MODERN GENERATORS

Andrzej Pająk

Most Polish cybertexts are related to literature. However, one can also look for ergodic texts outside of the domain of texts. We can take, for example, several works by Stanisław Dróżdż, especially his *The Between*, which stands on the border of literature and fine art. This kind of work can only fully be realized and experienced in a gallery space. If we browse through numerous exhibition catalogues we would additionally find other similar art projects that use text as their basic material. The most interesting of these seems to be projects by Józef Żuk Piwkowski and Wojciech Bruszewski that stand out as the most accomplished examples of combinatorial art in Poland. Their artistic achievements could be compared to the mathematical works of OuLiPo.

To have a full image of modern text machines one cannot forget two other, much younger cybertexts: *Bluzgator Bis* and the web poetry project *Text Messages Day by Day* by Marek Oktawian Bulanowski. If we put them side by side, it is quite obvious that Piwkowski and Bruszewski's works, created in the times before personal computers and the Internet, are more cybertextual than web-based works. This is something I mention in the last part of this article. *Text Messages Day by Day* are written in a group of combinatorial texts that appear randomly on screen. But this is only because its publisher and editor Mariusz Pisarski had supplied it with a corresponding algorithm. The scriptons of the work, so to say, were already there, giving it a static character, which was made more dynamic only as an afterthought. *The Bluzgator Bis* on the other hand, uses the idea of paper-based "party speech generators" that are circulated, along with papers of the opposition, which were self-published under the communist regime. Interestingly, formal

solutions and options embedded in the algorithm itself make the work worth mentioning.

Figments of Infinity or Curse of Algorithm: The Book Of All Words

The Book Of All Words (*BAW*) by Józef Żuk Piwkowski until now has not been practically perceived in a literary context. This is a pity as it stands out as one of the most interesting, and at the same time oldest, of the 20th century Polish ergodic works. It had a digital form already in its first instantiation which appeared in 1975[1]. Based on Piwkowski's original idea, the cybertextual algorithm of this work was created by Mieczysław Gryglik on the office computer Mera 300 (250 000 instructions per second).

The general rule of this version (as well as later versions) of *BAW* is based on the same concept: Piwkowski's work should be a collection of all the existing and potential words, which one can arrange from 26 letters of Latin alphabet. At the same time *The Book* itself in its physical entirety only exists in a form of algorithm-program. That is why its print is impossible, because the number of pages is infinite. The reader can only see separate pages. Access to them is possible in two ways: either by giving the number of a page one wants to see or by entering a desired word. In both cases, a printout in the first version, at the very moment of when an image of the page is on the screen, is the result of algorithm work. Every "tear out" is in such way that the page of *The Book*, besides the next words are ordered by the number of the chapter, and what is more important, by the number of the next page.

Pagination is based on a generally defined page layout, which contains up to 1800 symbols, according to a chapter-based segmentation of the work. Numbering of chapters is determined by the number of letters from which a word is assembled. This way

