Chapter 3
Poetic Technogenesis and the Future of Poetry? Johannes Heldén and Håkan Jonson's *Evolution* (2014)

"Welcome to evolution. Start by selecting language" reads the opening of the digital-poetic work *Evolution* (2014; see Fig. 1).[1] The opening page shows a photograph of a wooden desktop with an open book on it. The desktop is shabby and seems old and well used. It is full of scratches, stains and dry marks; there is even, perhaps, a mark where water had been spilled. The book appears to have a stiff cover; the pages of the book are creased and have slight folds. The book is opened to the colophon page, which lists information about the release, including an ISBN number, information that is historically and legally specific for the institutionalization of the book. So far,

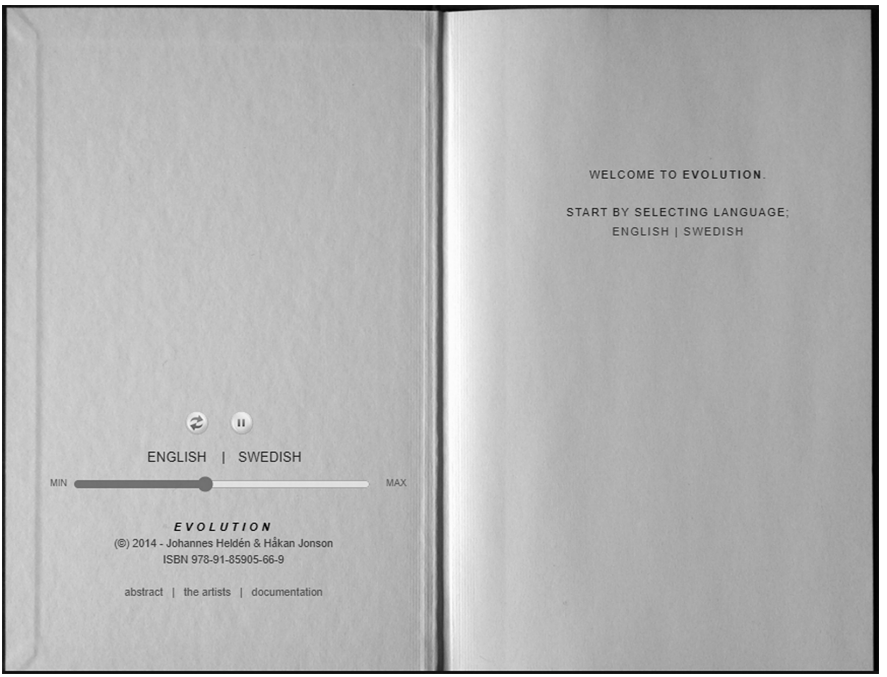

Fig. 1: The opening screen of the digital work *Evolution* (2014) by Johannes Heldén and Håkan Jonson.

1 http://www.textevolution.net/ (15 December 2022).

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https://doi.org/10.1515/9783111004075-003

this could simply be a page with a photograph of a desk and a book. But the page also contains interactive links with functions such as "restart" and "pause" and a device that allows one to control the pace of the process. Moreover, there are three links that lead to information about the present poetic project and its authors, marked respectively as "abstract", "the artists" and "documentation." On the opposite page is a link to the English and Swedish versions of the project. All of these functions emphasize that the book is not a book but an image of a book, a remediation that makes the digital work something different from what it would be in print.

Evolution is a collaborative work by the Swedish artist and poet Johannes Heldén and the Swedish poet and programmer Håkan Jonson. The image I briefly described above is from the digital part of this intermedial project that consists of a physical book and a digital work and involves several multimedia presentations and poetry readings. As a whole, it includes a potentially endless ecology of medializations and materializations. Parts of the project are presented at different physical and digital occasions and locations.[2] It is a multimedia work combining not only technical media but also graphics, photographs, words and computer codes, and it transgresses genre conventions.

The book *Evolution* includes code poetry, scientific tables and reports and scholarly essays. In 2014, it was awarded the N. Katherine Hayles' prize for Criticism of Electronic Literature, by the Electronic Literature Organization.[3] In their announcement, one of the jury members writes:

> Perhaps the book was written, compiled, designed by *Evolution* itself. Even the table of contents looks like computer code, laid out the way that a piece of software might prefer. I'm ranking this book first on my list because of its challenges to the form of criticism – there is a creativity and unexpectedness in the way that these responses to the text are presented that is very engaging and that contributes to the work and to the field in general.

While the book is both performative and fixed, the digital part is, in principle, a never-ending and ever-changing poetic event. This chapter concentrates on the digital part of *Evolution*, in order to grasp how certain aspects of the work are connected. Moreover, I explore how the work engages in its situation and media environment. It will therefore also be necessary to look at the print book *Evolution*. The purpose is to show how *Evolution* creates new understandings of what poetry and poetic language can be. I argue that with *Evolution* Heldén and Jonson practice and explore poetic thinking about a possible future relationship between

2 An overview of this activity and the many events are to be found on Heldén's artistic website: https://www.johanneshelden.com/news (5 December 2022).

