The Early Computer Poetry and Concrete Poetry

Matteo D'Ambrosio

UNIVERSITY OF NAPLES FEDERICO II, ITALY

ABSTRACT

This paper underlines the importance attributed to computer programs and computer graphics in the early experiments of Electronic Literature. Based on the texts reviewed, the influence of the aesthetic theory of Max Bense and of Concrete Poetry has to be reduced. The early anthologies of Concrete Poetry contained a scarce number of texts which belonged to a sub-genre that could be defined as "Computerised Concrete Poetry." Both Franke (1971) and Bailey (1973) have reported the greater presence of other textual models.

KEYWORDS

electronic literature; programming; computer graphics; concrete poetry; Max Bense; *Cybernetic Serendipity.*

RESUMO

Este artigo destaca a importância atribuída aos programas de computador e à computação gráfica nas primeiras experiências de Literatura Eletrónica. Com base nos textos analisados, a influência da teoria estética de Max Bense e da Poesia Concreta deve ser diminuída. As primeiras antologias da Poesia Concreta continham um número escasso de textos pertencentes a um subgénero que se poderia denominar "Poesia Concreta Computacional." Quer Franke (1971), quer Bailey (1973) relataram uma presença maior de outros modelos textuais.

PALAVRAS-CHAVE

literatura eletrónica; programação; computação gráfica; poesia concreta; Max Bense; *Cybernetic Serendipity.*

I.PREFIGURATION AND PRECURSORS: AN ART *À VENIR*

The few documented experiments in the early years of the history of Electronic Literature, under the label of what was then defined as 'Computer Poetry,' were essentially a prerogative of computer processing experts, only occasionally interested in the rhetoric power of words that intensifies their expressive potential by expanding the theoretical space of the verbal linguistic system.

As it happened with historical avant-gardes, the creative practices of the early stage prove that, regardless of the low complexity of the devices used and of the expressive results achieved, there was a longing for an art *à venir*, not yet fully identified and therefore still without a plausible and recognisable definition, faced with the unavailability of languages and tools. Walter Benjamin had perceived this interim and yet meaningful state, and wrote: "The history of every art form shows critical epochs in which a certain art form aspires to effects which could be fully obtained only with a changed technical standard, this is to say, in a new art form" (1992: 230).

In an interview entitled *Riflessioni sulla scrittura elettronica* given on 16 December 1996, Nanni Balestrini, the author of one of the earliest experiments of Electronic Literature, affirmed: "If Futurists had had computers … they would have created their texts quicker, faster (…) their texts … are waiting, … are calling for the existence of a machine to do those things" (Balestrini, 1996).

Here Balestrini is referring to just one of the principles of Futurist aesthetics, i.e. speed. However, when the historical avant-gardes realized that they lacked the elements they needed for progressing any further, they started seeking other solutions that could by-pass their limits, at least partially. This explains, for example, their strategies of movement simulation and simultaneity of phenomena.

Proof of this might be the first anthology of Futurist poets, dated 1912, and the first and only issue of *Cabaret Voltaire* (1916). Marinetti opened the anthology with the *Manifesto tecnico della letteratura futurista*, which proposed a true theory of writing, although there were no recognisable equivalents in the texts he had selected (Marinetti, 1912). As for Dada, *Cabaret Voltaire* shows how difficult it was, for the 'avant-garde of negation,' to reach those radical positions that were to find expression only two years later, in Tristan Tzara's manifesto (Tzara, 1918: 2-4).

Any attempt of historiographic re-tracing of the preludes to Electronic Literature should make a distinction between the mere prefiguration and the broader and closer activities of precursors.

As I already suggested elsewhere (D'Ambrosio 2009b: 92), we owe to Roman Jakobson the preliminary prefiguration of a poetry where words were replaced by numbers (1914) (Jakobson, 1983: 71).[1] However, this does not seem to have affected the works of Velimir Khlebnikov, one of the most prominent poets of Russian Futurism. Some other equally significant impact may be seen in the experimental practices of Italian Futurism.[2]

We may instead identify a close precursor in the French OULIPO, founded in 1960, that considered using mathematical structures in literary works. One of its founders, Raymond Queneau, openly admitted, "Nous regrettons de ne pas disposer de machines" (Queneau, 1950: 322).

II. THE ROLE OF MAX BENSE

We owe to the German Max Bense, a distinguished scholar of international renown, the idea that the textual models of Concrete Poetry may have transferred into Computer Poetry experimentation.

He dedicated many years to writing a monumental treatise on generative, technologic and semiotic aesthetics. Bense's studies appear to have been influenced, in particular, by his uncommon knowledge of such innovative disciplinary fields as Shannon's information theory, cybernetics, and Charles S. Peirce's semiotics. Bense, who is said to have never used a computer (Donguy, 1997), considered computerised poetry "a product of generative aesthetics"[3] and, associating Concrete Poetry with the texts produced by his student Lutz — also covered in this paper — regarded "stochastic and topologic poetry" as one of the six trends of contemporary poetry (Bense, 1967-68: 21). More generally, his definition of the poetic text as a surface justified all the branches of research that attribute a decisive role to the syntax of textual space (Bense, 1965: 1236-1244).[4]

Concrete Poetry in its early forms, documented since the mid-Fifties, could rely, apart from the centuries-long, deep-seated tradition that tried to give theoretical foundations to the relationships between verbal signs and images, also on the visual research of historical avant-gardes, and particularly on the Words-in-Freedom of Futurism, on the typography of Dadaism, and on Neoplasticism.

---

1 Cf. D'Ambrosio (2018a) and (2018b).
2 See D'Ambrosio, 2009a: 263-286.
3 Also Bense, 1974. A more cursory mention of that research is also found in Bense, 1969: 63.
4 In the article "Stili sperimentali" (1966: 5-9), for instance, Bense speaks of topologic "structure" and "style".

Bense, also a creative proponent of the international Concrete Poetry movement,[5] was in close contact with the Brazilian poets[6] of the "Noigandres" group[7] and contributed to spreading that trend, including the editing of an international anthology for *Rot*, the review he directed.[8] Of all the system of the arts, his studies usually privileged new trends.[9]

Bense was the undisputed leader of that community of scholars in the field of new sciences (programming, calculation, linguistics) who, after advanced training, dedicated themselves to research activities that represented the foundations of what is now known as the Stuttgart School (Klütsch, 2012: 65-89).

Bense published, also in *Rot,* the *Manifesto of Permutational Art* by Abraham Moles, a scholar of international recognition in those years.[10] That manifesto was an attempt to investigate the interaction between human and machine "that came to help the poverty of the human spirit" (Moles, [1962])[11] within the framework of an all-encompassing science of technology. Pragmatically speaking, the manifesto proposed the use of permutation, a textual strategy that, as Bense thought, can free creativity from all concerns in terms of contents and meaning, scaling down the value attributed to the imagination of each individual artist by Surrealism and, before that, by the Symbolist tradition.

III.LUTZ, THE SCHOOL AND THE STUTTGART GROUP

Theo Lutz, who is credited as the author of the first text classifiable as a work of Electronic Literature [Cf. Fig. 1] (Lutz, 1959: 3-9), was one of Bense's students. After his 'stochastic' texts, Lutz produced few other works of literary relevance (Funkhouser, 2012: 263 [note 9]). It is worth noting that the article in which he explains the method used for his compositions (Lutz, 1960: 11) makes no reference to previous avant-gardes. There is no evidence that he carried on those experiments: almost certainly he preferred working as a mathematician and programmer.