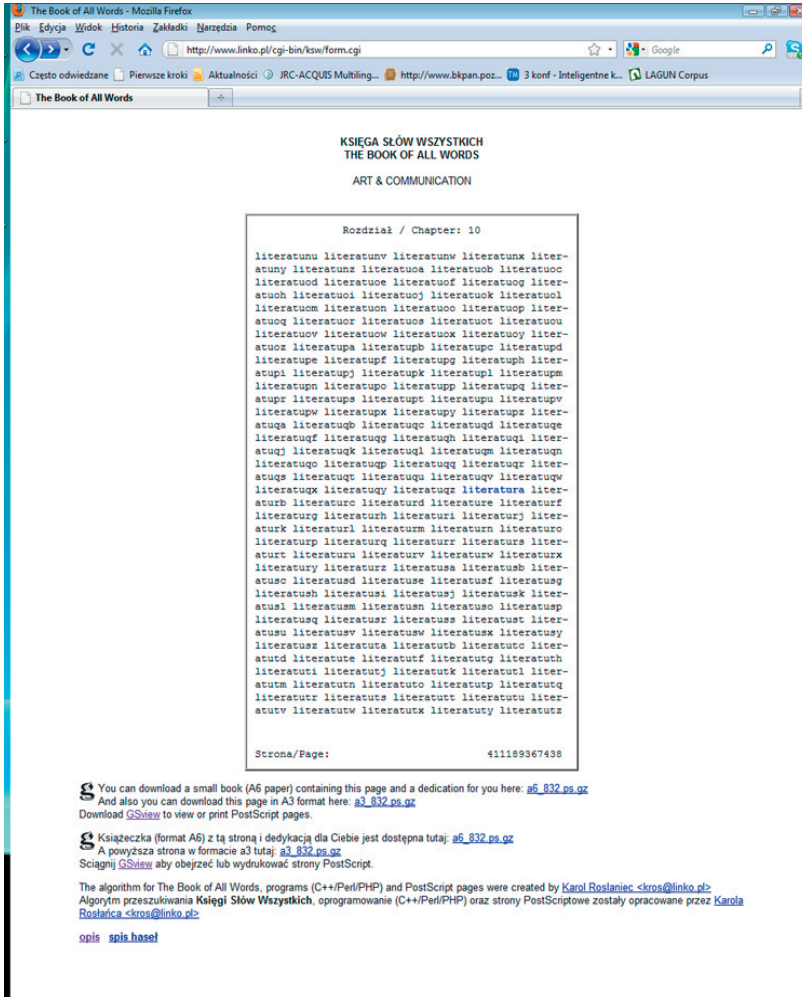

Illustration 1. *The Book Of All Words*, J. Ż Piwkowski

the first chapter will consist of just 24 single letters: a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z. The second chapter will have word couplets: aa, ab, ba, bb …, the third will have words

made with three letters, etc. For example the word literature is situated in Chapter 10.

Historically there are four versions of *BAW.* The first edition released in 1987 was followed by another one which was presented during the international exhibition Art & Communication. A demonstration of the program was supposed to be held both in the Art Museum in Łódź, where the exhibition was held, and in the Massachusetts Institute of Technology in Cambridge (USA). Unfortunately, the idea was not realized due to the poor phone network quality in Poland.

Currently two versions of Piwkowski's work are available. The first one is from 2000 (algorithm by Karol Rosłaniec), and the newest is dated January 2009 (programmed by Michał Śliski). Both are online versions of the original and some new web functions are implemented. They were enriched by the user option of adding definitions to any word. In this way from a simple collection of meaningful or (more often) non meaningful strings of words *The Bookers* can become a unique dictionary, thanks to the reader's input. Here, we would now find both the word "literature" and a series of words with the radix "–blin–", found and described by Radosław Nowakowski: barblin, barblinka, blinbank. These words do not exist in any Polish dictionary. Creating definitions in an unusual "dictionary" gives an opportunity of finding new words and creating new meanings, which one cannot find in any formal wordbook. The newest edition of *The Book of All Words* gives one more function: animating the words which are described in the *BAW*'s quasi-lexicon. The user can define a chosen word's colour, on–screen duration, appearance, and whether or not it overlaps with other objects. Readers' contributions reach even further. One can click a word and be transferred to a webpage where we one can write the word's definition.

Ergodism of BAW

From the point of view of ergodism, the newest instantiation of Piwkowski's work is highly intriguing and in many respects it comprehensively illustrates Aarseth's traversal function. This is worth going through in detail.