3 See http://eliterature.org/2014/06/announcing-winners-of-1st-coover-hayles-awards/ (5 December 2022).

poetry and artificial intelligence. Therefore, *Evolution* is a collaboration between Heldén, Jonson and the computer's algorithms. This collaboration forms a creative and cognitive assemblage and creates the poem that is constantly evolving on the screen. In this respect, I will also argue that the work draws the attention to technology as a creative agent and thus to the idea of technogenesis. For poetry in the computational network environment, this is perhaps the singular point, namely that point at which digital technology and artificial intelligence intervene in poetry in a way that dramatically changes both what poetry can be and how it works.

One of the most intriguing and pressing questions for poetry in the computational network environment concerns the role of media and how to understand the encounter between the poet, the poetic idea and so-called self-learning algorithms. The solipsistic idea of the poet, isolated from the world and everyday life, who receives inspiration through tranquility or in deep connection with God or an untouched nature is long gone. In our digital age, this idea is, as I discussed in Chapter 2, challenged by an understanding of the reciprocal interconnectedness of human and technology, put forward by philosophers like Bernard Stiegler or in theories of the posthuman such as N. Katherine Hayles' "technogenesis" (Hayles 2012). As mentioned, Hayles develops the idea of technogenesis in order to understand how aesthetic and social processes in the digital age work in networks of conscious and unconscious cognitions (Hayles 2017). Likewise, Heldén and Jonson explore a similar idea in their poetry.

The poetic event of *Evolution*

Evolution is an algorithm-based poem and event, a poem in which the computer's algorithms continuously create and change the poem on the screen and make it into an event. Words, word clusters and blank spaces appear, disappear and change on the screen, brought forward by the computer's algorithms. The poem performs itself on the right-hand side of the screen, while information about the ongoing process is given at the bottom of the page, below the poem. Here, the number of transactions that have been conducted by the machine is shown. Further, information about designations of atmosphere ("ambience") is displayed together with the title of the sequence that the computer is working on (e.g. see Fig. 2).

By clicking on the button marked with a play-sign on the left-hand page, the work is activated. On the right-hand page, a poem with a postmodern typography appears with single words and word clusters with blank spaces between them. The left-hand margin is straight, while the one on the right has a ragged edge. The poem follows just a few, if any, grammatical rules. None of the words are

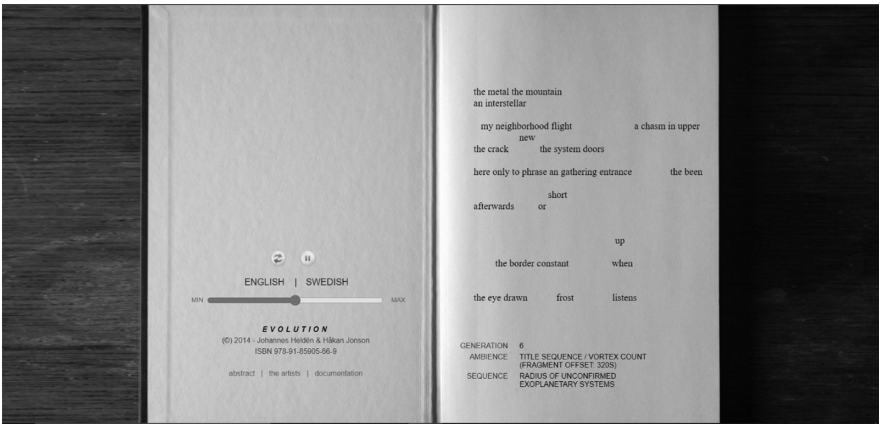

Fig. 2: A screenshot from a random place/page in the evolutionary process of the poem in *Evolution.*

written with capital letters or begin with a capital letter, and it lacks grammatical symbols and punctuation marks.

The poem gradually changes. New words appear, some fade from the screen immediately, others again stay on the screen for a long time and become part of different contexts. At an early stage in one of my readings, the first two lines read: "a metal door // an interstellar." Later in the same reading, "a metal door" has been replaced by "a comic door" and the word "interstellar" has been moved to the first line: "a comic door open my interstellar travel gargoyles". There seems to be no poetic or logical explanation for the changes, except that the changes and the event are the meaning of the work. The work is an event both because of its underlying code, its flickering signifiers, and because it is a continually changing assemblage. As I described in Chapter 2, poetry should be regarded as an event, including in those cases when poems change, vary or are disorganized to the extent that they end in breakdown or continue to change (see e.g. Hayles 2012, 13). Here, the lack of punctuation and other grammatical symbols strengthens the ongoing evolutionary process, since a full stop would mark, for example, the end of a sentence, a larger sequence or the poem as a whole. Likewise, a comma would signify a grammatical break. But, rather than including such breaks, computer-generated algorithms cause pauses to appear in the poem. Blank spaces and single words are kept on the screen during several sequences, perhaps for the sake of continuity or perhaps to make the poem readable for a human being. Evolution never stops, never pauses, but moves forward through both continuity and change. So does *Evolution*. As long as the computer is kept running and there is no technical breakdown, as long as the computer program continues to read code and is able to complete the predefined instructions, the poetic event will continue.

