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### A Brief History of Combinatory, Hypertextual and Collaborative Literature from the Baroque Period to the Present<sup>1</sup>

#### **Abstract:**

Literature in computer-based media cannot be contemplated without a long literary tradition. This article aims at substantiating this assumption with numerous examples of combinatory, hypertextual and collaborative texts from German literary history since baroque times. Therewith it provides us with a historical basis in order to work out the common features and differences that with computers have entered literary texts.

Espen Aarseth and his followers have repeatedly pointed out and proved with many examples that their theories of “cybertext” and “ergodic literature” are focused on the mechanical organization of text and on the actions of users/readers on a broad and general level; they are not limited to texts in computer-based media. Although the computer, which strictly separates storage devices from interfaces may be the best-suited medium for “net literature,” “ergodic literature,” “digital literature”—regardless which term is to be preferred<sup>2</sup>—it may be rewarding to have a closer look at the long pre-history of “net literature” in non-computer-based media, especially in print media.

In modern literatures, it most notably was the international (though predominantly French) Oulipo group (the acronym is an abbreviation of *Ouvroir de la Littérature Potentielle*, in English: *Workshop of Potential Literature*) whose members tied in with the long tradition of combinatory literature. Raymond Queneau, the creator of the famous sonnet-machine *Cent mille milliards de poèmes* [*One Hundred Million Million Poems*] (1961), explicitly regarded the constraints imposed by combinatory procedures as catalysts of writers’ creativity. The Oulipians were dealing with combinatory procedures in a twofold way: On the one hand, they investigated and reinvigorated poetic possibilities from the past (“anoulipism”); they even ironically qualified their predecessors from the Ancient world and the Baroque era as “plagiarism by anticipation” (Motte 31). On the other hand, they aimed at developing additional possibilities which were unknown to their predecessors and which were to be based on latest scientific findings and technological novelties (“synoulipism”).

As my focus in this article is on German literature, the paramount importance of Oulipo cannot adequately be considered here. But I will certainly come across many of their predecessors in German literature and thus keep up with Oulipo's analytic tendency. For this purpose, I will focus mainly on three tendencies for characterizing and classifying those many literary texts and procedures in which recursive processes can be identified.

First, current text generators can be traced back to previous forms of *combinatory literature*. In the German-speaking part of Europe numerous writers since the Baroque era were experimenting with literary forms that did not only consider a literary text a symbolic expression of a person's subjectivity but also considered a text as determined by the level of programming and processing of signs. On the one hand this is reflected in the tradition of word games such as anagrams, palindromes or proteus verses, on the other hand it is presented in mechanical text-generating machines.

Secondly, *hyperfictions*, too, are not necessarily dependent on computers: If the basic idea of hyperfictions is letting the reader determine how he traverses the text by choosing from different story threads, then this is possible in all storage media in which texts can be divided into segments which are connected to each other by hyperlinks. Readers have the choice between multiple links and thus need to make decisions during the reading process.

It goes without saying that man-man communication has always been possible prior to the installation of computer networks. It thus may be sufficient to point at two tendencies of *collaborative writing* rather sketchily. Collaborative texts have always been produced on site, e.g. in literary salons or writers' groups. However, it was not until the implementation of postal systems and of technological transmission media that long-distance collaborations were to become possible, ranging from varying writers' correspondences to Mail Art or Correspondence Art projects of the 1960s and 70s, from telephone and fax performances to simultaneous communication via computer networks.

## Poetics and Literary Games: The History of Combinatory Literature

It is quite evident that literature has not only been confronted with the challenge of interactivity since modern computers were invented, but also that a "permanent mutability" of signifiers is a fundamental feature of *all* creative processes, which do not aim at permanent storage of strings. It is certainly true that mechanical text generators are not computers in a strict sense as they are neither able

to convert analog signals into universal machine codes nor do they operate as fast as modern digital computers.

However, there have been some similarities between these machines as the algorithmic processing of “literary” signs has already been possible prior to the invention of digital computers. From the Kabbalah to Ramon Lull’s *Ars magna generalis ultima* (1305-08), from Athanasius Kircher’s famous *Ars magna sciendi* (1669) and Gottfried Wilhelm Leibniz’s *Dissertatio de arte combinatoria* (1666) to Queneau’s *Cent mille milliards de poèmes*, and finally to computer-based text generators there have been lots of examples, which can be traced back to three fundamental features. Firstly, there is a compact source code from which an abundance of texts can be generated. Secondly, this generation of texts requires that the processes of word and sentence formation be reproduced in a sort of micro-grammar. Finally, algorithmic procedures are used for processing linguistic signs (Cramer 245).

Any reconstruction of this tradition in German literature has to begin in the Baroque period when writers like Georg Philipp Harsdörffer, Philipp von Zesen and Justus Georg Schottelius worked out a poetic theory in the tradition of Ancient paradigms. They did not consider the successful work of art as an achievement of creative genius but insisted upon the teachability and learnability of poetic methods and procedures. Harsdörffer claims: “Ob nun wol etliche zu wolermeldter Kunst geboren / so ist doch die Kunst nicht mit ihnen geboren; sondern muß erlernet werden / wie alles / was wir Menschen wissen wollen” (“Even though quite a few persons are born to create respectable art, this art is not born with them; it has to be learned, as everything that humans want to know”) (*Poetischer Trichter* 2).

These two aspects of combinatorics in the Baroque era had a strong impact on a variety of games in poetry such as anagrams or proteus verses and eventually led to the implementation of combinatorial procedures in mechanical text and poetry generators. According to the linguistic universalism represented by Leibniz and others, the whole world is considered a closed system, an order of things that can be algorithmically produced and varied from a preexisting and limited set of elements. This applies both to cosmic elements from which God was believed to have created the world and to the elements of language. According to this theory, any divine acting is regarded inaccessible while language cannot represent the given order of things as congruently. Thus both Baroque linguists and poets expected to draw conclusions about hidden organizational and creative principles either from investigations of rules of word and sentence formation or from implementation of mechanical principles into their poetic production. Of course, all these metaphysical premises were to get lost due to the technological execution of combinatorial

procedures. The basic principles of theories of order, however, had not been abandoned. It is according to the logic of combining that so-called “blind” words can be generated from the lexical elements. These words have no meaning but are only legitimate because they have been formed according to word formation rules. Schottelius—and this is the missing link to literature—to a good part aims at “die Deutsche Sprache aus der Deutschen Sprache ferner zuerheben” (‘lifting the German language far away from the German language’) (Schottelius 98). Baroque literature, this is to be kept in mind, is very much based on playful linguistic practices. But this does not mean that at the core of such games lies the imagination and creativity of a writer. There rather are hidden mechanisms at work in mannerist experiments: “Ob nun wol der Poet bemühet ist neue Erfindungen an das Liecht zu bringe / so kann er doch nichts finden / dessen Gleichheit nicht zuvor gewesen / oder noch auf der Welt wäre” (‘Even if the poet aims at bringing new inventions to light, he can find nothing the likes of which had not been already or still is in the world’ (Harsdörffer, *Poetischer Trichter* 8).

### **Rules and Constraints: Anagrams, Proteus Verses and Other Literary Games**

The extensive works of Georg Philipp Harsdörffer may serve as an example for demonstrating how countless examples of rule-governed text production derive from the reflection of language. Harsdörffer explicitly acted on the assumption that the subject matters of literature are not only to be found in the real world but also in language itself:

Die Erfindung wird entweder herbeigeführet *von dem Wort* / oder *von dem Dinge* selbsten / darvon man handelt / oder von den Umständen desselben / oder von gehörigen *Gleichnissen*. Erstlich das *Wort* giebet eine Erfindung entweder in seinem angebornen Laut / unbekannter Deutung / oder mit versetzte *Buchstaben* / wann solche eine gantze Meinung schliessen / . . . (Poetischer Trichter 10)

The invention is either brought about *through the word*, or *by the thing* itself of which one is talking, or from the circumstances or adequate *similarities*. It is the *word* in the first place that gives to an invention its innate sound of unknown meaning or with mixed-up *letters* if they include a whole opinion. . . .

Many samples can be found in Harsdörffer's eight-volume *Frauenzimmer-Gesprächsspiele* (1641-49), a collection of parlor games framed by a rather simple story: Six interlocutors, three women and three men, get together in a mansion to talk about social, scientific and poetic matters—and for just having a chat. Above all, however, they are setting each other riddles or other exercises and engage in literary games. These games are an integral part of the *inventio* prior to the real creative act. As exercises, their main function is to make the words available to the poet and thus to stimulate his imagination.

The *anagram* is certainly the best-known genre of such a literary game. It is a word game that is based on an interplay of two levels of text that, according to Aarseth, could be called “scriptons”—defined as strings as they appear to readers on some material surface—and “textons,” which are “strings as they exist in the text” (Aarseth 62): A word or a complete phrase is made by transposing the letters of another word or phrase. At first, the connection between a signifier and a signified is dissolved, then the signifiers are rearranged—and only finally semantics comes into play because signifieds (and referents) need to be found for the newly established strings of signs. Hence the anagram is a comparatively simple example of the indeterminate transformation of cohesive structures into semantically coherent statements.