In terms of literary value, thematic ties with Franz Kafka's works have been identified in Lutz's texts: "Lutz ... has chosen passages from Franz Kafka's *The Castle* that put the machine processing for probabilistic techniques in parallel with the routing systems of social control described in the novel" (Higgins and Kahn eds., 2012: 9).

---

5 A few of his texts are in Gomringer ed., 1972: 19-25. Gomringer wrote for "Augenblick" already in the 1950s.
6 See Walther, 1996: 365. The young Haroldo de Campos, one of the "Noigandres," had been Jakobson's student at Harvard University.
7 We owe to the "Noigandres" a partial translation of his treatise on aesthetics: Bense, 1971.
8 Bense and Walther eds., 1965.
9 A fundamental essay on these was written by Eco, 1962.
10 See e. g. his essay Moles, 1972: 131-152.
11 Text in Italian, Czech, Hungarian, and German.

```
EIN SCHLOS IST FREI UND JEDER BAUER IST FERN
JEDER FREMDE IST FERN  .EIN TAG IST SPAET
JEDES HAUS IST DUNKEL  .EIN AUGE IST TIEF
NICHT JEDES SCHLOS IST ALT  .JEDER TAG IST ALT
NICHT JEDES HAS IST WUTEND  .EINE KIRCHE IST SCHMAL
KEIN HAUS IST OFFEN UND NICHT JEDE KIRCHE IST STILL
NICHT JEDES AUGE IST WUTEND  .KEIN BLICK IST NEU
JEDER WEG IST NAH  .NICHT JEDES SCHLOS IST LEISE
KEIN AUGE IST SCHMAL UND JEEER TURM IST NEU
JEDER BAUER IST FREI  .JEDER BAUER IST NAH
KEIN WEG IST GUT ODER NICHT JEDER GRAF IST OFFEN
NICHT JEDER TAG IST GROSS  .JEDES HAUS IST STILL
EIN WEG IST GUT  .NICHT JEDER GRAF IST DUNKEL
JEDER FREMDE IST FREI  .JEDES DORF IST NEU
KEIN WEG IST LEISE  .NICHT JEDES DORF IST NAH
JEDES SCHLOS IST FREI  .NICHT JEDER BAUER IST GROSS
NICHT JEDER GRAF IST STARK  .JEDER FREMDE IST NAH
NICHT JEDER TURM IST GROSS ODER NICHT JEDER BLICK IST FREI
EINE KIRCHE IST STARK ODER NICHT JEDES DORF IST FERN
JEDER FREMDE IST NAH SOGILT KEIN FREMDE IST NEU
EIN BAUER IST STILL  .JEDES HAUS IST GUT
EIN HAUS IST OFFEN  .KEIN WEG IST OFFEN
NICHT JEDER BAUER IST SPAET  .EIN GRAF IST LEISE
JEDER TURM IST FERN  .JEDES AUGE IST LEISE
EIN WEG IST OFFEN  .EIN GRAF IST SPAET
EIN TURM IST WUTEND  .JEDES AUGE IST FREI
EIN FREMDE IST LEISE UND NICHT JEDES SCHLOS IST FREI
EIN AUGE IST STARK UND EIN DORF IST STILL
NICHT JEDES AUGE IST ALT  .JEDER TAG IST GROSS
KEIN AUGE IST OFFEN  .
EIN BAUER IST LEISE
NICHT JEDES DORF IST TIEF  .
KEIN HAUS IST NAH
NICHT JEDER BLICK IST STILL  .NICHT JEDER TURM IST STILL
```

Figure 1. Theo Lutz, "Stochastische Texte," 1959.

According to Rolland Caignard, the Stuttgart Group included Lutz, Nees, Nake and Walter (1998: 48). Elisabeth Walter, a semiologist, was Bense's wife. Georg Nees and Frieder Nake were artists who worked in the computer graphics field. Another member of the group was Rul Gunzenhäuser, a computer science expert. In his production there is only one known work, *Weihnacht*, "made up of words from the semantic area of the concept 'Christmas'" (Franke, 1971: 97-98). Following the indications given by Bense, Gunzenhäuser, in a book dated 1962,

"applied Shannon's information theory to Birkoff's concept of aesthetic measure, building up a theory of a microaesthetics" (Klütsch, 2012: 69).

In his essay on the Stuttgart School, Christoph Klütch asserts that the group started its activities essentially in the mid-Sixties, concomitantly with the publication of an article by Nees on "statistical graphics" (69). The activities of certain concretist poets such as Reinhard Döhl and Hansjörg Mayer (Ferran, 2017), particularly focused on the pertinence of the typographic variations of verbal signs, started in a second phase.

A few other occasional experiences in the United States, often neglected by the critique, seem to have developed independently. Examples are those of R. M. Worthy (Worthy, 1962: 96-99),[12] Clair Philipy, "spécialiste en informatique" (1964) (Caignard, 1998: 48) and the Pocketa School, whose existence is only known for having been reported in a short and quite vague article published in "Time" magazine.[13]

Greater interest was raised instead by Brion Gysin's permutational poem *I am that I am* [Cf. Fig. 2 and 3],[14] often quoted with variable dating.[15] Its integral version of 2420 lines was developed with the contribution of mathematician Ian Somerville, who used a Honeywell Series 200, model 120.[16]