An important question that arises is whether the event is one single poem that continually evolves or a series of poems – a poetic sequence. More provocatively, one might ask whether the question concerning the event as a single poem or many poems has become irrelevant in the age of computation. When Raymond Queneau published his book with ten sonnets and created, as combinatory poetry, "poésie combinatoire," *Cent mille milliards de poèmes* (1961), he suggested in the very title that the book contained a hundred thousand billion poems. In other words, even if the poems are merely a result of changes in combinations of a given material, they are not a single poem. In Queneau's work, the pages separate each print poem and the poems have a fixed organization. On each page, the event has stopped and materialized itself as a print poem. This is not the case in *Evolution*. It would be correct to claim that each generation, or sequence, is only one materialization. However, such a claim would also imply that the reader must pause the process and interfere with the poem that continues to flow like a river. Still, the event is marked, quantified with the number of generations in the specific reading and qualified with a title on each sequence. In one reading, twenty generations yield the following poem:

of the new in
high dragonflies came around me
not leaves take another one
messages sent

In addition to information about the number of generations, the work tells us that the ambience is "Title sequence / corporations (fragment offset 140S)" and that the poem belongs to the sequence called "Radius of confirmed exoplanetary systems." The title of the sequences changes every eight to ten generations, while the information concerning the ambience changes less often or each time the reader pauses the performance, consequently interrupting the event. On the one hand, one could argue that because of the sequences, each containing eight to ten generations, the work could be treated as a sequence of poems. Sequence here is not to be understood as the genre elaborated by Sally M. Gall and Macha Rosenthal's classic study of the poetic sequence. Gall and Rosenthal claim that the poetic sequence is a long poem structured through association, juxtaposition and connection (Gall and Rosenthal 1983). These qualities in the process of selection and combination would assume a human being to associate, juxtapose and connect. Rather, in *Evolution* it is the computer that selects and combines, without any consciousness about why the words are selected and combined. Further, in *Evolution*, sequence is a technical term that denotes the number and logical steps that the algorithms perform and complete in performing one specific task. This implies that the name of one sequence does not necessarily

have anything to do with the poem or the words that appear on the screen in a specific sequence.

The first sequence in one reading is called "Cups of coffee per episode of Twin Peaks," while one of the generated poems in this sequence says: "so // phanerogams known / would probably be change / shining // out / something // is." Except for the fact that the poem appears to be as illogical as the fictive universe of David Lynch and Mark Frost, it would take some interpretative work to connect the information that is given in the title of the poem to its content. Therefore, the connection between changes in the knowledge of plants that carry seeds (phanerogams) and the number of cups of coffee that special agent Dale Cooper and the other characters drink during one episode of *Twin Peaks* is most likely random. Furthermore, from the tenth to the eleventh generation, the sequence shifts from "Cups of coffee per episode of Twin Peaks" to "Radius of unconfirmed exoplanetary systems," but the poem does not change with the change of title. In this specific reading, the first visual change in the poem takes place at the fourteenth generation. Taking into consideration the fact that the poem does not change much during one sequence or in the transition from one sequence to another, it seems reasonable to regard the sequence as a technical concept and to treat the title of each sequence as separate from the form and content of the poem that evolves. Additionally, the titles and ambiences of sequences represent the organization of a process that is continually taking place, not on the surface but below the surface, in the world of computer code.

In generation 3197 of one particular reading, the sequence is called "Mass of exoplanets detected by timing." The title denotes discoveries of planets outside of our solar system and signifies the fact that the poem is either referring to scientific facts – planets that have been detected – or that it is revealing itself to be a science fiction poem. Therefore, the generations and sequences are of importance for understanding the poem as an event, just as they emphasize both the performance and role of the computer in the performance. One could even ask whether the titles of the sequences constitute a poem or narrative in their own right and to what extent they provide information useful for the interpretation and experience of the poem.

To read an intermedial event

Another intriguing question is how to read *Evolution*. We might even go so far as to ask whether a concept like "reading" is applicable at all, since the poem continually evolves. What would it mean to "read" a media-ecological work presented as, among other things, digital and print poetry? Further: who, or what, is reading

and when? What takes place under the surface is a computer performance, what Hayles calls "machine reading" (Hayles 2012, 75–79). The computer selects and combines words, organizing them into a poem that appears on the screen for a human being to read.

To read *Evolution* does not require much interactive work. The poem evolves on the screen through repeated computer generations. The readers first need to choose a language, and then they can control the pace of the event and the changes that take place. They can also choose to read the above-mentioned information about the work in order to contextualize the poem. While the latter information functions as a fixed contextual framework for the poem that evolves, the poem is always in flux. The notion of the poem as an evolving event means that the poem is always different and that one (at least in theory) never reads the same poem twice. Every poem, the result of every generation, is unique.