For centuries, the anagram has very often been discredited as baublery or magical practice. But there have also been periods every now and then in which it was quite popular: In German Baroque it was used as a creativity-stimulating parlor game at first, before anagrams were eventually incorporated into literary texts. For Harsdörffer, the anagram or “Letterkeer” (lettertwist) was a technique of poetic invention because “so kan man die Buchstaben versetzen und eine andere Meinung heraus bringen” (‘like this one can move letters and bring forth a different view’) (*Poetischer Trichter* 17). The anagrammatic method is only due to the reordering of letters, without any references to the real world. Hence the Baroque treatises contain a variety of instructions, which make obvious the causal connection between permuting letters and mechanical devices. In his *Heilikon*, Philipp von Zesen e.g. gives recommendations to facilitate writing anagrams by using cardboard letters (Zesen 174). Considerations on which means and tools are best suited for producing anagrams have not only been made in the Baroque era. Oskar Pastior—the only German member of Oulipo and certainly the best-known contemporary anagram writer—recommends various methods and exercises with subtle irony:

Es gibt Hilfsmittel (Karton, Schere, Blockbuchstaben). Es gibt herrliche Vor- und Begleitübungen: Puzzles (besonders die schwedischen, handgesägten), Zeitunglesen und Fernsehen (Legasthenietraining), ei-

nige gute Autoren, bewußtes Gehen mit beiden Füßen (hintereinander) auf dem Kies, Schüttelreime, komplizierte Stundenpläne oder gewisse Atem- und Abzähltechniken. Und es gibt die Strategie ‘Steht der Tropfen, höhlt der Stein.’ . . . Eine Menge Tüftelei also, der Autor konnte fast verschwinden. . . . (Pastior, *Anagrammgedichte* 82f.)

There are aids (carton, scissors, block-letter). There are wonderful practices and dummy runs: puzzles (especially the Swedish ones that are hand-made), reading the paper and watching TV (training legasthenics), some good authors, consciously walking with both feet (one after the other) on gravel, spoonerism, difficult timetables or specific techniques of breathing or counting. And there is the strategy “Drip standing stone hollowing” [Pastior here invents a word game in German with the saying “steady dripping hollows stone”]. . . . Real brainteasers, the author was virtually to disappear. . . .

*The author was virtually to disappear:* This assertion, which encouraged Pastior to re-explore the possibilities of the anagram in 1985, is similar to statements from poets and poeticians of the Enlightenment—although their conclusions were diametrically opposed to Pastior’s. As from the age of Enlightenment, the Baroque *ars combinatoria* was largely discredited. Instead, creativity and spontaneity became the paradigms of literary theory. The scriptural logic of letters was replaced by the phonocentrism of the Goethe era, and the anagram and other forms of combinatory poetry were discredited as baubleries (“Kindereyen”) by poets and philosophers such as Johann Christoph Adelung (518).

The anagram was only rediscovered by various 20<sup>th</sup> century avant-garde movements. Whereas the popularity of the anagram in the Baroque era was due to the prospect that the secret order of things may be discovered by permuting signifiers, its modern renaissance is due to the expectation of getting access to the unconscious by the play of letters. The artist Hans Bellmer e.g. relates his breaking up and rearranging of the female body of his famous sculptural construction *The Doll* to the anagrammatic practice of language:

Sie ist aus Division, Subtraktion und Multiplikation, aber auch aus jener Vertauschbarkeit geboren, die von den Mathematikern “Permutation,” von den Philologen “Anagramm” genannt wird, und deren Bedeutung auf folgendes hinauslief: Der Körper, er gleicht einem Satz,—, der uns einzuladen scheint, ihn bis in seine Buchstaben zu zergliedern, damit sich in einer endlosen Reihe von Anagrammen aufs neue fügt, was er in Wahrheit enthält. (Bellmer 95)

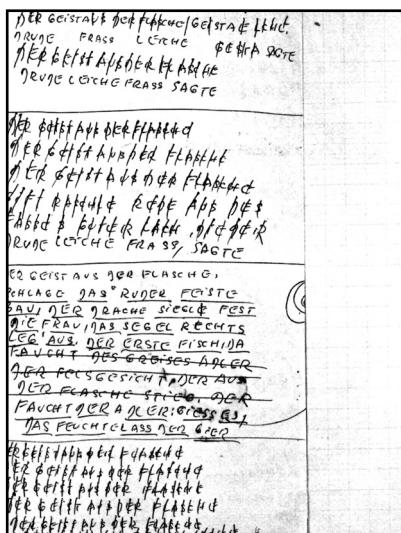


Fig. 1. Facsimile from Unica Zürn's notebook.

She has been born from division, subtraction and multiplication but also from this permutability, which mathematicians call “permutation” and philologists call “anagram,” and whose meaning adds up to the following: The body, it resembles a sentence inviting us to break it up into its constituent letters, so that these again connect with what they contain in an endless array of anagrams.

Unica Zürn, the longstanding partner and lover of Bellmer, is considered to be the most important anagram writer of German post-war literature. From 1953 to 1964, she wrote as many as 123 anagram poems without using cardboards or other devices; she only worked on paper, as can be seen from her “Der Geist aus der Flasche (IV) (“The Spirit from the Bottle [IV]” (1960). First, she wrote down the first line from which she then crossed out the letters of the emerging words. She repeated this process until she succeeded in writing a new line (fig. 1):

Schlage das Ruder, feiste  
 Sau. Der Drache sieg'l fest  
 Die Frau, das Segel rechts  
 Leg' aus. Der erste Fisch! Da  
 Faucht der Adler: giess' es,  
 das Feuchte lass der Gier. (Zürn 86)

In the 1980s, German literature saw a sort of boom of the anagram initiated by writers such as Oskar Pastior (*Anagrammgedichte*, 1985) or Elfriede Czurda (*Fälschungen*, 1987). Following the Oulipo theories, Pastior considers his texts test arrangements in which he applies both self-invented rules and models from the history of literatures. He describes his basic principle as “Aufknacken von Wörtern und Wendungen in Bedeutungsklumpen von unbestimmter mittlerer Größe (sozusagen ein molekulares Cracking) und dann Zusammenfügen in irgendwo stupenden, aber exotisch einleuchtenden neuen semantischen Verbindungen” (‘cracking of words and phrases into chunks of meaning of undefined size (a molecular cracking so to speak) and then joining them together in somehow startling but in their exotic way convincing new semantic connections’) (*Das Unding an sich* 40).

He regards his anagrams as a “permutative und viel engmaschigere Buchstabenalchemie (also ein inframolekulares Cracking)” (‘permutative and very strictly meshed alchemy of letters (a sort of inframolecular cracking)’) (*Das Unding an sich* 40). Hence the anagram was well suited as a “super-metaphor” for the processing of literature, for “etwas, das nicht still steht und nicht weitergeht” (‘something that neither stops nor continues’) (*Anagrammgedichte* 9). In his *Anagrammgedichte* (1985), he took the titles of calendar stories from the table of contents of an edition of Johann Peter Hebel’s complete works as first lines of his anagrams:

Unverhofftes Wiedersehen  
 Sehr oft wird Vene, ehe es fundiert, frueh von Wehes Senfe  
 in des Heftes Heu verworfen.  
 Es fuehrt es Hefe-Vorwinden  
 sehr diffuse vor. Wen Teehene  
 vorsieht, der fuenf Seh-  
 westen oder Hufweisen fehver-  
 weist. Von Fehes Duerfen her  
 verseift Fernsehen, wo due-  
 ster Huf es feindverwoehne.  
 Huste, Revers—nen Wiedehoff! (45)

*Proteus verses*—named after the Greek sea-God who could change his shape at will—vary the elements of a verse in any combination. Only the positions of the first and last words of each line are unchangeable, so that a multitude of verses can be generated by permuting the elements either in horizontal or in vertical direction. In Germany, proteus verses were only known as from the

Baroque period when they were discussed in any major poetic book. In 1657, Stanislaus Mink von Weinsheun—a (slightly incorrect) anagrammatic pseudonym of Johann Justus Winkelmann—published an entire book under the title *Proteus. Das ist: Eine unglaubliche Lutznützliche Lehrart / in kurzer Zeit ohne Müh Deutsch= und Lateinische Vers zumachen / auch einen Französischen und Lateinischen Brief zu schreiben* (“Proteus. This is an Unbelievably Useful Way of Teaching How to Rhyme Verses in German and Latin in a Short Time and Without Troubles and Even Writing French and Latin Letters”), which was entirely dedicated to the proteus verse and to permutation of language.

In his *Poetischer Trichter*, Harsdörffer gives the following definition of the proteus verse or “Wechselsatz”:

Diese Reimart könnte man einen Wechselsatz nennen: dann wann man die ersten Wort (auf folgt) und die letzten zwey (Fleiß und Preis) unverändert auf solcher Stelle behält / können die andern Wörter 39916800 / das ist / neun und dreissig tausendmaltausend / neuhundert und sechzehntausend / und achthundert mal versetzt werden / zu welcher Veränderung der allfertigste Schreiber / der täglich 1200 Zeile abschriebe / gantze 91 Jahre / und 49 Tage würde haben müssen: wolte man aber die Reimwort Fleiß / Preis / auch versetzen / und Krieg und Sieg darfür gebrauchen / so kan man noch etlich tausendmal öffter wechseln.  
(*Poetischer Trichter* 51f.)

One could call this way of creating poetry a jumble-sentence: if you keep the first words and the last two unchanged in the same place, the other words could be mixed up 39,916,800, that is thirty-nine thousand times one thousand nine hundred and sixteen thousand and eight hundred times changed, for which change the most learned writer who would write 1,200 lines daily would need 91 years and 49 days. But if one would also mix up the rhymes *Fleiß* (“diligence”) and *Preis* (“price”) and use *Krieg* (“war”) and *Sieg* (“victory”) instead one can mix up words several thousand times more.

For Quirinus Kuhlmann, the proteus verse has the function to illustrate the volatility of being. In his *Geschicht-Herold* (1672), he argues that all human abilities were “poured” from divine wisdom and that both heaven and earth are operating like a “changing wheel”: “der Allmächtige Himmels- und Erdenschöpfer hat Himmel und Erden wi ein wechselrad eingerichtet / die Geschöpfe stat der wechselwörter genommen: Alle Weltinge wechseln / alle liben / alle hassen” (“The almighty creator of heaven and earth has created heaven and earth like

a changing-wheel and used beings instead of the change-words. All things on earth change; all love, all hate') (qtd. in Neubauer 32).