---

12 The A. B. in the title is an acronym for "Auto Beatnik."
13 See "The Pocketa, Pocketa School," 1962.
14 Now in Burroughs and Gysin, 1978: 78-79 (incomplete version). Here is a statement Gysin made many years later about this, without any reference to permutational art: "The whole idea of the permutations came to me visually on seeing the so-called Divine Tautology, in print. It looked wrong, to me, non-symmetrical. The biggest word, That, belonged in the middle but all I had to do was to switch the last two words and It asked a question: ''I Am That, Am''' (Kostelanetz, 1980: 373).
15 According to J. Donguy (1997), an early elaboration apparently dates back to 1959.
16 The poem was "programmed with a random sequence generator on a Honeywell computer (using punch cards) by Cambridge University mathematics student Ian Somerville in 1960" (Funkhouser, 2012: 247).

```
I AM THAT I AM      AM I AM THAT I      I AM I AM THAT      THAT I AM I AM      AM THAT I AM I
AM I THAT I AM      AM AM I THAT I      I AM AM I THAT      THAT I AM AM I      I THAT I AM AM
I THAT AM I AM      AM I THAT AM I      I AM I THAT AM      AM I AM I THAT      THAT AM I AM I
THAT I AM I AM      AM THAT I AM I      I AM THAT I AM      AM I AM THAT I      I AM I AM THAT
AM THAT I I AM      AM AM THAT I I      I AM AM THAT I      I I AM AM THAT      THAT I I AM AM
THAT AM I I AM      AM THAT AM I I      I AM THAT AM I      I I AM THAT AM      AM I I AM THAT
I AM I THAT AM      AM I AM I THAT      THAT AM I AM I      I THAT AM I AM      AM I I AM THAT
AM I I THAT AM      AM AM I I THAT      THAT AM AM I I      I THAT AM I AM      I I THAT AM AM
I I AM THAT AM      AM I I AM THAT      THAT AM I I AM      AM THAT AM I I      I AM THAT AM I
I I AM THAT AM      AM I I AM THAT      THAT AM I I AM      AM THAT AM I I      I AM THAT AM I
AM I I THAT AM      AM AM I I THAT      THAT AM AM I I      I THAT AM AM I      I I THAT AM AM
I AM I THAT AM      AM I AM I THAT      THAT AM I AM I      I THAT AM I AM      AM I THAT AM I
I THAT I AM AM      AM AM THAT I I      AM AM I THAT I      I AM AM I THAT      THAT I AM AM I
THAT I I AM AM      AM THAT I I AM      AM AM THAT I I      I AM AM THAT I      I I AM AM THAT
I I THAT AM AM      AM I I THAT AM      AM AM I I THAT      THAT AM AM I I      I THAT AM AM I
I I THAT AM AM      AM I I THAT AM      AM AM I I THAT      THAT AM AM I I      I THAT AM AM I
THAT I I AM AM      AM THAT I I AM      AM AM THAT I I      I AM AM THAT I      I I AM AM THAT
I THAT I AM AM      AM I THAT I AM      AM AM I THAT I      I AM AM I THAT      THAT I AM AM I
AM THAT I I AM      AM AM THAT I I      I AM AM THAT I      I I AM THAT AM      THAT I I AM AM
THAT AM I I AM      THAT AM I I AM      I AM THAT AM I      I I AM THAT AM      AM I I AM THAT
AM I THAT I AM      AM AM I THAT I      I AM THAT AM I      AM THAT I AM I      I AM I AM THAT
I AM THAT I AM      I AM I THAT I AM    I AM I AM THAT      AM I AM THAT I      THAT AM I AM I
THAT I AM I AM      AM THAT I AM I      I AM THAT I AM      AM I AM THAT I      AM THAT I I AM
I THAT AM I AM      AM I THAT AM I      I AM I THAT AM      AM I AM I THAT      I THAT AM I AM
I AM THAT AM I      I I AM THAT AM      AM I I AM THAT      THAT AM I I AM      THAT AM I I I
AM I THAT AM I      I AM I THAT AM      AM I AM I THAT      AM THAT I AM I      AM THAT I I I
I THAT AM AM I      I I THAT AM AM      AM I I THAT AM      THAT AM I I AM      I THAT AM I AM
THAT I AM AM I      I THAT I AM AM      AM I THAT I AM      THAT AM I AM I      THAT AM AM I I
AM THAT I AM I      I AM THAT I AM      AM I AM THAT I      AM AM I I THAT      I AM AM I THAT
THAT AM I AM I      I THAT AM I AM      AM I THAT AM I      AM AM I THAT I      I THAT AM I AM
I AM AM THAT I      I I AM AM THAT      THAT I I AM AM      AM I AM THAT I      THAT AM AM I I
AM I AM THAT I      I AM I AM THAT      THAT I AM I AM      AM THAT I I AM      AM AM THAT I I
I AM AM THAT I      I I AM AM THAT      THAT I I AM AM      AM THAT I I AM      I AM THAT I AM
AM I AM THAT I      I AM I AM THAT      THAT I AM I AM      AM THAT I I AM      AM AM THAT I I
AM AM I THAT I      I AM AM I THAT      THAT I AM AM I      I THAT I AM AM      AM I THAT I AM
AM AM I THAT I      I AM AM I THAT      THAT I AM AM I      I THAT I AM AM      AM I THAT I AM
I THAT AM AM I      I I THAT AM AM      AM I I THAT AM      AM AM I I THAT      THAT AM AM I I
THAT I AM AM I      I THAT I AM AM      AM I THAT I AM      AM AM I THAT I      I AM AM I THAT
I AM THAT AM I      I I AM THAT AM      AM I AM THAT I      THAT AM I I AM      AM I THAT I AM
AM I THAT AM I      I AM I THAT AM      AM I AM I THAT      THAT AM I AM I      THAT I AM I AM
THAT AM I AM I      I THAT AM I AM      AM I THAT AM I      AM AM I I THAT      THAT AM I AM I
AM THAT I AM I      I AM THAT I AM      AM I AM THAT I      AM AM I THAT I      AM I AM I THAT
THAT AM I AM I      I THAT AM I AM      AM I THAT AM I      I AM I AM THAT      THAT I AM I AM
THAT AM AM I I      I THAT AM I AM      AM I AM THAT I      I THAT I AM AM      AM I AM I THAT
AM THAT AM I I      I AM THAT AM I      AM I I AM THAT      I THAT I AM AM      I THAT AM I AM
THAT AM AM I I      I THAT AM I AM      AM I AM THAT I      AM AM I I THAT      THAT AM AM I I
AM AM THAT I I      I I AM THAT AM      AM I I AM THAT      AM AM I THAT I      I AM AM I THAT
AM AM THAT I I      I AM AM I THAT      AM I I AM THAT      THAT AM I I AM      AM I THAT I AM
THAT AM AM I I      I I THAT AM AM      AM I THAT AM I      THAT AM I AM I      AM I THAT I AM
AM THAT AM I I      I AM THAT I AM      AM I AM THAT I      I AM I THAT AM      THAT AM I I AM
I AM I AM THAT      THAT I AM I AM      AM I AM THAT I      I AM I AM THAT      AM I AM I THAT
AM I I AM THAT      THAT AM I I AM      AM THAT AM I I      I AM THAT AM I      THAT I AM I AM
I I AM AM THAT      THAT I I AM AM      AM THAT I I AM      AM AM THAT I I      THAT AM I I AM
I I AM AM THAT      THAT I I AM AM      AM THAT I I AM      AM AM THAT I I      I AM AM THAT I
AM I I AM THAT      THAT AM I I AM      AM THAT AM I I      I AM THAT AM I      I I AM THAT AM
I AM I AM THAT      THAT I AM I AM      AM THAT I AM I      I AM THAT I AM      AM I AM THAT I
I AM AM I THAT      THAT I AM AM I      I THAT I AM AM      AM I I THAT AM      AM AM I THAT I
AM I AM I THAT      THAT AM I AM I      I THAT AM I AM      AM I THAT AM I      I AM I THAT AM
I AM AM I THAT      THAT I AM AM I      I THAT I AM AM      AM I THAT AM I      AM AM I THAT I
AM I AM I THAT      THAT AM I AM I      I THAT AM I AM      AM I THAT AM I      I AM I THAT AM
AM AM I I THAT      THAT AM AM I I      I THAT AM AM I      I I THAT AM AM      AM I I THAT AM
AM AM I I THAT      THAT AM AM I I      I THAT AM AM I      I I THAT AM AM      AM I I THAT AM
```

Figure 2. Brion Gysin, *I am that I am*, [1960].

Figure 3. Brion Gysin, *I am that I am*, [1960].

Nanni Balestrini is also a concretist poet (Balestrini, 1963: 195-205).[17] His *Tape Mark I* (October 1961) (Balestrini, 1961: 145-151)[18] is a "derivative" text, generated from a selection of passages from three pre-existing narrative works belonging to different genres: *Hiroshima Diary* by Michihito Hachiya, *The Mystery of the Elevator* by Paul Goldwin and the *Tao Te Ching* by Lao Tzu [Cf. Fig. 4]. The pre-existing linguistic materials were first broken down into minimal units and then

17 A few months earlier, Balestrini had put his concrete poems on exhibition at the "Ferro di cavallo" art gallery in Rome. He defined them as "chronograms."