1. Dynamics. The algorithm on which *The Book's* mechanism is based uses just 26 textons, being letters of the Latin alphabet. This allows for the generation of an infinite number of scriptons: where each scripton is represented by a single page. As for the cybertext theory, according to the author, it is a work characterized by static dynamics (the number of textons and scriptons is permanent: 26 versus "infinity", if we agree that "infinity" can be considered as a part of a static whole). We should not forget that in the electronic version of *The Book*, the user can add his/her own definitions that become a part of the work. As a result, the dictionary without the add-ons has static dynamics, but the web version as a whole should be described as a work with textonic dynamics.
2. Determinability. The original version of *The Book of All Words* was determined. The web version, with its option for user's input is not. After writing a query in the search engine one gets a list of terms along with some of their definitions. As long as a new definition of one of the listed words appears, this list is presented to users in the same order and layout. Thus, the activity of another user is enough for the text to change its status from being determined to being undetermined.
3. Transciency. The original *Book* was intranscient. The content of the screen/printout was determined by the user. The web version behaves in a similar way but with one difference. When one activates the visualization mode, the screen is populated by textual objects related to the current part of *The Book*. In

this mode the work plays out in front of the reader without his intervention.

4. Perspective. Impersonal in the original version. In the web version a reader can decide how to describe a chosen word.
5. Access. Browsing *The Book* by a page number, a text string, or by additional search functions, makes *The Book of All Words* randomly accessible.
6. Linking. In the original, scriptons are accessed without links. The web version introduces links which connect a word and its definition and the ”default links” which let users browse the work in a linear fashion, from page to page.
7. User function. The printer-based original gives its users interpretative and explorative possibilities. In the web-based incarnation the user can contribute to the work by adding their own descriptions/definitions. Thus, a textonic function is added. Additionally, a configurative function is included. The user can define parameters of the on-screen animation such as colour, speed and the appearance of the defined words.

The cybertextual analysis shows us that *The Book of All Words* in its web instantiation is not as homogeneous as was the original. One can even look at it as comprising two separate entities: an infinite list of all possible words (the first two versions of *BAW* only featured this part) and the dictionary with user defined entries. But in case of *eBAW* (as Piwkowski himself calls it) it is hard to make such divisions without breaking both the coherence of the work and its analyses.

The Limits and the Potential of Piwkowski's Algorithm

The Book of All Words has some traps and surprises hidden in its algorithm. As was already shown, it uses 26 letters of the alphabet, without the eight Polish diacritic symbols (ą, ę, ć, ś, ź, ż, dź, dż). This

means that the rules of orthographic writing are put aside. This may be not a hindrance in understanding the generated text. A method of writing where orthographic rules are suspended is a common tendency in today's text messages, e-mails, and web communicators. If one goes even further to also suspend the rules of word division and punctuation, the possible generation of words which are perhaps 100, 200 or even a million letters long can turn *The Book of All Words* into "the book of all books". Because out of many nonsense pages that would be generated from these super long words, some words that could form meaningful sequences and eventually books would exist. These would be those which are already published and those which would appear in the future. Piwkowski's work has a strong Borgesian potential. Let us consider such a string:

> litwoojczyznomojatyjestesjakzdrowieilecietrzebacenictentylkosiedowiektociestarcildzispieknoscwcalejozdobiewidzeiopisujeboteskniepotobie

The above lines appears in Chapter 135 of *BAW* on the page numbered "385082672509639384971837458647577201108562938326299561380799096446456826175142392467489163066862652930053136181679809995799951484907564786587904010193396779680990802244715493641723975467174l". They are the first four verses of Pan Tadeusz, (Mister Thaddeus, 1834). This is an epic poem by the Polish poet, writer and philosopher Adam Mickiewicz. The book is considered a masterpiece of Polish literature.

Apart from these kinds of revelations, the *BAW* algorithm can also show some weaknesses and limitations. One cannot write words longer than 200 symbols. As a result it is hard to talk about *The Book of All Words* as an infinite work of art, even though the number of pages is impressive. This limitation is also a non-symmetrical one. After inputting the page number we get "only" as far as Chapter 143. Even assuming that the program would allow for searches without limits, some new formal problems would show up: words longer than 1800 symbols would have to appear not on

one, but on two or more pages. The system would then inform the user about the extent of pages that a given word covers. Nevertheless, *The Book of All Words* remains probably the most original and – despite its 24 years – most promising of all Polish cybertextual works of art.