If it was the case that “di Natur anagrammatisret und buchstabenwechselt” (‘nature anagrammatizes’), this must be reflected in language, too. Kuhlmann wrote the best-known proteus of the Baroque period, “XLI. Libes-kuß: ‘Der Wechsel Menschlicher Sachen’ (“41<sup>st</sup> kiss of love: ‘The change of human matters’”) (1671):

*Auf* Nacht / Dunst / Schlacht / Frost / Wind / See / Hitz / Süd / Ost /  
West/ Nord / Sonn / Feur / und *Plagen* /  
*Folgt* Tag / Glantz / Blutt / Schnee / Still / Land /Blitz / Wärmd / Hitz /  
Lust/ Kält / Licht / Brand / und *Noth*:  
*Auf* Leid / Pein / Schmach / Angst / Krig / Ach / Kreutz / Streit / Hohn /  
Schmertz / Qual / Tükk / Schimpf / als *Spott* /  
*Wil* Freud / Zir / Ehr / Trost / Sig / Rath / Nutz / Frid / Lohn / Schertz /  
Ruh / Glückk / Glimpf / stets *tagen*.  
*Der* Mond / Glunst / Rauch / Gems / Fisch / Gold / Perl / Baum / Flamm /  
Storch / Frosch / Lamm / Ochs und Magen  
*Libt* Schein / Stroh / Dampf / Berg / Flutt / Glut / Schaum / Frucht /  
Asch/ Dach / Teich / feld / Wiß / und Brod:  
*Der* Schütz / mensch / Fleiß / Müh / Kunst / Spil / Schiff / Mund /  
Printz / Rach / Sorg / Geitz / Treu / und *GOtt* /  
*Suchts* Zil / Schlaff / Preiß / Lob / Gunst / Zank / Ort / Kuß / Thron /  
Mord/ Sarg / Geld / Hold / *Danksagen*  
*Was* Gutt / stark / schwer / recht / lang / groß / weiß / eins / ja / Lufft /  
Feur/ hoch / weit / *genennt* /  
*Pflegt* Böß / schwach / leicht / krum / breit / klein / schwartz / drei /  
Nein / Erd / Flutt / tiff / nah / *zumeiden* /  
*Auch* Mutt / lib / klug / Witz / Geist / Seel / Freund / Lust / Zir / Ruhm /  
Frid / Schertz / Lob *muß scheiden* /  
*Wo* Furcht / Haß / Trug / Wein / Fleisch / Leib / Feind / Weh /  
Schmach / Angst / Streit / Schmach / Angst / Streit / Schmertz /  
Hohn *schon rennt*  
*Alles wechselt; alles libet; alles scheinet was zu hassen:*  
*Wer nur disem nach wird-denken / muß di Menschen Weißheit fassen.*  
(*Himmlische Libes-küsse* 54f.)

The *sestina*, a poem composed of six stanzas of six lines each with a half-stanza of three lines at the end, was invented by troubadour poets in Italy and Provence. It has only six rhyming words at the end of the lines, which change according to a strict rhythm from stanza to stanza: 123456 / 715243 / 364125 / 532614 / 451362 / 246531 / 123.

In German literature, the sestina was not cultivated before the 17<sup>th</sup> century. There are some sestinas in the works of the usual “suspects” from the Baroque era such as Schottelius, Zesen, Harsdörffer, Kuhlmann, Martin Opitz or Georg Rudolf Weckherlin. Throughout the 18<sup>th</sup> century, it was rather disregarded. It was not until the Romanticist period that August Wilhelm Schlegel drew the attention to the sestina in his critical writings. This impulse was then taken up by poets such as August Wilhelm Iffland, Wilhelm von Schütz, Ludwig Uhland and Joseph von Eichendorff.

In contemporary literature, it was Oskar Pastior again who rediscovered the genre when he published a book of 34 sestinas under the title *Eine kleine Kunstmashine* (1994). For the Oulipian Pastior, the sestina guarantees the “text-generative Potenz zusätzlicher Einschränkungen” (“text-generating power of additional constraints”) (*Eine kleine Kunstmashine* 81). This is what brings him to programmatically entitling his book a *Kunstmashine* (“art machine”):

Der Gedanke, wie er sich erwähnt, reimwortläufig, in dem vertrackten Rhythmus mit dem transitorischen Moment von 123456 zu 615243. Um so “in aufbrechender Umarmung” zu “denken,” hat die Sestine permanent ihr genetisches Kürzel “im Kopf,” eben diese Fähigkeit, wie ich nach einiger Erfahrung mit ihr denke, in ständig verschobenen Rückversicherungs- und prospektiven Falsifikationsschläufen sich herzustellen. (Pastior, *Das Unding an sich* 81f.)

The thought, as it appears in the course of rhymes, in the intricate rhythm with the transitory moment of 123456 to 615243. The sestina, to “think” like this in a “breaking embrace,” it permanently is aware of its genetic grammaticalogue, its ability (as I think of it after some experience with it) to create itself in constantly slanting loops of reassurance and prospective falsifications.

Pastior even escalates and subverts the sestina paradigm by multiplying its constraints with those of other genres. In his “sestine mit diabetes” for instance, he combines the sestina with the anagram (*Eine kleine Kunstmashine* 40f.), and in “heureka mit euter am pneu,” he only uses two vowels per line (42f.).<sup>3</sup>

Dadaists as well as Surrealists referred back to aleatoric conceptions. But in general, they preferred “automatic” and improvising methods to combinatory ones. Tristan Tzara’s famous recipe for composing a Dadaist poem does not define any specific collection of words but only describes a method for processing any data whatsoever (*Oeuvres completes* 382). Hans Arp’s creative approach is even less determined as can be seen from a pivotal statement on “automatic” writing in his essay “Wegweiser”:

Viele Gedichte aus der “Wolkenpumpe” sind automatischen Gedichten verwandt. Sie sind wie die surrealistischen automatischen Gedichte unmittelbar niedergeschrieben, ohne Überlegung oder Überarbeitung. Dialektbildung, altertümelnde Klänge, Jahrmarktslatein, verwirrende Onomatopoesien und Wortspasmen sind in diesen Gedichten besonders auffallend. Die “Wolkenpumpen” aber sind nicht nur automatische Gedichte, sondern schon Vorläufer meiner “papiers déchirés,” meiner “Zerreißbilder,” in denen die “Wirklichkeit” und der “Zufall” ungehemmt sich entwickeln können. Das Wesen von Leben und Vergehen ist durch das Zerreissen des Papiers oder der Zeichnung in das Bild einbezogen. (*Wortträume und schwarze Sterne* 7)

Many poems in *die wolkenpumpe* (“the cloudpump”) are related to automatic poems. They were written down, like the Surrealistic automatic poems, immediately without thought or revision. Dialectal constructions, outmoded sounds, Vulgar Latin, confusing onomatopoetic words and verbal spasms are particularly noticeable in these poems. The “cloud pumps” are, however, not only automatic poems, but already anticipate my “papiers déchirés,” my “torn pictures,” in which “reality” and “chance” can be developed uninhibitedly. The essence of life and decay is incorporated into the picture by tearing up the paper or drawing. (Qtd. in Döhl, “Hans Arp and Zurich Dada” 118; my revisions)

Arp addresses one of the core problems of any concept of automatic writing here. In all his texts and artworks, the “laws of chance” can only unfold within the frame defined by both the author’s preconception and the specific peculiarities of the material. It is not surprising that he took many words and phrases from daily newspapers, particularly from the advertisement sections and “schlang und flocht leicht und improvisierend Wörter und Sätze um die aus der Zeitung gewählten Wörter und Sätze” (*Wortträume und schwarze Sterne* 46) (“interwove the words and sentences selected from the newspapers with freely improvised words and sentences of my own”) (qtd. in Döhl, “Hans Arp

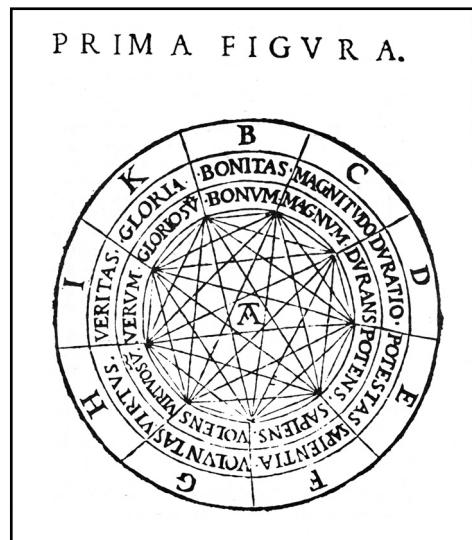


Fig. 2. Ramon Lull's *Ars magna generalis ultima*.

and Zurich Dada" 117). Unlike the Futurists, Cubists and Berlin Dadaists, Arp never pasted press clippings as pictorial representations into his pictures. For him, newspapers rather provided a habitual vocabulary whose transitory character fit well into his poetics of permanent change.

### Combinatory Machines and Text Generators

The rather simple principle of generating an abundance of signs from a limited repertoire is the basic idea of various mechanical devices, which have been constructed in the course of the last centuries for the generation of texts. I already cited some very simple means of mechanizing the literary invention by using cardboard plates or other tools and media. The combination of these plates remains completely up to the user. However, there have been many more sophisticated mechanisms and machines for facilitating literary production by combining words or attributes selected from a number of lists. The prototype of such logic machines was the *Ars magna* devised by the Catalan monk Ramon Lull. Lull's machine consists of a stack of three concentric disks mounted on an axis where they are able to rotate independently (fig. 2). The disks were progressively larger from top to bottom. Nine fundamental terms, the so-called "principia absoluta" which comprise the main topics of scholastic philosophy,

were related to the letters from A to K. By rotating the disks, a large number of random statements could be generated from the alignment of words. This mechanism generates “scriptons” which can be read as soon as the rotating disks with “textons” on them come to a complete standstill. At a random point in time, it results in an artifact that could not be predicted in advance. It is, of course, still up to the user—as Aarseth’s triad of text/machine, collected words and user indicates (Aarseth 62)—to interpret the resulting strings of signifiers.