18 The text was preceded by a foreword by the author and with reproductions of spreadsheets, flow diagrams and part of the program.

recomposed in a pre-ordinate collage. This is shown in the instructions given with the program (146-149). In the foreword, Balestrini wrote:

> The problem posed was not about obtaining from the machine an imitation of processes peculiar to humans. It was simply about exploiting the abilities of the electronic means to resolve, very fast, certain complex operations pertaining to poetic technique. The usefulness of, and the legitimate resort to, the methods and means made available by science and by the most advanced technologies, intended as an integration of the literary and artistic creative work, become manifest insofar as we belong to an industrial civilization. (145)

Figure 4. Nanni Balestrini, *Tape Mark I*, 1961.

Bense himself knew about Balestrini's experiments, but remarked that they were of limited complexity, because programming techniques diminished the heuristic value of the process, alien to the paradigms of the information theory:

> In 1963, Nanni Balestrini published in his *Come si agisce* machine-generated artificial texts that were not really developed as Shannon's approximations; on the contrary, they were programmed via an IBM 7070 into 1200 orders relative to combinations of 10 pre-given elements according to syntax rules. (Bense, 1967/68: 21)[19]

---

19 Later in Bense, 1974: 474-475. A quick mention of Balestrini's research also appears in Bense, 1969: 63.

There is an affinity between Lutz's 'stochastic' texts and Balestrini's *Tape Mark I*, in the sense that they are both derivative works: "Here the basic principle is to take an existing line or poem and alter it in some systematic way."[20] The specificity of this approach was determined later, when it became necessary to differentiate between that form of derivation and other types of texts, of 'formulary' nature: "Formulary poems consist of strings of sentences generated by means of a formula or syntactic rule" (Franke 1971: 51).

Considering that the former derivative texts require literary skills and sensibility, we understand why Lutz did not continue his experiments.

In these textual devices, the most relevant aspect is the re-affirmation of the role of the author as the one responsible for the evaluation of the materials processed and their final selection. In other words, here the author acts as writer/reader, or 'wreader.'

IV. *CYBERNETIC SERENDIPITY*

When, in the summer of 1968, the Institute of Contemporary Arts in London organized the exhibition *Cybernetic Serendipity*,[21] we may infer from its catalogue that Bense's aspirations had not been followed. Up to that moment, there was but one isolated experiment tried by the Scottish poet Edwin Morgan. Besides, in the section on *Computer poems and texts* (Reichtardt ed., 1968: 53-62), haiku was privileged as "perfect for computer reformulation" (Funkhouser, 2007: 35), being a textual model of only 3 verses and a total of 17 syllables, deriving from a centuries-old Japanese tradition known and appreciated by many Western poets (Masterman, 1971: 176).

Morgan's three "simulated computer poems" (Reichtardt ed., 1968: 57), that in any case establish a connection between Computer Poetry and Concrete Poetry,[22] had been developed with "the scope to simulate computer poetry without recourse to the machine" (Bailey, 1973: 40) and are basically limited to performing the serial completion of permutational phenomena [Cf. Fig. 5, 6, and 7]. In other words, we can recognise in those works the principles of Moles' permutational art, but we can also read them as an expression of the wish for a more complex operational feasibility that was not available then. The other contributions, "a fragment of the complete programme" of *The house of Dust* [Cf. Fig. 8 and 9], a work by Alison Knowles and James Tenney (Vostell and Higgins, 1969), and the "automatic sentence generation" experiment by Jean A. Baudot, dating back

---

20 Louis T. M[ilic], "Computer Poetry." The New Princeton Encyclopedia of Poetry and Poetics, 1993, 230.

21 See Reichtardt ed., 1968. Cf. the review by Radoslav Putar (1969: 84-100): "Cybernetic serendipity an exhibition in the institute of contemporary arts in London August 2-October 20 1968." BIT international 1.1 [issue entirely dedicated to "The theory of information and the new aesthetics"].

22 Many critics doubt that Concrete Poetry should be considered as one of the forebears of Computer Poetry. Cf. for instance, Newell, 1983: 159.

to 1964 (Reichtardt ed., 1968: 58),[23] appear to be more interested in the importance of program development, which in the latter case was based on a mathematical model.

THE COMPUTER'S FIRST CHRISTMAS CARD

```
jollymerry
hollyberry
jollyberry
merryholly
happyjolly
jollyjelly
jellybelly
bellymerry
hollyheppy
jollyMolly
marryJerry
merryHarry
hoppyBarry
heppyJarry
boppyheppy
berryjorry
jorryjolly
moppyjelly
Mollymerry
Jerryjolly
bellyboppy
jorryhoppy
hollymoppy
Barrymerry
Jarryhappy
happyboppy
boppyjolly
jollymerry
merrymerry
merrymerry
merryChris
ammerryasa
Chrismerry
asMERRYCHR
YSANTHEMUM
```

Figure 5. Edwin Morgan, *Computer's first Christmas card*, 1965.

---

23 The explanation and the two pages reproduced are taken from Baudot's *La machine à écrire* (1964).

```
goodk kkkkk unjam ingwe nches lass? start again goodk
lassw enche sking start again kings tart! again sorry
goodk ingwe ncesl ooked outas thef? unmix asloo kedou
tonth effff rewri tenow goodk ingwe ncesl asloo kedou
tonth effff fffff unjam feast ofsai ntste venst efanc
utsai ntrew ritef easto fstep toeso rryan dsons orry!
start again good? yesgo odkin gwenc eslas looke dout?
doubt wrong track start again goodk ingwe ncesl asloo
kedou tonth efeas tofst ephph phphp hphph unjam phphp
repea tunja mhphp scrub carol hphph repea tscru bcaro
lstop subst itute track merry chris tmasa ndgoo dnewy
earin 1699? check digit banks orryi n1966 endme ssage
```

Figure 6. Edwin Morgan, *Computer's second Christmas card*, 1965.

```
TEYZA PRQTP ZSNSX OSRMY VCFBO VJSDA
XSEVK JCSPV HSMCV RFBOP OZQDW EAOAD
TSRVY CFEZP OZFRV PTFEP FRXAE OFVVA
HFOPK DZYJR TYPPA PVYBT OAZYJ UAOAD
VEQBT DEQJZ WSZZP WSRWK UAEYU LYSRV
HYUAX BSRWP PIFQZ QOYNA KFDDQ PCYYV
BQRSD VQTSE TQEVK FTARX VSOSQ BYFRX
TQRXQ PVEFV LYZVP HSEPV TFBQP QHYYV
VYUSD TYVVY PVSZZ PCYJP FRDFV QYEVQ
PJQBT CYFES JQSZP QTTQZ DQRQZ VQUSP
TFRWP VCEYJ TZQSR JYEXP QOYFV XCYJP
MCYPV CQSWF AUSVP QTSRM GYYSX VQUSP
```