Erika Fischer-Lichte (2004) reminds us that an event on a theater's stage is unique and cannot be repeated. With theater performances as her main material, Fischer-Lichte emphasizes how performances take shape through an interaction between the audience and what happens on stage. According to Fischer-Lichte, a feedback loop arises in which the interaction is unpredictable and the event unique (Fischer-Lichte 2004, 59ff; 116). Therefore, she also emphasizes that a performance should not necessarily be understood but rather experienced as an action (Fischer-Lichte 2004, 17). To this, it is crucial to add that Fischer-Lichte strongly insists upon a physical co-presence of actors and audience. Therefore, her concept of event is not easily transferrable to the digital situation of *Evolution*, even though one might argue that in the events on the screen there is a strong physical presence of the computer as a co-creator of the generated words and phrases.

Evolution is a poetic event to be experienced, in which the computer functions as a platform and a stage where the poem unfolds and acts as a co-creator of the poem. One can press start, sit back and observe the poem that appears and changes on the screen. However, at the same time, *Evolution* invites the reader or viewer to reflect upon what is taking place on the screen and below the surface. It implicitly asks the reader to pay attention to the premises put forward by the media technology, to what is happening and to how the relationship between poetry and digital media, humans and algorithms and an alphabetical-conventional language and computer code can be understood.

To conduct a hermeneutic close reading of the digital poem is made almost impossible because the event that takes place on the screen is unpredictable, unique and never-ending. Consequently, there is no obvious or fixed correlation between individual parts and the whole. Rather than a hermeneutic circle, readers are left with a line, a stream of words that constantly feeds the changing

poetic event. In this sense, we might say that readers are put in a situation where they can experience the poem. This is what Fischer-Lichte would claim, in a more general way, about the proper way to approach performance. Nevertheless, in *Evolution*, two aspects are noteworthy. First, the poem develops in a pattern of repetition and change, which, as I will explain later in this chapter, is related to the technogenetic environment of the poem and its reflexivity. The other relevant aspect for a reading of *Evolution* is that readers are given the opportunity to interfere in the process. Either they can choose to watch the changes and experience the event, or they can pause at each generation, at each new sequence, to closely studying the words and combinations and thereby viewing each generation as a "whole." The flipside of such an approach is that the reader disrupts the event and turns the poem into something other than what it is, namely an evolution. It is possible to do both, to approach the poem as an event and, at the same time, to pause the poem in order to closely read specific moments of the event. A combination of these two approaches implies that one regards *Evolution* as a poem and as an event and that one concurrently keeps in mind that both the generations and the event are framed in a human-computer collaboration.

The print book *Evolution* contains the computer codes that run the digital poem. As mentioned, the book received the N. Katherine Hayles Award for Criticism of Electronic Literature in 2014. In their statement, the jury writes that the book is both "a work of literature and multi-voiced, multi-modal criticism". Further, they claim that it provides "responses to the generative [digital] poem *Evolution* by Johannes Heldén and Håkan Jonson and plays with the genre of criticism by enclosing the essays within over 200 pages of code."[4] The book is not pure but includes a mix of genres. Most striking is the many pages of code that in the book are combined with Heldén's poems, photographs and essays written by researchers in the field of digital literature: John Cayley, Marie Engberg, Jesper Olsson, Jonas Ingvarsson, Jakob Lien and Cecilia Lindhé.

The book is in itself a product of aesthetic and epistemological considerations in the computational network environment. With the computer codes, the human responses to the work and results of technological measures that are presented in graphs and lists, the print book too is a human and non-human work. It is a network, and it is part of a network of texts, media, codes and events. In the opening of the book, it says:

4 See https://eliterature.org/2014/06/announcing-winners-of-1st-coover-hayles-awards/ (5 December 2022).

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Package net.evolution.text.domain:

import net.evolution.text.domain.generation.Generation:
import net.evolution.text.domain.rule.ConsecutiveWordsRule:
import net.evolution.text.domain.rule.IllegalEndingFragmentRule:
(. . .)
Private static final Rule RULES []= {
        new LineBreakCommaRule(),
        new WhiteSpaceCommaRule(),
```

(Heldén 2014b, n.p.)

A human reader will most likely feel addressed in the encounter with the six essays and Heldén's print poems. In contrast, the computer code that fills most pages defamiliarize the work, as if the code is out of place in such a context. This response may occur because few readers can read computer code and because the pages of code appear in print, that is, in an analog rather than a digital medium. Additionally, one could argue that the code has an ambivalent, or double, addressee. Code is the language of and for computers, and is, in most cases, addressed to computers. Computer codes are commands, most often input by humans, which are meant for computers to execute. A human programmer speaks to the computer in a language it understands. This is also how the appearance of print code in the book can be read. It represents the codes and instructions that Heldén and Jonson have used in order for the digital part of *Evolution* to work. Anyone who wants to can enter all the print codes from the book into a computer and thus copy or change the digital poem.[5] The book is, in other words, a recipe book for the digital work *Evolution*, and, therefore, even though it has a double addressee, it turns its attention from what is present, the book, towards what is absent but present through codes, the digital work.

Furthermore, due to the medium, the print codes are also addressed to a human reader. A strong argument presented in the field of critical code studies is that codes used in code poetry could be made an object for human interpretation (Marino 2020, Vorrath 2022). Still, it is fair to ask how to read the book or whether we should read the 200 pages of code at all. Is it perhaps the case that a human reader should preferably read the code aloud, as in a poetry reading, so that the sound of the poems when uttered covers for the lack of linguistic semantics. In this respect, the poems may sound like Dadaist sound poetry. Or perhaps the effect of the sound of the repetitive commands can be recognized as a pattern, as anaphoric repetitions in an analog medium that has nevertheless become digital.

5 See "documentation" here: http://www.textevolution.net/ (5 December 2022).

In this way, the reading will reveal the poems as code poetry, a poetic work that mixes poetry with computer codes.

In the book, the codes cannot run, the commands cannot be executed by computer algorithms, but they can be executed, read, by a human reader. Still, I find it fair to claim that, as a response to the digital part of *Evolution*, the book needs to be regarded as a post-digital phenomenon because it occupies a space between analog and digital and because the term post-digital suggests how analog and digital cultures have merged. Florian Cramer defines the post-digital pragmatically as a description of "either a contemporary disenchantment with digital information systems and media gadgets, or a period in which our fascination with these systems and gadgets has become historical." (Cramer 2015, 13) Codes have become mainstream, also in poetry, whether we are conscious of them or not. When code appears in print, it denotes binary language at the same time as it differentiates itself from it, because in print it is analog, undivided and continuous.

The concept of the "post-digital" obviously does not mean that the digital era has ended, but it implies that, in the digital era, programmable and network media are "everywhere". Moreover, the term underpins the fact that in the computational network environment, analog and digital media, print and digital poetry, are entwined. Digital code has even invaded the print book, not only by amending the visual and material aspects of the book or by changing how we write and read but simply by being included on the surface of a poetry book as code poetry and combined with texts written in conventional English in humanistic genres like essays and scholarly reports. Therefore, the print book *Evolution* strengthens the hypothesis in this chapter: *Evolution* explores the relationship between humans and computers, and, more specifically, it explores poetry in the encounter with computer's genetic algorithms. Indeed, the book is precisely a materialized result of poetic technogenesis, that is, of the human-technological evolution of poetry.

Generative poetry and a poetic technogenetic feedback loop

Algorithm-based poetry belongs to the genre of generative poetry, what is also termed "combinatory poetics," and it is an early genre in the history of poetry in digital media, as the short presentation in the beginning of Chapter 2 tells. Indeed, according to Scott Rettberg, it is "the oldest genre of electronic literature." (Rettberg 219, 20) Produced by a computer, generative poetry implies a practice in which the selection and combination of words and other semiotic resources are based on predefined formal rules, commands for the computer to perform and a collection of characters, words and phrases in a database. Jean-Pierre Balpe

points out that generative literature is literature "of which the author does not write the final texts but which only works at the level of the high rank components such as: conceptual models, knowledge rules, dictionary entries and rhetoric definitions." (Balpe 2005, n.p.) Balpe's definition of generative literature is media-specific and assumes that the genre always involves processes with algorithms powered by a computer. However, generative poetry can also be performed in other media. The defining feature of generative poetry, however, does not have to do with the question of media but to what extent a generative poem is performed in accordance with predefined rules. Rather than computer algorithms, a human being could perform and execute the rules and instructions that she herself or others have made, as in the case with mathematical poetry where the poet follows predetermined mathematical rules for how to choose and combine words. As I pointed out earlier, this would be a creative process in which the purpose might be to diminish the role of the poet for the benefit of the rules and restrictions.