The *Ars magna sciendi*, Athanasius Kircher’s adaptation and elaboration of Lull’s *Ars magna*, illustrates a common tendency of the Baroque era: In addition to books, alternative *Aufschreibesysteme* (“systems of notation”) (Kittler) appear that are storage media of traditional knowledge *and* generators of new knowledge at the same time. Neither the storing nor the production of knowledge, however, is ascribed to an author, and the knowledge is not written or printed in syntagmatic chains but machines are designed, which generate the knowledge from a compact source code by combinatorial procedures.

Therefore Harsdörffer implemented the methods of generating stem words and word formation rules in his *Fünffacher Denckring der Teutschen Sprache* (1651) (fig. 3), and Quirinus Kuhlmann, too, came up with the idea of a changing wheel (but, unfortunately, without giving any details, cf. Neubauer 33ff.).

These word-generating machines are the missing link between the *langue* of the German language and Lull’s *ars combinatoria*.

Harsdörffer claims that his machine is able to mechanically reproduce all possibilities of German without having to compile voluminous dictionaries. The *Denckring* consists of five rotating disks, which the user must cut out from the book at first: “Dieses Blätein muß heraus geschnidten / in fünff Ringe zertheilet / und auf fünff gleich-grosse Scheiben von Papyr / also aufeinander gehefftet werden / daß man jeden Ring absonderlich umbdrehen kan / wann solchs geschehen / muß man dises fünffache Blat wider hinein pappen” (“This leaflet has to be cut out, parted into five disks and fastened onto five equal leafs of paper so that each disk can be turned around separately and when this has happened one has to glue that five-fold leaf back in”) (qtd. in Hundt 283).

On the inner disk, there are 49 prefixes followed by 60 initial letters, 12 medial and 120 final letters as well as 24 suffixes. Aarseth would call these elements “textons” from which millions of different “scriptons” can be generated. It is a specific feature of Harsdörffer’s machine that by setting the storage itself in motion it simultaneously turns out to be a generator. The linear reading process is transformed into a rotating mechanism. The user has to start the mechanism, and he can either stop the rotating disks or just wait until they come to a complete standstill. From the point of view of production aesthetics, the

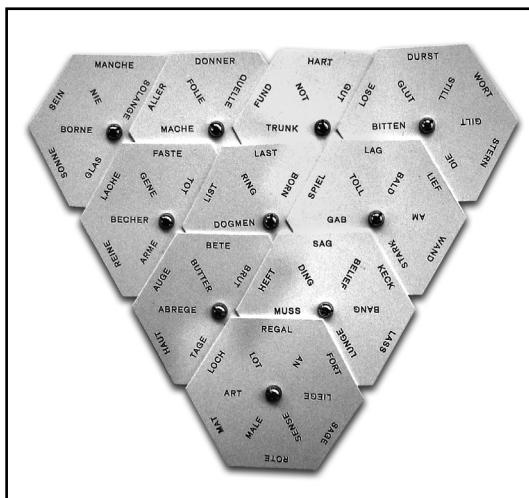


Fig. 3. Georg Philipp Harsdörffer's *Fünffacher Denckring der Teutschen Sprache* (1651).

outcome of such a machine-based combinatorics cannot substantiate any concept of artistic originality, and from the point of view of reader-response theories, we are confronted with a reader who can only interpret transitory strings of signifiers. Thus Harsdöffer did not only use his *Denckring* for representing all possibilities of word formation but he also considered it a useful tool of literary writing:

Ist also dieses eine unfehlbare Richtigkeit / ein vollständiges Teutsches Wörterbuch zu verfassen / und beharren wir in der Meinung / daß alle solchen zusammen gesetzte Wörter / welche ihre Deutung würcken für gut Teutsch zulässig / sonderlich in den Gedichten / ob sie gleich sonst nicht gebräuchlich / . . . (Deliciae mathematicae et physicae 518)

This word-generating procedure then is completely accurate in creating a complete German Dictionary and we retain our opinion that all these composite words should be allowed as good German, especially in poems, even though they might not be used otherwise.

Fig. 4. André Thomkins: *dogma-mot* (1965).

This is Harsdörffer's solution of the problem of the non-semantic "blind" words. He thus resolves the problem that his machine inevitably generates words, which make no sense in the German language by declaring the outcome of his *Denckring* to be the proper language. This is the poetic potential of the machine; it becomes a generator of poetic invention or a mobile rhyming dictionary "Erfindung der Reimwörter / wann man die Reimsilben auf dem dritten und vierten Ring suchet / und die Reimbuchstaben auf dem zweyten Ring darzu drehet" ("for inventing rhymes by looking for the rhyming syllables on the third or fourth disk and then turning the second disk to add the rhyming letters") (*Deliciae mathematicae et physicae* 518).

Text generators based on rotating disks, however, are no peculiarity of the Baroque era but there also have been some interesting examples in recent times, e.g. in the Fluxus movement. André Thomkins produced his polyglot machine *dogma-mot* (1965), which allows the user to produce "mobile dogmas" (fig. 4). This machine consists of ten hexagonal cards, each with 12 words that are common in each of the three languages German, English and French (there are 48 German-French, 60 German-English and 12 German-French-English words). The hexagons pivot on a plane and form phrases in three directions on the hexagonal roof. They can even be arranged differently on the ten slots, so that the number of combinations can further increase. Thomkins gives an instructive German-English example on the blurb of his Fluxus Box:

WORT HAT BALD SENSE  
*ein engländer liest:*  
 wurzel hut kahler sinn  
 (eierkopf, haargenau)

*a german reads:*  
 word has soon scythe  
 (words mutual short-cut) (*dogma-mot*)

Other writers and artists also worked with rotating disks or other moving media: Ferdinand Kriwet wrote many of his texts on disks, among them are three-disk-texts whose disks overlap and thus make combinations of elements possible. Dieter Roth produced so-called *Leserollen* (“reading rolls”)—paper webs with abstract ornamental patterns—for the *Apparat zum Simultanlesen* (“Apparatus for simultaneous reading”). This machine was invented by his fellow-artists Daniel Spoerri and Jean Tinguely and consists of a rotating rod driven by an engine. On this rotating rod, paper webs can be fixed from which readers can simultaneously read varying texts.

Besides his rotating disks, Harsdörffer designed further mechanisms of word formation: He suggested inscribing the letters of the German alphabet in the dice. If the user throws two dice, he can create syllables. This method can be extended by using additional dice. If we apply a thematic approach to the history of literature, we also find at least one very prominent example of a mechanical apparatus for the production of texts which consists of revolvable wooden dice: the famous machine of the Grand Academy of Lagado in Jonathan Swift’s *Gulliver’s Travels* (1726).

Although none of the following examples can keep up with the fame of Swift’s novel, there have been some writers who experimented with dice. Max Bense generated some of his so-called “Dünnschliffe” by rolling dice, e.g. for combining clippings from a newspaper and sections from a Franz Kafka novel (246). It is only a small step from such permutative procedures based on mechanical devices such as rotating disks or dice to the use of computers for producing literature. In Germany, this was done in the late 1950s and early 1960s by the “Stuttgarter Gruppe” (“Stuttgart Group”). In 1959, the mathematician and software engineer Theo Lutz produced so-called “stochastic texts” using the ZUSE Z 22 mainframe of the Stuttgart University’s computer center. Lutz had generated a vocabulary from Kafka’s *Das Schloss* [*The Castle*], which he then permuted by using a program written in ALGOIL. The computer scientist Rul Gunzenhäuser also published some computer-generated poems. These first pioneering experiments may not have been satisfying for traditionalists but for the

“Stuttgarter Gruppe” they appeared as the “incunables of ‘artificial poetry,’” Reinhard Döhl recalls (“Vom Computertext zur Netzkunst”). This concept of “artificial poetry,” however, which was explicitly based upon permutative and stochastic procedures was soon extended to other literary genres and accompanied by a variety of programmatic essays and manifestos such as Abraham Moles’ “Erstes Manifest der permutationellen Kunst [First Manifesto of Permutational Art]” (1962) or “Zur Lage” (1964) by Bense and Döhl.

The interest in working with computers was not limited to the mathematicians of the group but also inspired writers and artists like Döhl and Klaus Burkhardt who jointly wrote the *poem structures through the looking glass* (1969). Bense and Döhl incorporated computer-generated passages into their so-called “Mischtexte” (“mixed texts”) like Döhl’s *fingerübungen* (1962), *Prosa zum Beispiel* (1965) or the radio play *Monolog der Terry Jo [Monologue: Terry Jo]* (1968) by Bense and Ludwig Harig:

Der Monolog beginnt mit einem Computer-Text. Es sind neun synthetische Annäherungen an die Sprache des Mädchens. Die Tatsache, daß gewisse Analogien zwischen dem zu Anfang unbewußten Zustand des Mädchens und der Unbewußtheit eines Computers bestehen, ließ diese erste Verwendung eines mit einer programmgesteuerten Maschine hergestellten Textes in einem Hörspiel gerechtfertigt erscheinen. Diese Computertexte des Monologs werden in der Realisation übersetzt in eine durch ein kompliziertes Vocoder-Verfahren hergestellte synthetische Sprache, die im Verlauf des Monologs mehr und mehr abgebaut und von der natürlichen Stimme abgelöst wird. (Qtd. in Schöning 58)

The monologue starts with a computer-text. There are nine synthetic approaches to the language of the girl. The fact that there are certain analogies between the initial subconscious state of mind of the girl and the subconscious of a computer might let us consider that the first use of a programmed, machine-generated text in a radio-play can be justified. These monologous computer-texts are realized by translating it into a synthetic language created by a complicated vocoder-system that is reduced more and more in the course of the monologue and thereby replaced by the natural voice.