Figure 7. Edwin Morgan, *Computer's first Code Poem*, 1965.

```
A HOUSE OF PAPER
        AMONG HIGH MOUNTAINS
                USING NATURAL LIGHT
                        INHABITED BY FISHERMEN AND FAMILIES

A HOUSE OF LEAVES
        BY A RIVER
                USING CANDLES
                        INHABITED BY PEOPLE SPEAKING MANY LANGUAGES WEARING LITTLE OR NO CLOTHING

A HOUSE OF WOOD
        BY AN ABANDONED LAKE
                USING CANDLES
                        INHABITED BY PEOPLE FROM MANY WALKS OF LIFE

A HOUSE OF DISCARDED CLOTHING
        AMONG HIGH MOUNTAINS
                USING NATURAL LIGHT
                        INHABITED BY LITTLE BOYS

A HOUSE OF DUST
        IN A PLACE WITH BOTH HEAVY RAIN AND BRIGHT SUN
                USING ALL AVAILABLE LIGHTING
                        INHABITED BY FRIENDS

A HOUSE OF DUST
        IN A DESERTED CHURCH
                USING ALL AVAILABLE LIGHTING
                        INHABITED BY PEOPLE SPEAKING MANY LANGUAGES WEARING LITTLE OR NO CLOTHING

A HOUSE OF MUD
        IN AN OVERPOPULATED AREA
                USING ELECTRICITY
                        INHABITED BY LITTLE BOYS

A HOUSE OF WEEDS
        UNDERWATER
                USING CANDLES
                        INHABITED BY VARIOUS BIRDS AND FISH

A HOUSE OF BROKEN DISHES
        IN SOUTHERN FRANCE
                USING CANDLES
                        INHABITED BY PEOPLE WHO ENJOY EATING TOGETHER

A HOUSE OF ROOTS
        IN A PLACE WITH BOTH HEAVY RAIN AND BRIGHT SUN
                USING ALL AVAILABLE LIGHTING
                        INHABITED BY PEOPLE WHO LOVE TO READ

A HOUSE OF STRAW
        IN SOUTHERN FRANCE
                USING NATURAL LIGHT
                        INHABITED BY COLLECTORS OF ALL TYPES
```

Figure 8. Alison Knowles, *A house of dust*, 1968.

```
A HOUSE OF STRAW
        IN MICHIGAN
             USING ALL AVAILABLE LIGHTING
                  INHABITED BY VARIOUS BIRDS AND FISH

  A HOUSE OF STEEL
        IN A METROPOLIS
             USING ELECTRICITY
                  INHABITED BY FRIENDS AND ENEMIES

  A HOUSE OF PAPER
          BY AN ABANDONED LAKE
               USING ALL AVAILABLE LIGHTING
                    INHABITED BY FRIENDS

    A HOUSE OF PLASTIC
          ON AN ISLAND
               USING ELECTRICITY
                    INHABITED BY PEOPLE FROM MANY WALKS OF LIFE

  A HOUSE OF ROOTS
           AMONG SMALL HILLS
                USING NATURAL LIGHT
                     INHABITED BY AMERICAN INDIANS

    A HOUSE OF DISCARDED CLOTHING
          IN A HOT CLIMATE
               USING ELECTRICITY
                    INHABITED BY AMERICAN INDIANS

  A HOUSE OF BRICK
           AMONG OTHER HOUSES
                USING ALL AVAILABLE LIGHTING
                     INHABITED BY FRIENDS

    A HOUSE OF LEAVES
          UNDERWATER
               USING CANDLES
                    INHABITED BY COLLECTORS OF ALL TYPES
```

Figure 9. Alison Knowles, *A house of dust*, 1968.

V.HAIKU

The Japanese haiku gathered more success, at least in terms of quantity. Margaret Masterman and Robin McKinnon Wood's haiku were the output of a TRAC (Text Reckoning and Compiling) generator (Reichtardt ed., 1968: 54).

Charles O. Hartman explained the use of haiku by John Morris from the Michigan State University (Morris, 1967: 17-20) in 1967 with these words:

> Haiku were especially common. The reasons are clear from the history of modern Imagist poetry. As both poets and programmers have realized, for different reasons, the reader's mind works most actively on sparse materials. We draw the clearest constellations from the fewest stars. So the nonsense factor is low for a tiny collocation of words that can be imbued with imagistic significance. It's hard to put together two words that don't make some kind of sense to the willing reader. (Hartman, 1996: 31)

While listing the Computer Poetry works that used haiku — that appear to have not decreased to this date — understandable comparisons led Masterman to acknowledge that the results achieved by Computer Poetry appeared to be inferior compared to the results obtained by graphics, music, and cinema. Still, she underlined the decisive importance of the author's selection in the last stage of development: "He himself programs the algorithms at the beginning, and he himself chooses between the vast number of mechanical poems which have been generated, at the end" (Masterman, 1971: 183).

VI. CONCRETE POETRY ANTHOLOGIES

In the Sixties, Concrete Poetry gradually spread to many countries in the world, as is shown by the many publications of creative texts and exhibitions (D'Ambrosio, 1979: 249-261). In those years, Concrete Poetry benefited from a wide network of international relations. A global community guaranteed exhibitions, publications and reviews, which in the best cases were tied to studies on semiotics. The poets tried to remedy to the lack of critiques by promoting public and publishing initiatives.

Between 1967 and 1971, the main anthologies — i.e. those edited by Stephen Bann (1967: 174), Emmett Williams (1967: [216]), Mary Ellen Solt (1968: 210) and John J. Sharkey (1971: 69) — contain merely a reproduction of "Computer's first Christmas card" by Morgan. Certain personal choices of the editors are worth noting: Williams even ignores his own experiments — *Musica* (1965), [24] *IBM* (1966)[25] — and prefers proposing a page from a short story by Ekbom, an unidentified author. On her part, Solt presents the program (but not the text) of a *Computer Poem* by Carl Fernbach-Flarsheim (Solt, 1968: 246).

Those early anthologies show that a new sub-genre was slowly being born, a scarcely significant variant of the corpus that could be defined as "Computerized Concrete Poetry." The existence of a new form of art characterised by the use of the computer as a tool was noted maybe for the first time — not without indicating plausible examples — in *Computer for the Arts*, a book by Dick Higgins that defined an artificial language, Fortran, as useful for the "solution of creative problems" (Higgins, 1970: 1).

VII. FRANKE'S INTERPRETATION

"Basic computer-versifying principles of permutational change, randomness, and repetition had always been common ingredients in Concrete poetry" (Newell, 1983: 161). The connections between Computer Poetry and Concrete Poetry were highlighted in 1971 by the physicist and artist Herbert W. Franke, "the

24   A reproduction is found in D'Ambrosio, 2009a: 9-10.
25   Also known under the title The ultimate poem. See the first section by Williams, 1973: [5-73].

first significant writer on computer art: (...) he stated that only members of the scientific community had the language, awareness, and skill to approach the new form" (Franke, 1971: 7).