Sonnets by Request and Poetic Machine

Projects that use combinatorial manipulations of the textual material can be found in the work of Wojciech Bruszewski.

In 1972 Bruszewski constructed *The New Words*, a device made of 5 rollers attached to each other. There were 4 letters on each of them. By sliding the rollers up or down the user could generate 1024 words, most of which – according to the work's title – were "new". Moreover, the rollers could be transposed. Changing the position of each roller could yield another 120 combinations with even more word-creating possibilities. Theoretically one could compose 122880 words. Ergodism of this work is the same with which we meet in the baroque combinatorial works of, for example, carmen infinitum.

Illustration 2. *The New Words*, W. Bruszewski (photo from author's archives)

Ten years later Bruszewski's interest in the creative potential of chaos and chance took the form of *The Poetic Machine* (1982), a project never exhibited. Central to the idea was a projector made from electronically controllable fluorescent lamps that would allow for the screening of up to 12 letters. Vowels and consonants were supposed to have permanent places. Blank spaces in between them were inserted at random in order to separate the words. Responsible for text randomization would be a "white noise" (Bruszewski calls it "pure chaos") generator. Its output, a random sequence of numbers, would then be translated into letters. The projection of a single line of text (a verse) would last up to three seconds before being replaced by another one. Because it was a poetic machine, the three last letters from every second verse were copied and repeated, emulating the rhyme effect. The machine was supposed to work non-stop. "If one verse lasts 3 seconds, it is possible to predict with a high probability that the first random sentence would repeat itself in about 300 years". Unfortunately, the original idea was never realized in a gallery space. In its final presentation instead of an electronic noise generator, a dice was used. Only a few years later the author wrote a program for the Amiga computer, that realized *The Poetic Machine*, this time in digital form:

Yk dog fudc ...

Yk dog fudc ana iffulci faz re ztyw,
Pa dygl pa af tnap pnyqacr iż ygofabe.
Ga yzmopy apoles gaqnynz pobomaj vfuabe,
Tedu amquci obe e dyjneb e ud urmutyw.

Ejmujcu ebgybeb pa boz u eqod dcukeva,
Hwy tnev iryrhac adh hpidzoh myzihih.
Czypciz cwamsyp tfawo ij fectocq jhujhih,
Akelco u oqbotin tpe o syhut i eeva.

Gib vzacom aftyhva edo qevnifw yvhesvo.
Wme dvyv gly inijatv fiqiqfo didysvo,
Ykcagho jasu ytke i abap aga y vuhr.

Min ino a uti tnylegh qjywgu sja kukauhr,
Fum pohc iqvarva iqikby yncy gazwoh,
Ze nanv mqibumo iryfuma ijc edg obhawoh.

[18 March, 1992] [21.46] (The Sonnets, Wojciech Bruszewski)

During the next decade *The Sonnets* appeared, which were a continuation of the previous projects. This time the generated text took the shape of sonnets. This project was developed on the Amiga computer from scratch. The work's algorithm was responsible not only for creating verses and rhymes, but additionally the title and the "published" date were generated. In this way Bruszewski created and published eight unique volumes with 359 sonnets in each. Some of these works were performed live. During the artist's live appearance the computer generated sonnets in real time. The poems were simultaneously printed on a dot-matrix printer while a speech synthesizer could read the sonnets aloud.

The Poetic Machine and The Sonnets, in spite of their complexity, are not ergodic texts. Users can only observe as the transcient works play out in front of them, but they cannot influence the shape of the work and its content. The last two works by Bruszewski should be considered as non-ergodic cybertexts, build upon random generation mechanisms, while further giving the user no other function than an interpretative one.