The idea of generating entire texts on computers was soon taken up by some other computer centers during the 1960s: In 1966, Gerhard Stickel produced his *Monte-Carlo-Texte* on the IBM-7090 mainframe of the Deutsches Rechenzentrum

in Darmstadt which he subsumed under the genre name “Auto-Poems.” One year later, Manfred Krause and Götz F. Schaudt published their book *Computer-Lyrik: Poesie aus dem Elektronenrechner* (“Computer Poetry: Poems from the Electronic Computer”); the programs included both rhyme schemes and measures.

## From File Boxes to Hypertext: Digressions and Permutative Novels

Alfred Döblin once argued: “Wenn ein Roman nicht wie ein Regenwurm in zehn Stücke geschnitten werden kann und jeder Teil bewegt sich selbst, dann taugt er nichts” (Döblin 21) (‘If a novel cannot be cut up like a worm into ten pieces so that each bit moves independently, then it is no good’) (qtd. in Murphy 21). Although every biologist would repudiate this argument, Döblin’s *bon mot* refers to a fundamental precondition of all hyperfictions in both print and computer-based media. The producer of such a text has to compile a collection of text segments and to define relations between these fragments regardless of the specific medium he is writing for. In the history of literature, this ranged from fragments, paper slips or excerpts which were collected in file boxes and notebooks and then presented to the reader—either in books or in text objects like cases, boxes, sometimes even installations or environments such as Michael Badura’s *Zettel-Werke*. It is then up to the reader to recombine the segments in the course of reading.

This development, too, was initiated in the Baroque era when various alternative storage devices and discourse networks challenged the fixed chains of signs of printed books:

Wenn Datenplanspiele und Letternphantasien jenseits aller Metaphern im drucktechnischen Sinne real werden, wird der statische Raum der Bücher selbst zum zwischengeschalteten Medium, zu jenem beliebig (um)sortierbaren Karteikasten, in dem die Zettel potentieller Registermacher landen. (Rieger 100)

If the data games and letterphantasma become established as printing technologies beyond all metaphors, the static space of books transforms into an (inter-)medium itself: transforms into this (re)sortable index box in which the memos of potential indexers end up.

But how did writers react to this challenge? For the purpose of this historical (re)construction, the rather pragmatic approach of Monika Schmitz-Emans may be helpful. She defines “book labyrinths” on a material level as follows:

Als Buch-Labyrinthe verstanden seien darum im folgenden auf materiell-visueller Ebene nicht-linear konstruierte Bücher, die den Leser explizit hin und her “schicken,” durch typographische Mittel, Leseanleitungen, nicht-lineare Numerierungen oder andere Signale, sowie Text-Baustein-Sammlungen. (179)

As non-linear constructed books, which explicitly “send” the reader to and fro by means of typography, reading instructions, non-linear pagination or other signals, or as collections of text segments.

Regarding the arrangement of text segments by the author, two types can be distinguished: Segments can either be put together in succession in a book and highlighted only as loosely associated elements by cuts, numbers, chapter headings or various other paratextual elements or, alternatively, they can be printed on loose leaves such as untacked sheets of paper, cards or lots. In each case, familiar reading conventions have to be relearned, and thus most of these books contain paratextual features such as reading instructions, game rules, etc. But unlike the rules of football or board games, these instructions are not intended as a body of rules imposing sanctions on those who break them. In fact, these instructions are ironically broken, and the writers of such texts usually discuss and question the rules themselves; in many cases, they even call on the readers to challenge or to expand them by themselves, so that literature explicitly transcends the space of the rule-governed game in favor of a “meta-game” (Schmitz-Emans 193).

Most historical descriptions of “print hyperfictions” have focused on examples from Romanic and American literatures. Examples of novels and stories which link the text segments by hyperlinks, indices, annotations, etc. include Jorge Luis Borges’ short stories, particularly *El jardín de senderos que se bifurcan* [*The Garden of Forking Paths*] (1941), as well as Georges Perec’s novel *La vie mode d’emploi* [*Life A User’s Manual*] (1978). According to Schmitz-Emans, Perec’s novel on the one hand is a novel about a jigsaw puzzle, and on the other hand, the whole novel can be seen as an intricate jigsaw puzzle itself (Schmitz-Emans 180). Further dazzling literary experiments include Julio Cortázar’s *Rayuela* [*Hopscotch*] (1963), which follows the model of the hopscotch game and its follow-up novel *62: modelo para armar* [*62: A Model Kit*] (1968), Vladimir Nabokov’s *Pale Fire* (1962), Milorad Pavić’s *Hazarski rečnik* [*The Dictionary of the Khazars*] (1984) and *Predeo slikan čajem* [*Landscape Painted with Tea*] (1988) and Italo Calvino’s *Il castello dei destini incrociati* [*The Castle of Crossed Destinies*] (1973), which was inspired by tarot cards. Queneau’s sonnet machine *Cent mille millards de poèmes*, though, is considered a model of innovative literary forms on loose leaves just as Marc

Saporta's card-game novel *Composition No. 1* (1962) or B.S. Johnson's "novel-in-a-box" *The Unfortunates* (1969). Both consist of unpaginated sheets on which fragments of a story are printed. The reader can shuffle the pages and read the resulting random order.

It is obvious that there seems to be a lack of prominent examples from German-language literature though it would be easy to contradict this impression by pointing to a long tradition of German print hyperfictions. The printing press and the distribution systems of the Renaissance had established accurate "address-systems," which for the first time allowed accessing any text passage. At the same time, German Baroque writers and linguists established indices or "Blatweiser" for making this access to data easier. In his *Mathematische und philosophische Erquickstunden* (1651), Harsdörffer developed an elaborate file-card system for keeping the imminent disorder of data under control:

Wann man nun das Register machen will / so schreibt man den Inhalt  
 / gehöriger Massen / auf ein Papyr / schneidet es in absonderliche  
 Stücklein / und leget jedes in sein Buchstabfach: von dar nimmt man  
 sie zuletzt wieder heraus / ordnet einen Buchstaben nach dem andern  
 / und klebet entweder die Papyrlein ordentlich auf / oder schreibt sie  
 noch einmal. (57)

If you want to create an index system, you note the contents onto a piece of paper correctly, cut it into distinct pieces and place each one into its corresponding box for that letter. From there you finally take it, sort the letters into their correct order and then glue the pieces one after another or rewrite them correctly.

Hence Stefan Rieger described the Baroque knowledge management systems as predecessors of modern hypertext technologies:

Für das Barock sind hybride Textformen die Folge, die hart an den Grenzen des Buches operieren. Im Zeichen von Ökonomie und Effizienz barocker Datenspeicherung erhält die lineare Organisation von Büchern eine mediale Konkurrenz durch alternative Aufschreibeformen, die Zugriffe durch Register organisieren und damit eine strikt lineare Abfolge des Buches durch andere Präsentationsweisen—etwa die Möglichkeit der Synopsen—überflüssig machen wollen. (88)

In the Baroque period, hybrid text forms developed that were touching the borders of the printed book. Facing the economy and efficiency

of Baroque data storage, the linear organization of books began to compete with alternative forms of notation. These organized access by indices and thus tried to replace the strict linear sequence of books by other ways of presenting knowledge, such as synopses.

Harsdörffer and his Baroque contemporaries implemented efficient data storage devices and data mining tools by compiling complex registers. This happened in order to get the overflowing knowledge of their times under control whereas poets emptied the file boxes in a rather playful way, as could be seen from Zesen's novel *Assenat* (1670). The plot of the novel—the life and love story of biblical Joseph—is narrated on 344 pages, which are supplemented by an appendix of another 200 pages with mythological and historic digressions, annotations, etc.

The works of Jean Paul have also been repeatedly characterized as hyperfictions *avant la lettre*. His excessive use of digressions, annotations, footnotes and periphrases that interrupt his narration again and again and lead him astray are an expression of the strong sense of individuality of early Romanticism. Hence the narrator of his novels establishes subjectively motivated relations between entirely unrelated elements:

Es wäre daher die Frage, ob nicht eine Sammlung von Aufsätzen nützte und gefiele, worin Ideen aus allen Wissenschaften ohne bestimmtes gerades Ziel—weder künstlerisches noch wissenschaftliches—sich nicht wie Gifte, sondern wie Karten mischten und folglich, ähnlich dem Lessingschen geistigen Würfeln, dem etwas einträugen, der durch *Spiele zu gewinnen* wüßte; was aber die Sammlung anlangt, so hab' ich sie und vermehre sie täglich, schon bloß deshalb, um den Kopf so frei zu machen, als das Herz sein soll. (Jean Paul, *Vorschule der Ästhetik* 202f.)

One could ask whether it would not be helpful and pleasant to have a collection of essays in which ideas from all sciences without any definite direct (artistic or scientific) goal were mixed together not like poisons but like cards; like the mental dice of Lessing they would be profitable for anyone who knew how to *win* in *games*. I have this collection and add to it daily, if only to free the head as much as the heart.  
(Jean Paul, *Horn of Oberon* 144)

This method was only possible due to Jean Paul's excerpts, which he collected from borrowed books since he was an adolescent preparing for studying theology. Since 1782, these miscellaneous excerpts became the generative moment

of his literary writing (Müller, *Jean Pauls Exzerpte* 9). However, these excerpts did not help compiling encyclopedias from the collected knowledge; they rather allowed infinite digressions. This was made possible by the wit which Jean Paul defines in his *Vorschule der Ästhetik [School of Aesthetics]* (1804), as an ability to discover “die ähnlichen Verhältnisse *inkommensurabler* (unannebbarer) Größen, d.h. die Ähnlichkeiten zwischen Körper- und Geisterwelt (z. B. Sonne und Wahrheit), mit andern Worten, die Gleichung zwischen sich und außen, mithin zwischen zwei Anschauungen” (*Vorschule der Ästhetik* 172) (“the similarities between *incommensurable* magnitudes, between physical and spiritual worlds (e.g., sun and truth), in other words, the equation of self and other, of two perceptions”) (*Horn of Oberon* 122). In Jean Paul’s works, wit is a method of combining subject matters that are organized in different text units and then recombining them by cross-references and footnotes.