Apart from marginality, Franke recognises in Computer Poetry a stylistic reminiscence of Concrete Poetry, even though the configuration criteria refer especially to the research in Computer Graphics:

> The relatively simple language patterns accessible to contemporary computer poetry are reminiscent of the stylistic means of concrete poetry. This is marked by a restriction to linguistic elements of the utmost simplicity, the breaking up of relations, the juxtaposition of fragments and so on. If computers are introduced for such experiments, satisfactory results may well follow. [...] Alan Sutcliffe's works are an example of this. The kind of concrete poetry where the surface distribution of linguistic elements becomes a formative component — in a sense already a transition to graphics — is also open to the application of the computer. Works of this kind come from Marc Adrian. (Franke, 1971: 51)

Therefore, Franke gives two examples to support his considerations. A "Semantic infra- and meta-structure" by Adrian [Cf. Fig. 10, 11, 12, and 13], who worked at the Vienna Institute for Advanced Studies (51),[26] is defined as "computer-generated 'concrete' text" and classified among the results of research on 'optical semantics.'[27] However, in *Cybernetic Serendipity* Adrian had assured that "choice, size and disposition [of words] are determined at random" (Reichardt ed.: 53). As to the *Poems for SPASMO* by British Alan Sutcliff [Cf. Fig. 14],[28] a pioneer of Computer Music, Franke explains how the author introduced verbal configurations in a "multimedia composition":

> These works are components of SPASMO, a multi-media composition for magnetic tape and colour slide presentation. Each run of the program produces 256 poems. Through the input of a vocabulary and other data, a fresh series of poems can be produced. The program is written in FORTRAN and was run in the ICL office at Reading, Berks., on an ICL 194. The première took place on February 10, 1969, in the Queen Elizabeth Hall, London. (50-51)
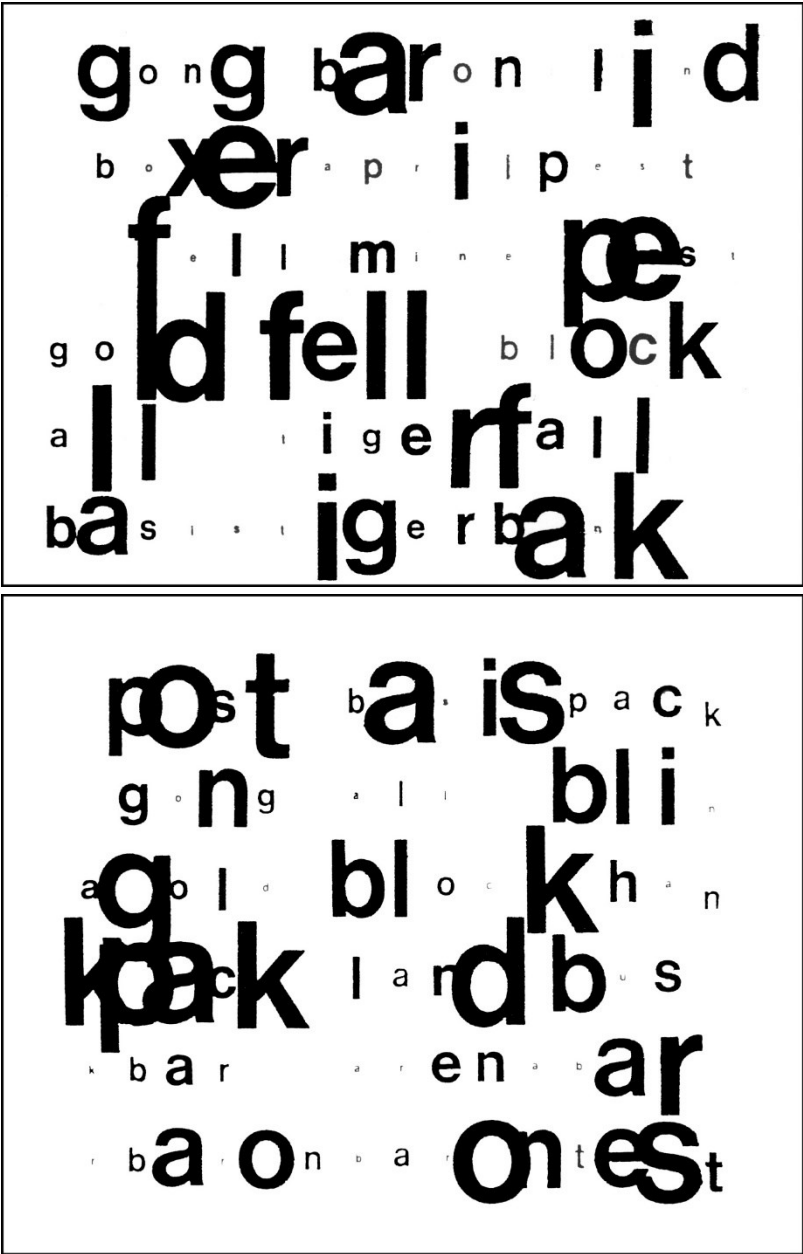
---

26 A text belonging to that same series was reproduced in the catalogue of the event Impulse Computerkunst. Grafik – Plastik – Musik – Film (see Franke, 1970).
27 The author, already a member of Group Zero, produced a number of markedly experimental films in those years.
28 Text no. 3142 is taken from Event One, 1969.
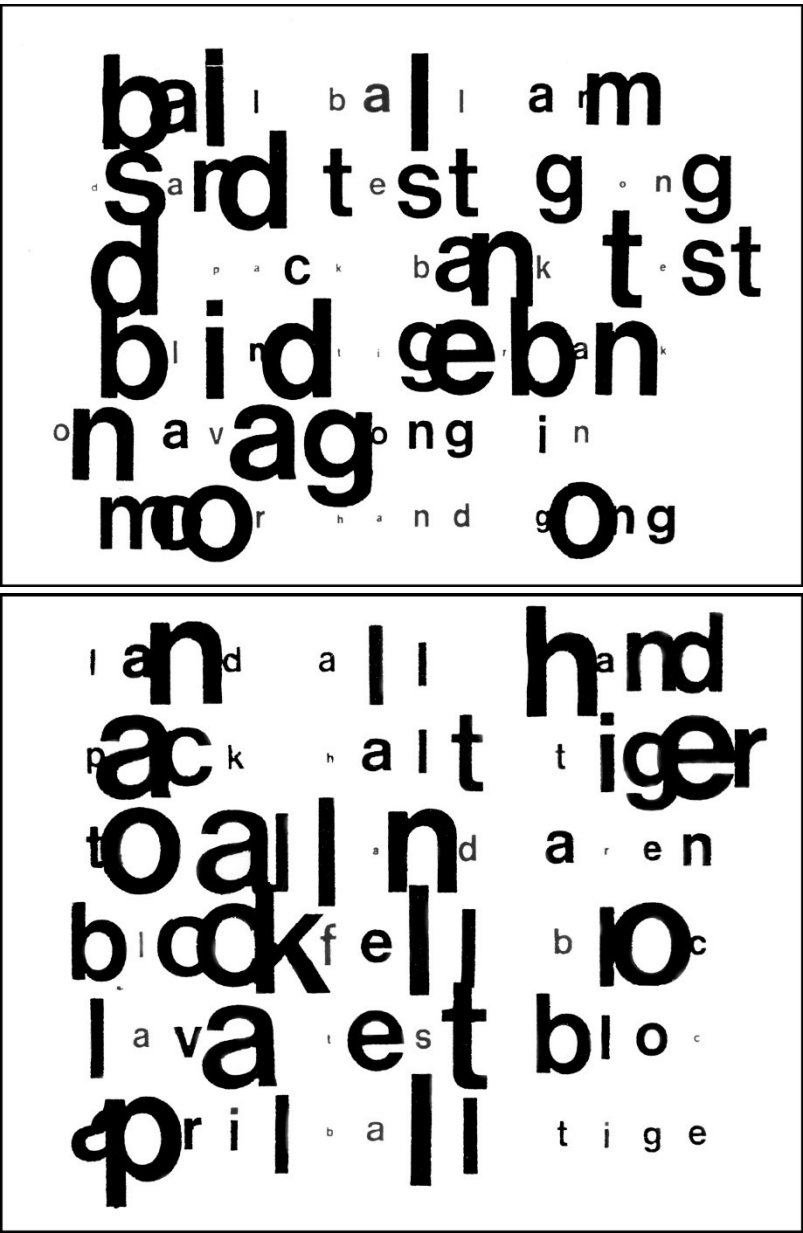
Figures 10, 11, 12 and **13**. Marc Adrian, "Semantic infra- and meta- structure," 1970.

```
POEM 3142            FOR SPASMO          ALAN SUTCLIFFE
COMPOSED USING ICL 1904      INTERNATIONAL COMPUTERS LIMITED

29 AND 30 MARCH 1969      EVENT  ONE     COMPUTER ARTS SOCIETY
SATURDAY AND SUNDAY       EVENT  ONE     ROYAL COLLEGE OF ART

WHEN YOU SEE THE ROAD PLEASE SAY THIS POEM BEGINNING QUIETLY


                          LIKEW                LIKE GALAXIES
                          LIKESN               LIKESUNLIGH
                          LIKESAN               LIKECIRCU
                          LIKEHAIR               LIKEGAL
   LIKESNOW    LIKEPRINT  LIKELOAVES   LIKECARNAGE  LIKESHUTTERS    LIKE
   LIKETIME    LIKESTEAM  LIKEFLAMES   LIKEPLANETS  LIKEMACHINES    LIKE
   LIKEHAIL    LIKEFLESH  LIKELFAVES   LIKEFLOWERS  LIKECIRCUITS    LIKE
   LIKERAIN    LIKENIGHT  LIKEPLUMES   LIKEPEBBLES  LIKE            LIKE
FLAMES                                   LIKEBRASS
STARS                                    LIKEPRINT
HAIL                                     LIKEFLESH
                                         LIKESTEAM
                                         LIKENIGHT
                                         LIKESTARS
                                         LIKEVEINS
```