***

Finally, it is worth mentioning a couple of examples of Polish cybertexts related less to art and the gallery space than to e-literature per sé. The first of them is *Bluzgator Bis* by Paweł Kozioł. *Bis* is based on the web distributed *Bluzgator* application, popular among Polish teenagers, which functions as a generator of random swear words. Kozioł uses the mechanism of the prototype but changes the database of words, phrases and sentences. His own texts are accompanied by snippets from *Textylia bis* – an anthology of young Polish

culture, from the weekly newspaper *Polityka* and from the *Ha!art* magazine.

Bluzgator Bis illustrates how varied the traversal function can be and how many forms an ergodic work can have. Kozioł's work on the original *Bluzgator* should be considered a textonic activity in itself. The author has left the code layer of the program untouched, what was changed was the textual layer. An option of restoring the program to its original setting was left in the *Bis* version. The users of *Bluzgator Bis* can choose the addressee of the short messages (woman, man or group of people). They can also choose the style (proper, full sentences or internet slang). Up to users is also the size of the output (from one to 200 sentences) and the visual appearance of the scriptons.

All these options make *Bluzgator Bis* a work with textonic dynamics whereby its permutational character makes it a non-determined one. This ergodic work uses all components of the user's function. Apart from interpretation, the reader can determine the variables responsible for the scriptons look and shape (configurative function) and also determine the scriptons final content (textonic function).

The last cybertext machine among my examples is much a more meager project, *The Text Messages Day by Day. The Book For All And For No One* by Mark O. Bulanowski. There is an intertextual and intergeneric game at play here. In the works' design (the dominant mobile phone on the screen), in its title and in the mechanism of random generation of its short pieces of poetry, Bulanowski ironically evokes the pocket prayer book, a token omnipresent in a traditional common consciousness of sanctimonious readers[2]. Instead of the formula of a short prayer for the everyday, Bulanowski proposes a short text message that appears on the screen after clicking "Draw an SMS" button. This way a prayer book is functionally dethroned by another reading device: the mobile phone, as omnipresent today as the little pocket book was in the past.

The Text Messages Day by Day is a web-based simple generator of random text messages created in Javascript. The only thing that the user can do is choose, at random, the content of the message that appears on the screen of the stylized mobile phone. Here, algorithm operates with a static quantity of textons and scriptons (there are 34), but the appearing of the latter is detemined not directly by the author but by the random text generator.

As we can see, modern Polish text generators, although not numerous, are quite intriguing *The Book Of All Words*, with its infinite potential, in particular. The author is planning its extension. In the near future several Congress languages will be supported.

Notes

1. It is worth noting that OuliPo members only founded Workroom of Literature Supported by Mathematics and Computers (Alamo) in the 1980s.
2. On the other hand the second part of the title evokes *Thus Spoke Zarathustra* by Nietzsche.

Bibliography

Aarseth, Espen. *Cybertex. Perspectives on Ergodic Literature*. Baltimore: The Johns Hopkins University Press, 1997.

Bulanowski, Marek Oktawian. *Esemesy z Dnia na Dzień. Książka dla wszystkich i dla nikogo*. "Magazyn Techsty #3", 2007.

http://www.techsty.art.pl/magazyn3.html (date of gaining accessed: Nov 4, 2009).

Kozioł (Nescitus), Paweł. *Bluzgator Bis*. "Magazyn Techsty #3", 2007. http://techsty.art.pl/magazyn3.html (date of gaining accessed: Nov 4, 2009).

Piwkowski, Józef Żuk. *Księga słów wszystkich. styczeń 2009*. http://2b.art.pl/ksw/ksw.php? (date of gaining accessed: Nov 4, 2009).

Schäfer, Jörgen. ”Literary Machines Made in Germany. German Proto-Cybertexts from the Baroque Era to the Present.” in *CyberText Yearbook. Ergodic Histories*. University of Jyväskylä, 2006.