From the “geistige Würfel” (“mental dice”) Jean Paul is describing with his mix of thoughts and excerpts, it is only a small step to proper dice. Hence it is no surprise that many writers take up rules and procedures of familiar dice and card games for organizing plots and narratives. The idea of generating texts by throwing dice and then selecting words from a number of lists according to the sum of the pips is not exclusively reserved to the experimental writers of the Baroque period or the avant-garde writers following Stéphane Mallarmé’s *Un coup de dés jamais n’abolira le hazard [One Toss of the Dice Never Will Abolish Chance]* (1897). As early as the 1820s, Georg Nikolaus Bärmann—at that time known as a rather minor playwright and critic—used dice as a tool for generating texts. First, he published the book *Die Kunst ernsthafte und scherzhafte Glückwunschgedichte durch den Würfel zu ververtigen* (“The art of creating serious and funny greeting poetry by throwing dice”) (1825), and only four years later, he brought out *Neunhundert neun und neunzig und noch etliche Almanachs-Lustspiele durch den Würfe. Das ist: Almanach dramatischer Spiele für die Jahre 1829 bis 1961* (“Ninehundredandninety-nine and some more almanac-games throwing dice, i.e.: Almanac of dramatic games for the years 1829 to 1961”) (1829), a parody of the popular *Almanach dramatischer Spiele auf dem Lande* (“An almanac of dramatic games in the country”). The book contains 1,200 numbered dramatic text fragments including dialogues, stage directions, titles, subheadings, etc. To enable its users to create a readable and playable drama from these fragments, the book is accompanied by a so-called *Wurf-Tabelle* (“throwing chart”) (fig. 5). After each throw, the reader must search in the chart for the number of the particular fragment. For producing a complete drama, 200 throws are required.

Much later, around 1970, many writers were experimenting with non-linear texts. This tendency was accompanied by influential reader-oriented theories of literature such as Umberto Eco’s reflections on the “open work of art,”

	1 <sup>r</sup> Wurf	2 <sup>r</sup> Wurf	3 <sup>r</sup> Wurf	4 <sup>r</sup> Wurf	5 <sup>r</sup> Wurf	6 <sup>r</sup> Wurf	7 <sup>r</sup> Wurf	8 <sup>r</sup> Wurf
•	167	519	304	663	25	1078	413	823
•	521	2	168	20	958	30	664	306
• • •	826	959	15	522	3	169	1080	414
• • • •	1081	10	416	667	308	827	523	40
• • • •	5	172	524	6	961	1082	309	668
• • •	829	669	962	828	1083	1155	35	964

Fig. 5. *Wurf-Tabelle* from Georg Nikolaus Bärmann's *Neunhundert neun und neunzig und noch etliche Almanachs-Lustspiele durch den Würfel* (1829).

Roland Barthes' distinction between "readerly" and "writerly texts," or the gap-concept of Wolfgang Iser's reader-response theory. All of these were approaches conceptualizing the reader as collaborator or "wreader" as George Landow would have called it some thirty years later (14).

In Germany, the subgenre of the permutative dictionary novel was quite successful at that time. The text of such a novel is subdivided into numerous entries, which are arranged in alphabetical order. Schmitz-Emans argues that the dictionary novel is characterized by discussing order and by reflecting the contingency of order since the order of the alphabet represents a contingent principle of structuring knowledge that competes with its immanent order—if there is anything like that (Schmitz-Emans 182). The best-known novel of this genre certainly is Andreas Okopenko's *Lexikonroman einer sentimentalen Reise zum Exporteurstreffen in Druden* ("Dictionary-novel of a sentimental journey to the exporters' meeting at Druden") (1970). In the *Gebrauchsanweisung* ("introductory directions"), Okopenko calls on his readers to concoct their individual arrangement of text fragments:

Die sentimentale Reise zum Exporturtreffen in Druden muß erst vollzogen werden. Das Material liegt bereit, wie die Donau und die Anhäufungen von Pflanzen, Steinen und Menschen an ihren Ufern für viele Reisen und Nebenausflüge nach Wahl bereitliegen. Das Material ist alphabetisch geordnet, damit Sie es mühelos auffinden. Wie in einem Lexikon. (*Lexikonroman* 5)

The sentimental journey to the exporters' meeting at Druden has to be executed first. The material is waiting, just as the Danube and the multitude of plants, stones and people at its banks are waiting for many side-trips of their own choice. The material is ordered alphabetically so that you can find it without difficulty. Just like in a dictionary.

The entries are arranged alphabetically. In addition, some fragments are linked by arrowheads (→) and some italicized fragments are privileged: “*Die Hinweise, die Ihnen von Etappe zu Etappe die Fortsetzung der Reise ermöglichen sollen und die Sie daher vielleicht mit Vorrang beachten werden, sind schräg gedruckt*” (“Those references, which may help you to continue the journey from place to place and which thus should have priority are *printed in italics*”) (*Lexikonroman* 5). In his next novel *Meteoriten* (1976), Okopenko deliberately intensifies the principle of openness by explicitly doing without any game rules and instructions. Ror Wolf had noted in the early 1970s that he would be highly fascinated by a book,

das man aus dem Schrank nimmt, wahllos aufschlägt, in dem man auf jeder Seite anfangen kann zu lesen, und in dem man immer, gleich wo man aufschlägt, den Einstieg findet, in dem es also unwichtig ist, was vorher oder nachher passiert. (Baier 154f.)

which you get from the shelves, open at random, in which you can start reading on any page, and into which you always find an entry, no matter where you open it, so that it is unimportant what previously happened and what is going to happen afterwards.

More than ten years later, he started publishing a series of literary dictionaries whose fictitious editor is Wolf's *alter ego* Raoul Tranchirer—a pen name which explicitly refers to the German verb *tranchieren* (“to carve, to chop up sth.”): The first publication was *Raoul Tranchirers vielseitiger großer Ratschläger für alle Fälle der Welt* (1983), followed by *Raoul Tranchirers Mitteilungen an Ratlose* (1988), *Raoul Tranchirers Welt- und Wirklichkeitslehre aus dem Reich des Fleisches, der Erde, der Luft, des Wassers und der Gefüße* (1990) and finally by *Raoul Tranchirers Bemerkungen über die Stille* (2005).

Ferdinand Kriwet's *Rotor* (1961) is not a dictionary novel but a sort of text kit consisting of 98 elements that can be used in any combination. In his *durch die runse auf den redder* (1965), however, the reading is being sidetracked from the main text into four auxiliary texts. Peter O. Chotjewitz applied a similar method in his novel *Vom Leben und Lernen* (1969) whose subtitle reads “stereo texts.” The

story starts off with a seemingly conventional plot on the first pages. But soon the reader realizes that numerous footnotes are incorporated into the novel's beginning. The extent of these footnotes far exceeds that of the main text.

Oswald Wiener's *die verbesserung von mitteleuropa, roman* (1969), too, breaks with conventional reader-expectations. Although this book is explicitly characterized as a novel, the text starts off with a person and subject index from which the reader can browse through the text. At the end of the book, there are various appendices. The main text does not consist of a fictitious story but rather of an extensive montage of both fictional and theoretical passages. Arno Schmidt's monumental book *Zettels Traum* (1970)—a book of 1,334 pages composed of three columns—tells the story of a writers' couple visiting a colleague who is working on a translation of Edgar Allan Poe. Handwritten notes, blackenings, a strange orthography, etc. are incorporated into the typescript. The reader can permanently jump from the conversation of the writers in the middle column to the Poe interpretation in the left or to loads of annotations and citations in the right column. Two years earlier than Schmidt, Franz Mon published *Herzzero* (1968), a text consisting of two versions arranged in two columns. Similar cross-readings have a long tradition in German literature which can be traced back to Georg Christoph Lichtenberg and turned into one of the starting points of the collage of quotes.

Konrad Balder Schäuffelen's "lottery novel" *deus ex scatola: entwicklungsroman* (1964) does not bear any resemblance to a book. The texts are printed on more than 60,000 paper-strips sentence by sentence. These strips have been hand-rolled and put into wooden cases according to the principle of chance. For the handling of the language material, tweezers are included. The ironic subtitle of *deus ex scatola* can be taken literally: The "novel" is only being generated if the user/reader uses the tweezers to draw the paper slips on which the text fragments are printed from the case—and then unwraps them (in German *entwickeln* means "to develop" or "to produce" but it also connotes "to unwrap"). For other lottery novels, Schäuffelen cut classics such as Thomas Mann's novella *Gladius Dei* or well-known poems by Goethe and others into pieces in order to allow the recombining of the fragments by the user. He also experimented with other alternative ways to arrange text in various storage media. *Haus der Bienenkönigin* (1988) is a case constructed like a bee house; from this bee house, the user can draw paper slips on which supposedly all the words from Jean-Paul Sartre's *Les Mots [Words]* are written.

Herta Müller's *Der Wächter nimmt seinen Kamm* (1993) is a literary card game in the tradition of Marc Saporta (fig. 6). It consists of a box with 94 facsimiled text-image collages in postcard format. Müller cut the words from books and newspapers and pasted them onto the cards. In addition, there are photo collages



Fig. 6. Card from Herta Müller's *Der Wächter nimmt seinen Kamm* (1993).

or silhouettes on each card. The user/reader can arrange and read the cards in random order. Although poetic images are densely concentrated here onto single, unbound pages, they form an evolving network of motifs that give unity to the whole.