Still, concerning computer-generated poetry, two aspects are, in this respect, of particular interest. One is that the selection and combination of words and phrases are performed partly by a human being who sets the premises for the action that takes place and partly by a computer that performs the actions. Selection and combination are two processes, each belonging to its own axis. Roman Jakobson regards the two processes as significant for the poetic function. In his elaboration on the poetic function, the poetic quality is linked to the axis of selection and combination and, more specifically, to a transfer of the principle of equality from the axis of selection to the axis of combination:

> The election is produced on the base of equivalence, similarity and dissimilarity, synonymity and antonymity, while the combination, the build up of the sequence, is based on contiguity. *The poetic function projects the principle of equivalence from the axis of selection into the axis of combination.* (Jakobson 2014, 240)

For computer-generated poetry, these two processes are redefined from being human-centered processes to being rule-based and (partly) computer-centered. This means that when the computer takes over selection and combination processes, it takes over part of the poet's role, performing tasks that are regarded as significant for the poetic function and the quality of both poem and poet.

Even though the role of the poet in the process of making poetry, her freedom to create, has been changed, she is by no means rendered completely peripheral. Computer-generated poetry is based on computer code or "numeric representations." Therefore, the code, and with it the poem, can easily be changed or adopted. As Lev Manovich points out in *The Language of New Media* (2001, 36), one of five principles of digital media is "variability," a principle referring to how digital texts

are not fixed but can easily be amended. As a result, the digital text can potentially exist in infinite versions, either because of genetic or self-learning algorithms or because the poet is in a position to interfere in the process. In a mathematical print poem, the poet can choose to break the chain of rules and, in so doing, transform the poem into something other than a formal-based, mathematical poem. In a generative poem run by a computer, the poet, or programmer, can interfere in the process by applying new rules or changing existing rules during the potentially endless event.

Actually, during several presentations of *Evolution*, Heldén has explained that after they launched *Evolution*, he and Jonson discovered that the word "Toyota Land Cruiser" appeared much more frequently in the poem than other words. They could not identify any reason why the computer seemed to have a preference for the name of a car over other nouns and decided to change the rules by instructing the algorithms not to choose "Toyota Land Cruiser." This short anecdote shows not only that rules in computer-generative poetry can be altered, but it also serves as an example of how the poem is a collaborative event by poets and computers, human and non-human agents.

According to Hayles when people, technology and cultural representations migrate across networks, changing configurations, interpretations and opinions also emerge, circulate, interact and are disseminated through networks. In her book *Unthinkable*, Hayles therefore develops the term "cognitive assemblage" as a specification of the term "assemblage" from the network theories of Deleuze and Guattari (1987) and Bruno Latour (2007). In this respect, Hayles' term "cognitive interconnections" refers to networks that are characterized by the circulation of information and interpretations produced by both humans and artificially intelligent machines. The latter is what Hayles describes as "cognizers," i.e. actors who have cognition. She defines cognition as the ability to perform interpretations of information (Hayles 2017, 22) and suggests that not only humans but also computers can interpret information in contexts and create meaning. Here, artificial intelligence is an obvious example to use because it can process and even interpret information. Furthermore, Hayles notes that "cognizers direct, use, and interpret the material forces on which the assembly ultimately depends." (Hayles 2017, 22) In this sense, the actors in a network who act as cognizers have an important role because they can make decisions and perform tasks of selections, combinations and interpretations that make them appear flexible and adaptable. There are features that provide them with the opportunity to develop based on feedback information from their environments.

Cognizers have degrees of cognition or degrees of ability to interpret and create meaning. On a continuum, humans will be considered sophisticated, while plants will be deemed primitive or simpler forms of cognizers. Similarly, we can imagine that computers can be positioned at different stages on this continuum, depending

on the technological standard and on what kinds of tasks they are designed to perform. This is likewise the case with poetry. Furthermore, the question is not so much whether cognizers, such as genetic algorithms, can create poetry by themselves. After all, genetic algorithms are not autonomous geniuses. The question is rather how we consider the collaboration between humans and non-humans, poets and genetic algorithms, in computer-generated poems like *Evolution*.