Figure 14. Alan Sutcliffe, "Poem no. 3142," 1969.

The first anthology dedicated entirely to this genre, edited by Richard W. Bailey, shows that early Computer Poetry had not progressed much. Its textual models reminded not only those of Concrete Poetry, but also referred to (1) "poetry of sound in verbal orchestration," (2) "imaginistic poetry in the juxtaposition of the unfamiliar" (hardly identifiable) and (3) "haiku" (Funkhouser, 2007: 9).

The scarce quantity of texts produced within this "largely disorganized global phenomenon" (Funkhouser, 2007: 28), and by science scholars more than by artists, is probably due to the following reasons: (1) limited availability of data processing tools; (2) isolation of individual authors, without any or scarce exchanges of information and ideas, especially as far as neo-avant-garde poetry was concerned.

VIII. CONCLUSIONS

Jakobson's prefiguration had no significant impact on the poetry of Velimir Khlebnikov. Neither did Bense's involvement cause an immediate and significant diffusion (including in quantitative terms) of a Computer Poetry related with Concrete Poetry. Just as historical avant-gardes had tried to simulate effects that could not be achieved in their times, Morgan's experimental simulations showed the way for the future feasibility of a Concrete Poetry capable of accomplishing the options available in its textual models.

In the Sixties, the editors of major anthologies identified a sub-genre, not yet fully developed, that could be denominated 'Computerised Concrete Poetry,' and started to include works that were actually born from Computer Graphics,

to counterbalance its limited diffusion. The Computer Poetry that was then developing, as is shown in the texts quoted by Franke, tried to assimilate certain textual strategies that reminded of Concrete Poetry. However, in the works of Adrian and Sutcliffe, the addition of the hyper-coding of verbal signs was inspired by contemporary computer graphics strategies.

The early experiments (like those of Lutz or Balestrini) have their 'literariness' guaranteed by a prevailing feature that allows us to define them as 'derivative' works. However, the research focused mostly on programming and processing languages, where verbal linguistic system and creative variant are only a component. Apart from a combinatory approach (that has been implemented for centuries), the few texts produced appear to prefer the permutation referred to by Moles in his treatise on aesthetics. Both in Gysin's *I am that I am* and in the works of Morgan included in the catalogue of *Cybernetic Serendipity*, there is the simulation of a further possible computer processing. In other words, by retracing the history of early times we understand the disappointment of a minority of the literary community, focused on the advanced research in innovative forms of post-verbal writing and in new connections between art and new technologies.

REFERENCES

Almanacco letterario Bompiani 1962 (1961). Milano: Bompiani.

[Anon.]. "The Pocketa, Pocketa School." *Time Magazine* (May 25, 1962).

AUBERT, Jean-Paul, Serge Milan, and Jean-François Trubert, eds. (2018). *De l'avant-garde, des avant-gardes: frontières, mouvements,* III. Sampzon: Editions Delatour. Forthcoming.

BAILEY, Richard W. (1973). *Computer Poems.* Drummond Island, MI: Potagannissing.

BALESTRINI, Nanni (1961). "Tape Mark I." *Almanacco letterario Bompiani.*

––––––––– (1963). *Come si agisce.* Milano: Giangiacomo Feltrinelli Editore.

––––––––– (1996). "Riflessioni sulla scrittura elettronica". http://www.mediamente.rai.it

BANN, Stephen, ed. (1967). *Concrete Poetry: An International Anthology.* London: London Magazine editions.

BAUDOT, Jean A. (1964). *La machine à écrire.* Montreal: Editions du Jour.

BENJAMIN, Walter (1992). "The Work of Art in the Age of Mechanical Reproduction [1936]". *Illuminations.* Ed. Hannah Arendt. London: Fontana Press.

BENSE, Max (1965). "Konkrete Poesie." *Sprache im Technischen Zeitalter* 15: 1236-1244.

––––––––– (1966), "Stili sperimentali." *Modulo* 1.1: 5-9.

––––––––– (1967/68). "Progetti di estetica generativa." *Il Verri* 12.22: 17-23.

––––––––– (1969). *Teoria testuale della poesia.* Roma: Silva editore.

––––––––– (1971). *Pequena estética*. São Paulo: Perspectiva.

BENSE, Max, and Elisabeth Walter, eds. (1965). "Konkrete poesie international." *Rot* 21.

BURROUGHS, William S., and Brion Gysin (1978). *The Third Mind.* New York: Seaver Books.

CAIGNARD, Rolland (1998). "La poésie électronique." *Lo stato delle cose* 2.6: 45-57.

Chercher le texte (2018). Morgantown: West Virginia University Press. EBook. Forthcoming.

D'AMBROSIO, Matteo (1979). "Sémiotique de la poésie concrete." *Canadian Journal of Research in Semiotics* 6.3 / 7.1: 249-261.

––––––––– (2009a). "Le disavventure della parola. Dalle avanguardie storiche all'ambiente multimediale." *Il testo, l'analisi, l'interpretazione, III: Letteratura, tecnologia, scienza.* Ed. M. D'Ambrosio. Napoli: Liguori Editore: 1-19.

––––––––– (2009b). *Roman Jakobson e il futurismo italiano.* Napoli: Liguori Editore.

