus regained some of the human control over the text. In the fourth part, *Rauschen*,[17] the same happened as in part three, but this time the speakers were drunk. People can decide for themselves who was in control of what in this last part.

In advance of the broadcast, there was an upload area in which anyone who wanted could upload whatever digital material they chose. This material was deleted successively during the broadcast.

fig. The Famous Sound of Absolute Wreaders, 2003

The Net project utilised the text basis of the radio broadcast. Each of the authors involved used the text written by one of the others about the project of another as the source text for a new work.

This hybrid form—radio broadcast and extension through a website—is a form already introduced and practiced in the literary productions of Ö1 *Kunstradio*. From 1999 onwards there was the exceptional series *Literatur als Radiokunst* (*Literature as Radio Art*), which was concerned with "finding forms of presenting literature on the radio beyond the traditional genre of 'readings' [*Lesung*] and 'plays' [*Hörspiel*]." Authors were given a Net extension within the homepage of Ö1 *Kunstradio*.[18]

Similarly, in *Familie Auer*[19] (broadcast from January 1996 to January 1997) the accompanying Web platform was a fundamental and complementary element of the

project. Thus a connection could be made between "the SitCom and the new cultural technologies."[20]

Love Talk

"Hypertexts are in fact just as unsuitable for reading out as source code is," said Heiko Idensen in his project description of *.ran4 – Idensen live!*.[21] If he is right, then his radio program, testing precisely the possibilities of a listener hypertext, was just as pointless as the next section of my essay might be.

As already mentioned, what codeworks and concrete poetry along with Dada have in common is a reduction to the elements of language (or program language, respectively). Isn't it likely, then, that it should be possible to hear features common to Dadaistic sound poetry and to audible renderings of program source codes?

On May 4, 2000, a computer worm spread itself extremely rapidly per e-mail. "I love you was" the subject heading, leading to the virus being named "Loveletter." Franco Berardi Bifo performed the source codes of this Loveletter virus at the d.i.n.a. Festival in Bologna on May 24, 2001.[22]

Audio material from his performance was collaged into the radio broadcast *.ran5 – Codeworks*[23] by Florian Cramer (et al.)

Anyone listening to Bifo's performance will feel strongly reminded of Dadaistic sound poetry.[24]

However, there is a serious difference to concrete poetry and Dada. This "code" doesn't just become a sound event.[25] It can cause damage when read by a computer: it is also a program code which executes itself!

Retrospective and Interim Résumé

The examples outlined above as early attempts to link Net literature with radio reveal surprising parallels to the development of the radio play.

Hans Flesch's *Zauberei auf dem Sender* (*Magic on the Radio Channel*) was the first German radio play to be broadcast, on October 24, 1924. Briefly, in this "radio broadcast grotesque," instead of the symphony concert on the program, listeners heard a chaotic mixture of numbers, dance music, the barking of dogs, and some announcers claiming "the radio channel has gone mad!" A magician had taken over the radio station and caused the sound chaos. The program director asked, horrified:

"But what will happen if everyone just does as he likes?" He believed that the "centralized, hub-and-spoke system of radio was in danger."[26]

Hans Flesch addressed the question of control in his play: who is in charge of the medium, and thus who decides how and what is broadcast?

The Famous Sound of Absolute Wreaders also deals with these issues of control (who is in charge of the text—the author, the reader, the computer?) and loss of control (drunk speakers in the fourth part ignore large sections of the text presented by the author and reworked by the computer and, instead, "do as they like").[27]

It is natural for a young medium to concentrate on itself in the early stages. However, drawing on what is familiar is a tried and tested way of approaching new territory.

The first radio play ever is considered to be *A Comedy of Danger* by Richard Hughes, broadcast by the BBC on January 15, 1924. Hughes used a trick to make his play suitable for the radio: during a mine inspection the lights fail, and in this way the dialogue and the radio play can commence. The radio play becomes "Theater für Blinde,"[28] (drama for the blind) and thus creates a setting for the new form of radio play (lights out), which allows the adaptation of the familiar form of a stage play for the radio.

It seems justified here to claim that there are parallels between the "drama for the blind" and "radio art for non-users of the Net" with the series *.ran* and *The Famous Sound of Absolute Wreaders*. In all these productions, reference to the Net was made in advance of the broadcast or was a simulation[29] but at any rate had a decisive influence on the concept and material of the radio play. One can say that the Internet here was (reflexively) the occasion for the radiophone language game.