In her article "Literary Texts as Cognitive Assemblages: The Case of Electronic Literature" (2018), Hayles comments directly on Heldén and Jonson's *Evolution*: "[It] reveals the power of literature conceived as a cognitive assemblage, in which cognitions are distributed between human and technical actors, with information, interpretations and meanings circulating throughout the assemblage in all directions, outward from humans into machines, then outward from machines back to humans (Hayles 2018, n.p.). According to Hayles, *Evolution* demonstrates a collection of cognitions at work. Three of these are Heldén, Jonson and the computer that works in collaboration. The first two act as conscious cognitive participants, while the computer is what Hayles calls an unconscious cognition. Pertaining to poetry, an interesting question arises regarding the idea of a cognitive accumulation of connections between human and non-human actors: what happens to our understanding of the quality of poetry and poetry as poetry? Keeping the anecdote above in mind, it is evident that poets are still partly in control of the poetic event and apply certain preferences and poetic judgments to the sequences that appear on the screen in order to improve them. This is a poetic technogenetic feedback loop. There is a movement from the computer to Heldén and Jonson (and other readers) in the form of a poem that contains, for instance the frequent use of the word "Toyota Land Cruiser." Then, there is a movement from Heldén and Jonson back to the computer in the form of a new instruction that again changes the poem. Then again, the changed poem moves from the computer back to Heldén, Jonson and other readers. It is in a loop that potentially never ends.

The evolution of poetry

The title of the work, *Evolution*, can be applied on three levels. First, it reflects the evolution that takes place on the screen because the poem is an event. As a digital poem, it is based on computer codes running under the surface. Second, it highlights what happens in the poem. Not only is the poem an event, but the poem also evolves continuously. Third, the title signifies that poetry as an art form is evolving and is in constant flux. Finally, this evolution implies that the relationship between humans and computer technology, in the arts in general, is also in the process of development. In this respect, it is relevant to ask how the relationship between

Heldén, Jonson and the algorithms, human and non-human cognizers are explored in the work.

The work presents itself as an exploration of a rivalry between computer technology and poetry, AI and the poet Johannes Heldén but ends up showing the fruitful reciprocal relations of the assumed "opponents." In their presentation of the work, Heldén and Jonson write: "Evolution is an online art work-in-progress designed to emulate the texts and music of poet and artist Johannes Heldén with the ultimate goal of passing 'The Imitation Game' as proposed by Alan Turing in 1951." (Heldén and Jonson 2014a) They explain that they want to explore the role of the author and challenge established conceptions that distinguish the role of the author from the role of the programmer. "Is it [the distinction] even relevant?" they ask, a question that is highly appropriate to the computational network environment. In *Evolution* and in computational network environments, the question does not only actualize the distinction between author and programmer. Just as significant is the question of the relationship between author and algorithms, as well as human and non-human actors.

The above-mentioned reference to Turing evidently concerns his idea and ambition to develop a machine that could perform intelligent behaviors equivalent to human behaviors, with the aim of being able to pass a test. Basically, the Turing test involves the idea that a human receiver of a machine's response would not be able to distinguish a machine's response from the response of a human being. The Turing test as a framework for understanding *Evolution* is fascinating. Nevertheless, it is reductive because it is based on a situation and a scenario in which a human being sets the premises for the evaluation of the capacity of the computer. The computer is measured against human capacity, while a human being evaluates the output. Therefore, in the Turing test, the human is still the center of attention. Consequently, the development is human-driven and the computer perceived is as a tool, the value of which is measured by its capacity to imitate human behavior.

It should not come as a surprise that I will suggest as an alternative that *Evolution* demonstrates an evolution that puts the development of the poem and poetry in the hands of both the poets and the computer. In this respect, it demonstrates a contemporary poetic technogenesis. The collaboration between the computer and Heldén and Jonson is of a posthuman "nature". Except for those cases in which Heldén and Jonson intervene in the algorithm-driven event by changing the rules, for example with the anecdote about the name "Toyota Land Cruiser," one can ask whether it makes sense to distinguish between human beings and computer algorithms, to treat these two in a subject-object relationship and to think of them in a user-tool dichotomy. In the framework of posthumanism, Hayles emphasizes the human-computer relation: "the posthuman implies not only a coupling with intelligent machines but a

coupling so intense and multifaceted that it is no longer possible to distinguish meaningfully between the biological organism and the informational circuits in which the organism is enmeshed." (Hayles 1999a, 35) Consequently, we might say that *Evolution* demonstrates the posthuman ideal. Here, digital poetry becomes a collaborative environment for humans and computers. This notion stands as an alternative to the conception of a post-biological future developed by Hans Moravic (1990), connoting a future (for poetry and the arts) dominated by intelligent and self-learning machines. Still, it is relevant to ask to what extent the posthuman ideal is fully realized in *Evolution*. We might ask, in other words, how far the technogenetic evolution of poetry has come in this work.