––––––––– (2018a). "Di come Carlo Belloli, partendo dal "Poema preciso" marinettiano, divenne il precursore della Poesia concreta," *De l'avant-garde, des avant-gardes: frontières, mouvements.* Ed. Jean-Paul Aubert, Serge Milan, and Jean-François Trubert, eds. Forthcoming.

––––––––– (2018b). "A 'Poetry of Numbers'? Khlebnikov, Jakobson, Marinetti, Schwitters, Kostelanetz." *Chercher le texte.* Morgantown: West Virginia University Press. EBook. Forthcoming.

DONGUY, Jacques (1997). "Poésie et ordinateur."

http://www.sitec.fr/users/akenatondocks/theory_f/DONGUY. htm.

ECO, Umberto (1965). *Opera aperta.* Milano: Bompiani.

ECO, Umberto, ed. (1972). *Estetica e teoria dell'informazione.* Milano: Bompiani.

EDELINE, Francis (1969). "Une syntaxe topologique." *Le Journal des poètes* 39.2: 12-15.

Event One. London: Computer Arts Society, 1969.

FERRAN, Bronac (2017). *The Smell of Ink and Soil: The Story of (Edition) Hansjörg Mayer.* Köln: Walther König.

FRANKE, Herbert W. (1970). *Impulse Computerkunst. Grafik – Plastik – Musik – Film.* München: Kunstverein.

––––––––– (1971). *Computer Graphics / Computer Art.* London: Phaidon.

FUNKHOUSER, Christopher (2007). *Prehistoric Digital Poetry: An Archaeology of Forms, 1959-1995.* Tuscaloosa: University of Alabama Press.

––––––––– (2012b). "First-Generation Poetry Generators". *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts.* Ed. Hannah B. Higgins and Douglas Kahn. Berkeley: University of California Press. 243-265.

GARNIER, Pierre (1968). *Spatialisme et poésie concrete.* Paris: Gallimard.

GARVIN, Harry R., and James M. Heath eds. (1983). *Science and Literature.* London-Toronto: Bucknell University Press.

GOMRINGER, Eugen, ed. (1972). *Konkrete poesie: Deutschprache autoren.* Stuttgart: Philipp Reclam.

GROUPE μ. (1977). *Rhétorique de la poésie: Lecture linéaire lecture tabulaire.* Bruxelles: Edition Complexe.

HARTMAN, Charles O. (1996). *Virtual Muse: Experiments in Computer Poetry.* Hannover-London: Wesleyan University Press.

HIGGINS, Dick (1970). *Computers for the Arts.* Somerville, MA: ABYSS Publications.

HIGGINS, Hannah B., and Douglas Kahn (2012a). "Introduction". *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*, Berkeley: University of California Press. 1-14.

HIGGINS, Hannah B., and Douglas Kahn, eds. (2012b). *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts.* Berkeley: University of California Press.

KLÜTSCH, Christoph (2012). "Information Aesthetics and the Stuttgart School." *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts.* Ed. Hannah B. Higgins and Douglas Kahn. Berkeley: University of California Press. 65-89.

KOSTELANETZ, Richard, ed. (1980). *Text-Sound Texts.* New York: William Morrow and Company.

KRAUSE, Manfred, und Götz F. Schaudt eds. (1967). *Computer-Lyrik.* Düsseldorf: Droste Verlag.

JACKSON, K. David, Eric Vos, and Johanna Drucker, eds. (1996). *Experimental – Visual – Concrete. Avant-Garde Poetry since the 1960s.* Amsterdam: Rodopi.

JAKOBSON, Roman (1983). Letter to V. Khlebnikov [February 1914]. Italian trans. Remo Faccani. *Il Verri* 28.31/32: 71.

Longman Dictionary and Handbook of Poetry (1985). New York.

LUTZ, Theo (1959). "Stochastische Texte." *Augenblick* 4.1: 3-9. English translation: http://www.stuttgarter-schule.de/lutz_schule_en.htm.

––––––––– (1960). "Über ein Programm zur Synthese stochastisch-logischer Texte." Grundlagenstudien aus Kybernetik und Geisteswissen-schaft 1.1: 11.

MARCUS, Adrian (1974). "An Introduction to the Visual Syntax of Concrete Poetry." *Visible Language* 8.4: 333-360.

MARINETTI, Filippo Tommaso (1912). *I poeti futuristi, con un proclama di F. T. Marinetti e uno studio sul Verso libero di P. Buzzi.* Milano: Edizioni futuriste di "Poesia".

MASTERMAN, Margaret (1971). "Computerized haiku." *Cybernetics, Art and Ideas*: 175-183.

MINGUET, Philippe (1969). "La poésie comme art de l'espace." *Le Journal des poètes* 39.2: 2-5.

MOLES, Abraham [1962]. "Erstes manifest der permutationellen kunst." *Rot* 3.8.

––––––––– (1972). "Analisi delle strutture del messaggio poetico a differenti livelli della sensibilità. L'aspetto informazionale dei problemi di una poetica." *Estetica e teoria dell'informazione*: 131-152.

MORRIS, John (1967). "How to Write Poems with a Computer." *Michigan Quarterly Review* 6.1: 17-20.

PREMINGER, Alex, Terry Brogan, and Frank Warnke, eds. (1993). *The New Princeton Encyclopedia of Poetry and Poetics*. Princeton, N.J.: Princeton University Press.

NEWELL, Kenneth B. (1983). "Pattern, Concrete, and Computer Poetry: The Poem as Object in Itself." *Science and Literature*. Ed. Harry Raphael Garvin, Harry Garvin, and James M. Heath. Lewisburg: Bucknell University Press.159-173.

PUTAR, Radoslav (1969). "Cybernetic serendipity an exhibition in the institute of contemporary arts in London, August 2-October 20 1968." *BIT international* 1.1: 84-100.

QUENEAU, Raymond (1950). *Batons, chiffres et lettres*. Paris: Gallimard.

REICHARDT, Jasia, ed. (1968). *Cybernetic Serendipity. The Computer and the arts. A Studio International special issue*. Ed. London: W. & J. Mackay.

––––––––– (1971). *Cybernetics, Art and Ideas*. Greenwich, CT.: New York Graphic Society.

SHARKEY, John, ed. (1971). *Mindplay. An Anthology of British Concrete Poetry*. London: Lorrimer Publishing.

SOLT, Mary Ellen, ed. (1968). "A World Look at Concrete Poetry." *Artes Hispanicas / Hispanic Arts* 1:3/4.

TZARA, Tristan (1918). "Manifeste Dada 1918." *Dada* 2.3: 2-4.

VOSTELL, Wolf, and Dick Higgins (1969). *Fantastic Architecture.* New York: Something Else Press.

WALTHER, Elisabeth (1996). "The Relations of Haroldo de Campos to German Concretist Poets, in Particular to Max Bense." *Experimental – Visual – Concrete. Avant-Garde Poetry since the 1960s*. Eds. K. David Jackson, Eric Vos, and Johanna Drucker. Amsterdam: Rodopi. 353-366.

WILLIAMS, Emmett (1973). *A Valentine for Noël. Four Variations on a Scheme.* Barton-Brownington-Berlin: Something Else Press.

WILLIAMS, Emmett, ed. (1967). *Anthology of Concrete Poetry.* New York: Something Else Press.

WORTHY, R. M. (1962). "A New American Poet Speaks: The Works of A. B." *Horizon* 4.3: 96-99.