At this point it is worth remembering Georges Perec's excellent radio play, *The Machine* from 1968. Four speakers—"three memories" and a "controller"—simulate the work of a computer which is intended to systematically analyse Johann Wolfgang von Goethe's poem "Wanderers Nachtlied."

> It becomes clear to the attentive listener that this play on language does not merely describe the way a machine works, but also reveals the internal mechanism of poetry itself, though on a far more subtle level.[30]

As a provisional conclusion, one can say that there appear to be three possibilities for adapting Net literature for the radio (and all three are hybrid forms):

1. The performed reading, either as a radio text or radio play (example: *The Famous Sound of Absolute Wreaders*) or as sound poetry (example: Loveletter)

2. The collage of differently generated sound material (example: *.ran1– appleinspace* or *.ran3 – DADA TO GO*).

3. The algorythmic generation (example: *.ran5 – Codeworks* and *.ran2 – authorship and its automatic generation*). The supposition here is that the more the text/tone is generated throughout the course of the program, the more it is heard as a "musical" experience.

This provisional conclusion excludes, however, a very significant aspect of the potential of Net literature—radio: interactivity or listener participation.

So far I have deliberately omitted this, as a reflection of my own emphasis in working with Net literature and radio. For a long time the hyperfiction euphorie, which started in Germany in 1996, overshadowed other interesting aspects of Net literature (see "A Digression: Apple Games" above). Interactivity was triumphantly declared to be the death of the author and trivialized into mere "clickability" as a form of "user participation." In the series *.ran – real audio netliterature* I thus expressly aimed at placing emphasis on the other aspects of Net literature (such as program codes as a base, use of databases, collage and montage).[31]

In *The Famous Sound of Absolute Wreaders*, the future listener could participate by up-loading digital material in advance, but the "insolent" way the user data was erased without being used in the course of the broadcast was, if anything, a demonstration of the power of the author and not of listener participation.

The above résumé illustrates that this form of adapting Net literature for the radio leads to interesting artistic experiments with language, which reflect the medium they were conceived for. Nonetheless, I have to admit that for the listener the form remains largely "traditional."

Authentic Interactivity: Speculation

Is interactivity the decisive element which can turn Net literature on the radio into a new acoustic form and experience?

Sabine Breitsameter regards the bi-directional communication possibilities as having great potential for radio art.

Since the digital networks came up recently, the electro-acoustic media space which radio art is based on has altered. Its new architecture makes available a shared environment, a distributed space, with—finally—bi-directional communication possibilities.

She then gives precise instances of how radio art can become interactive:

1. Dramaturgies based on navigation.
2. Productions based on the flexibility of the sender/receiver relation.
3. Concepts based on network-architectural principles ("distributed space" and "shared environment.")[32]

Of course there were attempts to involve the listener in radio plays in pre-Internet times,[33] and also early forms of "dramaturgies based on navigation." A good example is Richard Hey's *Rosie: Ein Radiospektakel zum Mitmachen für Stimmen, Musik und telefonierende Hörer*, Südwestfunk, 1969 (*Rosie: A radio spectacle involving voices, music and phone-in listeners*), in which listeners could determine the course of the broadcast by phoning in to the radio studio. This tradition was picked up electronically in 1996 on Ö1 *Kunstradio* in two parts of *Familie Auer*,[34] whose conclusion listeners could decide per e-mail.

At the same time, interaction requires that the public is prepared to become involved, as Dieter Daniels commented.

I think that interaction will always be confronted with the problem that it runs counter to the human desire to be offered something, to be entertained passively. Of course we all like to be told a story. And all of this potentially resists any movement in the direction of interaction. These are poles which cannot easily be reconciled.[35]

This is well illustrated by a dialogue with a listener who phoned in during Richard Hey's *Rosie*:

Moderator: "Studio *Rosie*," Good evening.

Listener 4:   Well, hallo. I'm calling from Durmersheim. I reckon the young man ought to give someone a good thumping. And the person he ought to thump is Mr Hey. I've often listened to radio plays from him in the past but I don't like this one at all.

Moderator: Why not? Don't you want to give your opinion and influence the plot?

Listener 4:   No, I want to be entertained.

> Moderator: Well aren't you being entertained right now?
>
> Listener 4: Maybe, but not the way I want to be.[36]

The public's reluctance to participate seems to me a particular problem of "dramaturgies based on navigation," since the interaction is generally restricted to selecting from a limited number of predetermined options. This means that the listener is not really a genuine player, but, maintaining the metaphor, at best a referee.

As I see it, the greatest challenge in an interactive radio play is achieving authentic participation.