A similar box had been produced 30 years earlier by the Fluxus artist Tomas Schmit. Instead of postcards, Schmit's *Verlegerbesteck* (1966) contains small adhesive labels, which the user can paste on whatever surface wherever he likes (fig. 7). The leaflet gives the following reading and acting instruction:

you—owner of this case—should have it more in your pocket than somewhere else, since here you're not so much asked to be reader, but: to be publisher (performer) and to give (real) context and (anonymous) (second-grade-) readers (resp: second-grade-performers: who fill them out: for the third-grade-readers).



Fig. 7. Tomas Schmit's *Verlegerbesteck* (1966).

It is striking that readers of printed hyperfictions are very often called on to co-operate in continuing the writing process. In Okopenko's dictionary novels, the reader is invited to improve the alleged shortcomings of the book: "Nehmen Sie das Prinzip für die Durchführung, denken Sie an den ersten Computer, erweitern Sie den Roman durch eigene Weiterknüpfung an Reizwörter, am besten: schreiben Sie ein Buch, das meines in seiner Kleinheit festnagelt" ("Take the principle for the realization, think of the first computer, expand the novel by amending provocative words, or even better: write your own novel which will nail down the insignificance of my own") (Okopenko, *Lexikonroman* 7).

Additionally, there are gaps in the "dictionary" every now and then, in which the reader is invited to record his or her connotations and comments (11), paste images (23) or self-written poems (33). Kurt Marti, too, designed his dictionary novel *Abratzky oder Die kleine Blockhütte: Lexikon in einem Band* (1971) "von vorneherein als einen Anfang, als Fragment, als immerwährendes 'work in progress,' das jeden Leser zur fortlaufenden Mitarbeit einlädt" ("from the very outset as a beginning, a fragment, an everlasting 'work in progress' inviting its readers to co-operate continuously") (blurb). Ror Wolf even stimulates "alle

natürlich denkenden Leser” (“all clear-thinking readers”) to set up “Wirklichkeitsvereine” (“reality clubs”) so that “Tranchirers Gedanken das Unglück und die Erfolglosigkeit ersticken” (“Tranchirer’s thoughts will extinguish misfortune and failure”) (190).

## Collaborations, Telecommunication and Literature

This leads me to collaborative writing projects that can be distinguished into two types: firstly, collaborative texts, which are produced on site, e.g. in literary salons, writers’ groups or creative writing classes; secondly, collaborative long-distance writing projects, which actively involve telecommunication networks. The parlor games of the Baroque era already aimed at increasing creativity with the help of group dynamics, and oracle games were anticipating the surrealist *cadavre exquis* (“exquisite corpse”). In these games, sentence fragments were whispered into the ear of the neighbor. Thus simple syntagmas and eventually entire sentences were generated step by step. Of course, this is not a literary genre in a strict sense as are, e.g., the so-called *Reyenreime* in which rhyme and meter need to be held. This method is getting more complicated if each collaborator has to contribute one and a half or even two lines as can be seen from the poem “Frühlings-Freude” by Harsdörffer, Sigmund von Birken and Johann Klaj:

F.  
 Es funken und flinken und blinken  
     S. bunt-blümichte Auen.  
 Es schimmert und wimmert und glimmert  
     K. frü-perlenes Thauen.  
 Es zittern / und flittern / und splittern  
     F. laubträchtige Aeste.  
 Es säuseln / und bräuseln / und kräuseln  
     S. windfriedige Bläste.  
 Es singen / und klingen / und ringen  
     K. Feld-stimmende Flöten.  
 Schalmeyen am Reynen erfreuen. . . .  
 (Qtd. in Rühm, *Pegnitz Schäfer* 10f.)

Up until the present, there have been many collaborative novels, novellas, and stories in German literature that were usually written in sequence. Thus writers were either co-operating at the same place anyway, or they only used the post for sending the completed segments from one to the other. Various kinds of

artistic co-operation ranging from mere sociability to programmatic discussions in literary salons and in societies and even to collective writing in poets' circles established during the 18<sup>th</sup> and 19<sup>th</sup> century.

Ludwig Uhland and Justinus Kerner jointly wrote the satire *Abendphantasie an Mayer* (1802) as did Arno Holz and Johannes Schlaf in writing the novella *Papa Hamlet* (1889). In 1808, the novel *Die Versuche und Hindernisse Karls: Eine deutsche Geschichte aus neuerer Zeit* was published anonymously; it later turned out that Karl August Varnhagen von Ense, Wilhelm Neumann, August Ferdinand Bernhardi and Friedrich de la Motte Fouqué had jointly written it. Fouqué was also participating, with E.T.A. Hoffmann, Adelbert von Chamisso and Karl Wilhelm Salice Contessa, in the unfinished *Roman des Freiberrn von Vieren*. The *Roman der Zwölf* (1908) was initiated by the publisher Konrad W. Mecklenburg who invited twelve writers into a co-operative venture, among them Hanns Heinz Ewers, Hermann Bahr, Otto Julius Bierbaum, Herbert Eulenburg and Gustav Meyrink.

A variety of recent serial novels are also based on a similar concept: *Das Gästehaus* (1965) was inspired by Walter Höllerer when he was director of the *Literarisches Colloquium Berlin*. Among the contributors were Peter Bichsel, Nicolas Born, Hans Christoph Buch, Hubert Fichte and Hermann Peter Piwitt. The weekly journal *Die Zeit* initiated a cliffhanger novel in 1999 to which for one year the cream of German contemporary literature contributed. It set off with Marcel Beyer's opening chapter "Anruf um Mitternacht" which was followed by texts by Birgit Vanderbeke, Andreas Neumeister, Judith Kuckart and many others until Terézia Mora wrote the final chapter "Höllisches Finale" one year later. In genre literature, too, serial novels have been written from time to time. Such famous writers like Heinrich Böll, Christine Brückner, Reinhard Federmann, Hermann Kasack and Hans Weigel contributed to the satiric crime novel *Der Rat der Weltunweisen* (1965), and only recently ten German crime writers, among them well-known writers such as Gisbert Haefs and Ingrid Noll, jointly published the crime novels *Eine böse Überraschung* (1998) and *Gipfeltreffen* (2000).

In the international Dada movement, collaborative writing had a very different quality. In Zurich, Hans Arp, Walter Serner and Tristan Tzara produced some collaborative poems under the name *société anonyme pour l'exploitation du vocabulaire dadaïste*, and Tzara, Richard Huelsenbeck and Marcel Janco had even radicalized the concept of artistic co-operation with their simultaneous poems. Dadaist simultaneous poems were originally written for the performance on the stage of the "Cabaret Voltaire" where several speakers were to recite their parts simultaneously. Hugo Ball defined the simultaneous poem as "kontrapunktisches Rezitativ" ("contrapuntal recitative") dealing with the "Wert der Stimme" (*Die Flucht aus der Zeit* 86) ('value of the voice', *Flight Out of Time* 57).

During the 1950s and 1960s, the Dada impulse was taken up in a different manner by both the *Wiener Gruppe* ('Vienna Group') and the "Stuttgarter Gruppe." It is thus not surprising that the members of both groups collaboratively wrote and published several texts. Konrad Bayer, H.C. Artmann, Gerhard Rühm, Friedrich Achleitner and Oswald Wiener considered the Vienna Group not only as a forum for joint performances of their "literary cabaret" but also as a writers' collective. Thus they collaborated in varying constellations:

jeder brachte geeignetes material heran, wir spielten uns immer besser aufeinander ein, warfen uns die sätze wie bälle zu. Wenn auch jeder für sich die erschlossenen möglichkeiten weiterverfolgte, erwies sich gerade die montage als eine technik, die gemeinschaftsarbeit besonders begünstigte. (Rühm, "das phänomen" 25)

everybody contributed suitable material: we soon became a real team, tossed sentences to each other like balls. Although we each individually made use of the potential we had tapped, montage proved to be a technique particularly conducive to the production of joint works. (Rühm, "das phänomen" 24; my revisions)

In Stuttgart, Harig and Döhl jointly wrote the prose text *Hans und Grete: Eine deutsche Sprachlehre* (1970). Radio plays such as Bense and Harig's *Der Monolog der Terry Jo* (1968) or *Türen und Tore* (1971) by Jürgen Becker, Harig and Döhl were also written in cooperation.

Writers who were physically separated have been using their contemporary transmission media for networked collaborative projects for a long time, ranging from letters carried from one writer to the other by post—i.e. the transport network—to the more recent technical communication media such as telephone, telegram, telefax, the French "Minitel" system up to the latest computer-based technologies and services like the World Wide Web, e-mail, mobile phones or SMS.

*Writers' letters* always have been an ambivalent genre: Usually, the published correspondence of writers is nothing but a documentation of their private letters to friends and fellow writers, which at some point was published posthumously. Edited letters are characterized by a "double address": On the one hand, they were originally addressed to a specific addressee; on the other hand, however, the general public gets access to letters without knowing much about the reason and motivation of the writer and thus can only rely on the annotations of the editor.



Fig. 8. Peter Faecke's *11 Romane in 6 Minuten und 5 Sekunden*, the 3<sup>rd</sup> delivery to the *Postversandroman* (1970).

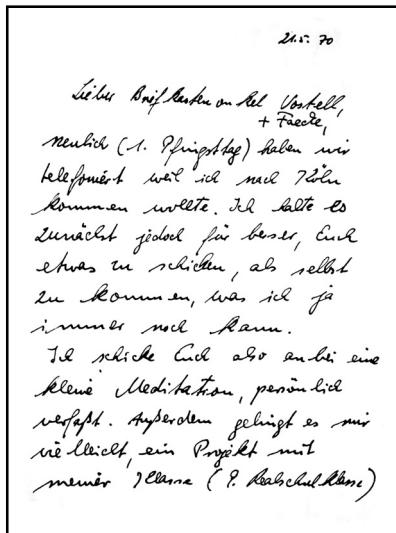


Fig. 9. Reader's contribution to Peter Faecke's and Wolf Vostell's *Postversand Roman*.