I have made a few attempts myself in this direction with *free lutz* and *search lutz!*, live broadcasts for *Radio_Copernicus*[37] and RadioRevolten.[38]

In 1959, a calculator generated a literary text for the first time ever. Theo Lutz wrote a program for Zuse Z22 to create stochastic texts. On the advice of Max Bense, he took sixteen nouns and adjectives out of Kafka's "Schloss," which the calculator then formed into sentences, following certain patterns. Thus every sentence began with "*ein*" or "*jeder*" ("one" or "each") or the corresponding negative form "*kein*" or "*nicht jeder*" ("none" or "not every"). Then the noun, selected arbitrarily from the pool of sixteen, was linked through the verb "*ist*" ("is") with the likewise arbitrarily chosen adjective. Then the whole assembly was linked up through "*und*," "*oder*," "*so gilt*" ("and," "either," "thus") or given a full stop. Following these calculation instructions, by means of this algorithm, the machine was able to construct such sentences as:

> *EIN TAG IST TIEF UND JEDES HAUS IST FERN*
>
> (A day is deep and every house is distant)
>
> *JEDES DORF IST DUNKEL, SO GILT KEIN GAST IST GROSS*
>
> (Every village is dark, thus no guest is large)[39]

For the live broadcast *free lutz* and *search lutz!*, I used a web conversion of Theo Lutz's program which I wrote in PHP. The Web interface generated stochastic texts on the basis of Lutz's algorithm but permitted additional word input. The nouns and adjectives of the original vocabulary could be replaced by listeners through the Internet or the audience at the performance through a terminal. Furthermore, in *search lutz!* words from the live search of the search engine Fireball[40] could infiltrate the text generation process.

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EIN DORF IST LEISE ODER EIN BLICK IST NAH
JEDES HAUS IST SPAET. EIN BILD IST STILL
EIN FREMDER IST OFFEN. NICHT JEDER GRAF IST OFFEN
NICHT JEDES AUGE IST SPAET. KEIN TURM IST STILL
EIN KNECHT IST LEISE UND NICHT JEDER TURM IST FREI
NICHT JEDES SCHLOSS IST LEISE. NICHT JEDES BILD IST DUNKEL
KEIN KNECHT IST WÜTEND UND KEINE Bühnenbeleuchtung IST LEISE
KEIN GAST IST GROSS. KEIN HAUS IST GROSS
EIN RADIO IST FREI, SO GILT NICHT JEDES BILD IST LEISE
JEDES HAUS IST GROSS. NICHT JEDER sex mit tieren IST HÖRBAR
NICHT JEDER GAST IST TIEF. NICHT JEDES AUGE IST FERN
NICHT JEDER BAUER IST STARK, SO GILT JEDER BAUER IST WÜTEND
JEDE Bühnenbeleuchtung IST GUT. KEIN GAST IST TIEF
NICHT JEDER Bökasafin IST GROSS. KEIN WEG IST OFFEN
NICHT JEDER BAUER IST WÜTEND. EIN Städtefahnen IST TIEF
JEDER KNECHT IST GROSS: KEIN HAUS IST STILL
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Fireball Livesuche schrieb um 14:20:08 Bühnenbeleuchtung
Fireball Livesuche schrieb um 14:20:20 golfen in süditalien
80.129.29.123 schrieb um 14:20:26 RADIO HÖRBAR
Fireball Livesuche schrieb um 14:20:30 Bökasafin
Fireball Livesuche schrieb um 14:20:41 sex mit tieren
80.129.29.123 schrieb um 14:20:26 GEDANKEN FREI
Fireball Livesuche schrieb um 14:20:51 Lichttechnik
Fireball Livesuche schrieb um 14:21:02 Städtefahnen
Fireball Livesuche schrieb um 14:21:12 frei

stochastische texte 1959   ///////   search lutz 2006

Substantiv   Geschlecht   Adjektiv (Prädikativ)
                         ○ w ◉ m ○ n
[abschicken (LUTZEN)]   [reset (LUTZ Original)]

Livesuche schreibt mit
[stop]

fig. Screenshot Webinterface search lutz!, 2006

In 1959, computer texts were connotated as literary texts twice over, firstly through the "Kafka" vocabulary, and secondly through corrections carried out by Theo Lutz. In an edited print out of a selection of stochastic texts, Theo Lutz corrected minor grammar errors and punctuation omissions by hand, and thus, out of keeping with the programming, he acted as a "traditional" author. In the live broadcast, reference was made to these literary features (or one could almost say "human touches") of the first computer-generated texts in several ways. The first was through the co-authorship of the listeners, the second was the inclusion of terms which at that instant were being entered in a search engine, and the third was the literary production of the computer texts by a professional speaker reading off the screen and performing them as they were generated.

A real-time performance with a speaker seems to me crucial in the pursuit of authentic interactivity. To illustrate this, I would like to make one closing, brief digression.

Almost everyone has at some point experienced a significant difference between the way Usenet and mailing list subscribers behave online and the way they would behave if they were in similar exchanges with people in "real life."[41]

I would claim that the (linked) computer is not so much a machine that serves to establish dialogue with others as an apparatus that facilitates autistic monologues. In front of the screen, people communicate with themselves or products of their own imagination. The space in front of the computer is not Net space but a space filled with one's own projections and images. The fact that e-mail writing has less to do with letter writing than with holding imaginary dialogues explains, in my opinion, the

strong tendency for Usenet and mailing list subscribers to flame others. This includes even those who in "normal" life remain calm in discussions but who turn here very quickly to sharp, insulting responses. When I imagine angrily how I would give someone "a piece of my mind," and when I compare this with what I would probably say in a real conversation, then it is the uninhibited, aggressive internal monologue which corresponds to the e-mail.

fig. The actor Peter Gorges as the "human interface." RadioRevolten, Halle 2006 (photo: Florian Hartling)

If my supposition is correct, then how can the autistic attitude (and posture) of the computer user in front of the screen be transformed into one of participation?

I believe this can only happen by "humanizing" the interface. Authentic interaction can, in my opinion, only work if users experience an authentic presence on the other side.[42]

In *free lutz* and *search lutz!* I attempted to create this situation with a speaker. The speaker does not merely read off the text, but he performs it, interprets it and thus gives it meaning.

When the listener in this live play interacts through the computer and enters words, then the answer out of the radio does not come from an algorithm but from a human being.

Notes

1. Sabine Breitsameter, "Audiohyperspace – From Hoerspiel to Interactive Radio Art in the Digital Network," 2001, http://netzspannung.org/database/37545/de (accessed June 10, 2007).
2. Bertolt Brecht, *Gesammelte Werke*, vol. 18 (Frankfurt am Main, 1967), p. 129.
3. Johannes Auer, "worm applepie for doehl," http://auer.netzliteratur.net/worm/applepie.htm (accessed February 11, 2007).

4. Florian Cramer, "Wenn Schrift sich selbst ausführt: Über Codes und ihre Reflexion in Literatur und digitalen Künsten," http://www.netzliteratur.net/cramer/schrift_selbst_ausfuehrt.html (accessed February 11, 2007).

5. This code line is the book title of: *$wurm = ($apfel>0) ? 1 : 0; experimentelle literatur und internet. memoscript für reinhard döhl*, ed. Johannes Auer, edition cyberfiction (Zurich and Stuttgart, 2004).

6. Translator's note: here, there is a German play on *ist* = is and *isst* = eats.

7. Beat Suter and René Bauer, *appleinspace*, http://appleinspace.cyberfiction.ch (accessed February 12, 2007).

8. See http://www.kunstradio.at/2004B/07_11_04.html (accessed February 12, 2007).

9. Ö1 *Kunstradio*, *curated by*, http://www.kunstradio.at/PROJECTS/CURATED_BY/index.html (accessed February 12, 2007).

10. Ö1 *Kunstradio*, *.ran [real audio netliterature]*, curated by Johannes Auer, http://www.kunstradio.at/PROJECTS/CURATED_BY/ran/ (accessed February 12, 2007)

11. Benjamin Whooley, *New Media-Worlds* (London, 1992), p. 165.

12. Uwe Wirth, "Literatur im Internet. Oder. Wen kümmert's wer liest?" http://www.netzliteratur.net/wirth/litim.htm (accessed February 12, 2007).

13. Johannes Auer, "Text im Bild // Marcel Duchamp," in Reinhard Döhl and Johannes Auer, "Text – Bild – Screen // Netztext-Netzkunst," *Literatur in Westfalen*, vol. 8, *Beiträge zur Forschung*, ed. Walter Gödden (Bielefeld: Aisthesis-Verlag, 2006), p. 295ff.

14. Ben Fry, "genome valence," http://acg.media.mit.edu/people/fry/genomevalence/ (accessed February 12, 2007).

15. See http://www.kunstradio.at/2003B/07_09_03.html (accessed February 13, 2007).

16. See http://kunstradio.cyberfiction.ch (accessed February 13, 2007).

17. Translator's note: *Rauschen* refers both to the noise of static and a state of intoxication.

18. Ö1 *Kunstradio*, *Literatur als Radiokunst*, http://www.kunstradio.at/PROJECTS/LITERATURE (accessed February 17, 2007).