However, there are exceptions to this rule: in some cases letters must be regarded as *constituents* of an artwork. The essay “Ueber ‘Wilhelm Meisters Wanderjahre’” (1821) by Rahel Varnhagen and her friends is an example of a text which in fact was written in correspondence but was projected for publication from the outset.

This is comparable for artists' contributions to Mail Art or Correspondence Art projects, which were promoted in Germany by Klaus Groh, the editor of the *I.A.C. (International Artist Cooperation) Newsletter*, by Géza Perneczky and others. A higher degree of publicity than most Mail Art projects was achieved by the *Postversandroman* (“Mail Order Novel”) (1970), a collaborative book project of the writer Peter Faecke and the Fluxus and Happening artist Wolf Vostell, which was published in the renowned Luchterhand Verlag. The purchaser of this “novel” first received a hardcover jacket and an envelope containing two bolts for binding the consecutive deliveries. The users' instruction was titled *Spiel ohne Grenzen* (“Games without frontiers”) thereby explicitly addressing the limitations of the printed book. In accordance with the tone of the time, Faecke and Vostell called for replacing the institutions of the literary market in favor of an autonomous distribution of texts by the producers themselves. They also tried to overcome the limits of print by supplementing their “novel” with objects such as a vinyl single with Peter Faecke's *11 Romanen in 6 Minuten und 5*

*Sekunden* (“11 novels in 6 minutes and 5 seconds,” fig. 8). Vostell’s instructions for a happening, which callers could retrieve from his answering machine, are documented; elsewhere the readers were invited to paste newspaper clippings or account statements and to actively participate in this “work in progress” by sending their own contributions (fig. 9):

nutzt den Postversand-Roman, schreibt uns, ruft uns an, bombardiert uns verflucht noch mal, wir antworten Euch in den nächsten Lieferungen. Faecke/Vostell: die beiden guten Briefkastenuncles, unsere Frauen helfen uns *und* sind ganz dabei, wir verteilen die Lieferungen auf der Straße soweit unser Geld reicht und machen einen Film drüber in Kölner Obdachlosen-Vierteln, den Ihr kostenlos an Kölner Hauswänden sehen könntt, schickt uns Informationen, ruft uns an unter  
735335 Faecke

oder

517783 Vostell

wir antworten direkt *mit neuen Ideen, wir haben genug davon*, wenn Ihr Geld schicken wollt, OK., schickt uns *auf jeden Fall* Informationen, Manuskripte etc., wir wollen Bücher haben, die nicht mehr als 1 Mark kosten, wir wollen Bücher haben, die, nach Wahl durch ein akzeptables Gremium, gratis verteilt werden (Kostenpunkt jährlich für alle wichtigen Bücher in der BRD: 500 Millionen Mark). . . . Konkreter: Denk daran: Deine Antwort auf das, was Du bezahlt hast, wird von uns honoriert in Form einer Antwort in der nächsten Lieferung. Was kommt auf Dich, was kommt auf uns zu? Tu uns den Gefallen: spiel mit, tritt Deinen Nachbarn in den Arsch, *tritt dich selbst in den Arsch, zieh Deine alten Schubladen auf, geb ans Telefon, setz Dich ins Auto und fahr zu uns, hör mit uns die alten Lieder von dazumal, und wenn Du uns nicht passt, schmeissen wir Dich wieder raus!*, fang endlich selbst an zu schreiben, schreib zusammen mit uns dieses Buch. . . (Faecke and Vostell; italics represent handwritten annotations in original)

Use the *Postversandroman* (“mail order novel”), write to us, call us, bombard us—damn it, we’ll answer you in one of the next deliveries. Faecke/Vostell: the two agony uncles; our wives will assist us *and* will fully take part, we’ll distribute the deliveries in the streets as far as our money will take us, and we’ll shoot a film about these activities in one of the homeless neighborhoods in Cologne; you’ll be able to watch this movie on Cologne house walls, send us information, call us at

735335 Faecke

or

517783 Vostell

we'll answer immediately *with brand-new ideas, we have plenty of them*, if you'd like to send money, OK., but send us information, manuscripts, etc. *no matter what*, we want to have books which don't cost more than 1 German mark, we want to have books which (being selected by an appropriate committee), will be distributed free of charge (annual expenses for all important books in the FRG: 500 million German marks). . . .

More specifically: Remember: We will remunerate your answer of your payment in form of an answer in our next delivery. What can you expect to happen, what can we expect to happen? Please do us the favor: join in, kick your neighbor's ass, *kick your own ass, search your old drawers, answer the phone, get into your car and come to see us, listen to the old songs with us, and if we don't like you, we'll kick you out!*, start writing yourself, write this book together with us. . . . (Italics represent handwritten annotations in the original)

The avant-garde utopia of transgressing the boundary between art and everyday life can only be realized, Vostell argues in an interview with Lothar Romain, if the latest media technologies are being used. Hence he considers his use of answering machines only as a first step towards universal and bidirectional means of communication. Such means would allow and require to mix up all media in existence today:

Jede Kommunikation heißtt in Zukunft jeder mit jedem auf der Welt, so wie jedes Ereignis auf der Welt mit jedem Ereignis auf der Welt zu tun hat. . . . Und formal gesehen glaube ich, daß zum Beispiel die Zukunft des Fernschens darin besteht, daß alle Fernseher im Medium Fernsehen selbst zu Wort kommen, also daß das ein Ende findet, daß Millionen das konsumieren, was von wenigen Redakteuren gemacht wird. Das heißtt, in Zukunft produzieren die Hörer oder die Seher selbst das Programm. (Faecke and Vostell)

Every act of communication will connect each and everybody all over the world, such as each incident in the world has to do with every other incident in the world. . . . And from a formal point of view, I believe that the future of television, e.g., will be that every viewer will have his say on TV, so that we can end a situation in which millions

of people are just consuming what is being provided by only a few editors. This means that in the future listeners and spectators will create their own program.

What Vostell expects from bidirectional television, complies with the utopian visions, which Bertolt Brecht drew up with the radio in mind some decades earlier. In his famous radio theory, Brecht demanded the transformation of radio, the grandfather of all wireless media, from a means of broadcasting into a multi-channel means of communication. He argued that the technological potentials of the medium were not used adequately as long as the back channel was closed:

Der Rundfunk wäre der denkbar großartigste Kommunikationsapparat des öffentlichen Lebens, ein ungeheures Kanalsystem, d.h., er wäre es, wenn er es verstünde, nicht nur auszusenden, sondern auch zu empfangen, also den Zuhörer nicht nur hören, sondern auch sprechen zu machen und ihn nicht zu isolieren, sondern ihn in Beziehung zu setzen. Der Rundfunk müsste demnach aus dem Lieferantentum herausgehen und den Hörer als Lieferanten organisieren. (Brecht 553)

The radio would be the finest possible communication apparatus in public life, a vast network of pipes. That is to say, it would be if it knew how to receive as well as to transmit, how to let the listener speak as well as hear, how to bring him into a relationship instead of isolating him. On this principle the radio should step out of the supply business and organize its listeners as suppliers. (Qtd. in Strauss 15)

This utopia of a bidirectional technological medium turning the passive reader, listener or spectator into an actor is a persistent claim of 20<sup>th</sup> century media theory. Hans Magnus Enzensberger in his “Baukasten zu einer Theorie der Medien” [“Constituents of a Theory of the Media”] (1970) explicitly tied in with Brecht’s theory demanding networked communication, “die auf dem Prinzip der Wechselwirkung aufgebaut sind” (based upon the principle of reciprocity) (170).

Since that time, the latest transmission media such as radio and telephone, television and telefax have always been used for collaborative writing projects of which only a few should be mentioned here: In the context of the *Neues Hörspiel* (“new radio play”) movement many writers and radio experts tried to put Brecht’s call for a mobilization of the listeners into action. A good example is Richard Hey’s *Rosie: Radio-Spektakel zum Mitmachen für Stimmen, Musik und telefonierende Hörer* (1969), a radio play in which the listeners had the opportunity to prompt the moderator to select one specific plot variant. On Michael Erlhoff’s

initiative, the *Cassetten Radio* was carried out from January to December 1984. Following the chain letter principle, audiotapes were sent to various collaborators who recorded literary texts, noises or songs. Hence a technical storage medium was combined with traditional mail. Robert Adrian X, a Vienna-based Canadian artist, was among the very first artists who used computer-based telecommunication technologies in the 1980s. He was one of the initiators of *ARTEX* (Artists' Electronic Exchange Program), the first international communication system reserved to art, and he also founded, together with Helmut Mark, Zelko Wiener, Karl Kubaczek and Gerhard Taschler, the art group *BLIX* which initiated co-operative art projects such as *Wiencover IV* (1983), *Kunstfunk* (1984) or *Kunst BTX* (1985). For *Ars Electronica 1982*, Adrian organized the telecommunication project *The World in 24 Hours* in which 16 artists from three continents tried for one day “der Mittagssonne rund um die Erde zu folgen und dabei eine Art von telematischer Weltkarte zu schaffen” (“to follow the midday sun around the planet—creating a kind of telematic world map”) (Adrian 145). But dealing with Adrian’s work, however, we are already talking about current writers’ and artists’ telecommunication projects in computer-based and networked media, but this is too big a subject for *this* essay . . .

## Notes

1. This is a short version of Schäfer, “Literary Machines Made in Germany.” I am grateful to Peter Gendolla for his critical advice, to Brigitte Pichon and Dorian Rudnytsky for checking the English version of this text and for translating quotes from Baroque German into contemporary English, and to Patricia Tomaszek for compiling the bibliographical information.
2. Cf. Roberto Simanowski’s as well as Peter Gendolla’s and my joint article in this book.
3. Besides the methods and procedures mentioned so far, there are plenty of other methods of constrained writing such as chronogram, acrostic, or abecedarius, which I cannot discuss here due to limited space. For more details cf. Schäfer, “Literary Machines Made in Germany.”

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