19. Ö1 *Kunstradio*, *Familie Auer*, http://kunstradio.at/AUER (accessed February 17, 2007).

20. See http://kunstradio.at/AUER/auer_info.html (accessed February 17, 2000).

21. See http://www.kunstradio.at/2005A/30_01_05.html (accessed February 13, 2007).

22. An MP3 and a video of this performance can be found at http://www.epidemic.ws/dina_en.html (accessed February 13, 2007).

23. Broadcast by Ö1 *Kunstradio* on February 20, 2005, http://www.kunstradio.at/2005A/20_02_05.html (accessed February 13, 2007).

24. This may be largely because Franco Berardi Bifo spent a lot of time on Schwitters's sound poetry in preparation for his own performance, as Florian Cramer mentioned in a conversation we had. This supports rather than disproves my claim that program code is well-suited for interesting experiments in the tradition of sound poetry.

25. The partiture of Schwitters's *Die Ursonate* (*The Primal Sonata*) is, in a non-technical sense, also a "code to be executed" in a performance.

26. Sabine Breitsameter, "Die Apparatur hinterfragen: Telekommunikationskunst im Radio," http://netzspannung.org/cat/servlet/CatServlet/$files/272719/breitsameter.pdf (accessed February 17, 2007).

27. I was not aware in 2003 of the parallels to Hans Fleschs's *Zauberei*.

28. See here Reinhard Döhl, "Zu Richard Hughes' 'Danger,'" http://www.uni-stuttgart.de/ndl1/hspl_hughes.htm (accessed February 17, 2007).

29. Sylvia Egger, for example, followed "*DADAspuren im Netz*" ("DADAtracks on the Net") before the broadcast (*.ran3 – DADA TO GO. a walkthrough (levels)*), and the noise of the search engine terms in *.ran1* was recorded before the broadcast and collaged with other material. Heiko Idensens *Hoerhypertext* in *.ran4* was an auditive collage and thus a simulation of a hypertext reading.

30. Georges Perec, *Die Maschine*, first broadcast by SR (Saarland Radio) and WDR (West German Radio), November 13, 1968.

31. "Copy and paste," a basic operation in handling computer data.

32. Sabine Breitsameter (see note 1).

33. See Sabine Breitsameter (see note 24).

34. Ö1 *Kunstradio*, *Familie Auer. Familienausflug I* (broadcast on March 21, 1996) and *Familienausflug II* (broadcast on March 28, 1996), by Renate Pliem and Reinhard Köberl.

35. Quoted after Sabine Breitsameter, "unterhaltungen im internet. hörspiel als interaktion. ein radiophoner essay," in Auer 2004 (see note 5), p. 34.

36. Ibid. (see note 5), pp. 33–34.

37. *free lutz*, broadcast by *Radio_Copernicus*, Wrocław, December 8, 2005, http://radio-c.zkm.de/radio-copernicus.org (accessed February 19, 2007) and http://copernicus.netzliteratur.net (accessed February 19, 2007).

38. *search lutz!*, broadcast by *Radio Corax* as part of the festival RadioRevolten, Halle, September 30, 2006, http://www.radiorevolten.radiocorax.de/cms/index.php (accessed February 19, 2007) and http://halle.netzliteratur.net (accessed February 19, 2007).

39. Theo Lutz, "Stochastische Texte," *augenblick* 4, no.1 (1959), p. 3–9, http://www.stuttgarter-schule.de/lutz_schule.htm (accessed February 19, 2007).

40. The live search by "Fireball" and other search engines displays the stream of terms as they are entered by users in the search engines. See http://www.fireball.de/livesuche (accessed February 19, 2007).

41. "It is possible to ignore the fact that a person is behind the texts on the screen, whereas one is automatically aware that one is talking to a person in FTF communication. In this respect, the threshold for insulting someone seriously is lower. It is no wonder that in Netiquette users are admonished not to forget "that there is a person on the other side of the screen with whom they are interacting." From Gloria Dabiri and Dörte Helten, "Psychologie & Internet," http://userpage.fu-berlin.de/~chlor/werk.pdf (accessed February 19, 2007).

42. And definitely not through the ELIZA principle, whereby a program within the limits of its algorithm is able to reactly so skillfully that its answers fulfill the projected expectation of the "dialogue partner."