Evolution is the result of an encounter and collaboration between Heldén's previous publications of poetry and Heldén and Jonson's genetic algorithms. Heldén's publications are collected in a database. Genetic algorithms work within an evolutionary model and perform the selection and combination of words and phrases. The algorithms have evolutionary properties, which means that they develop from selections, recombinations and mutations. At each generation, a group of algorithms is developed on the basis of previous algorithms. Further, this process means that new algorithms are constantly being developed, and these again produce new combinations of Heldén's words.

On the one hand, one could argue that there are some similarities between how the computer works in *Evolution* and Tristan Tzara's idea of Dadaist poems. When asked to clarify what Dadaist poems could be, Tzara once explained that one should cut out words from a newspaper. Then pick one word at a time from a hat and put them together into a text.[6] Nevertheless, this comparison is a simplification because Heldén and Jonson's work is a poetic thinking with and through a programmable medium; they think with, through and together with the algorithms. In Tzara's example, it will be a human being who chooses, while in Heldén and Jonson's work, it is a computer that, through a process of cognition, is responsible for the selection and shaping of the poem. Furthermore, the creative process in *Evolution* is not a game of chance, as it will be in Tzara's version of Dadaism but rather an interplay between repetitive patterns and small changes. One consequence of the fact that the evolutionary process is run by genetic algorithms is that the poem continually changes and that an identical poetic expression – unless the algorithms are told differently – will never be generated twice.

Thus, a poetic practice is established, further developing Heldén's original style. In this respect, it is fruitful to recall Hayles who claims that it "is precisely

6 See Tristan Tzara's "Pour faire une poème dadaïste" here: https://www.gommeetgribouillages.fr/Presse/poemedadaiste.pdf (5 December 2022).

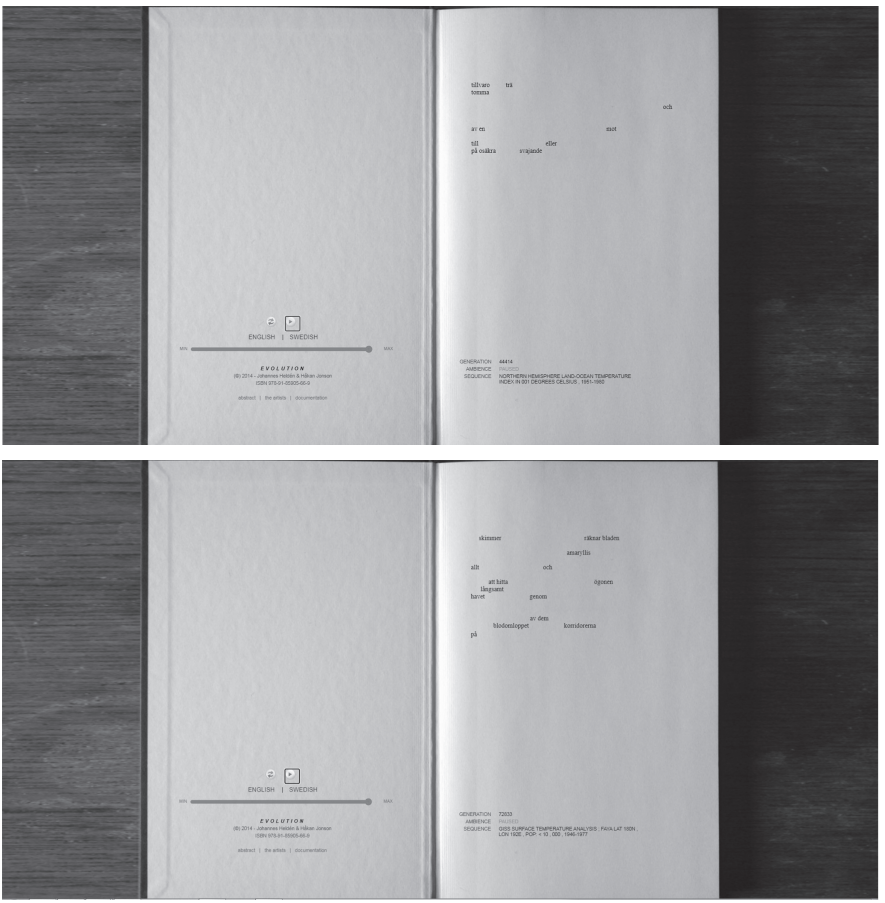
when these multilayered, multiply sited processes within humans and machines interact through intermediating dynamics that the rich effects of electronic literature are created, performed, and experimented." (Hayles 2008, 119) Beyond the fact that the computer provides performative dimensions to the work on the three levels mentioned above, it is fair to question whether it also makes a contribution on a syntactic level of the poem, which would indeed imply an even deeper poetic technogenetic evolution.

Poetic technogenesis

Evolution demonstrates a media environment in which poetry can perform. It is a reciprocal environment: the environment constitutes the work as the work simultaneously constitutes the (local) environment. Hayles describes this environment as programmable and reflexive. Thus, such reflexivity can be understood through the model of a pendulum, a feedback-loop of what I described earlier as a pattern of repetition and change rather than as a circle or spiral. In other words, when a computer creates texts, it is not a process of reproduction but a reproduction with a difference since the algorithms create small variations with each new generation. To look further into these possible small variations, let us consider two examples. In respect to the work as written in a Scandinavian language, the two examples will be given in Swedish.

The two screenshots above are selected at random from the same reading, at generation 44414 and 72833, respectively. It is, of course, impossible to determine whether Heldén could have written the two generations, but they are both so far out in the performance that we must assume that the algorithms have left some marks on the poem. The first of the two generations (Fig. 3) shows a poem that consists of 12 words. It includes several voids and caesuras, and it appears fragmented with several blank spaces. The disruptions of syntax are of semantic significance and give space to and highlight each word or cluster of words. These disruptions indicate that, if read aloud, the poem should be read slowly, since the silence between words and clusters reflects the empty spaces that are visualized on the screen. In the continuous development, the algorithms have led the poem into a phase where it has been given many pauses, which together with the relatively few words provides the poem with a sense of silence and emptiness. It is worth noticing that the reader, by controlling the speed of the generations, can slow down the process and thus establish a correlation between the slowness and silence in the poem and its visual appearances on the screen. Otherwise, the reader can speed up the process, speed up the evolution and by that conceal or compensate for the impression of silence and stagnation in the poem. Also, the

poem appears without verbs, which strengthens the indication of an atmosphere of stagnation established by the words and the visual form. There are no pronouns in the poem at this generation either, which underlines the lack of action and an acting subject.



Figs. 3 and 4: Two screenshots, both randomly chosen, from Heldén and Jonson's *Evolution.*

The second example (Fig. 4), taken almost 30000 generations later into the process, contains only five words more than the first. Still, it has a different character due to the composition of word classes. Besides the fact that it includes several nouns, seven against two in the first example, one of which is the name of a flower ("amaryllis"), we find two verbs in contrast to none in the first example. One of the verbs is in the present tense, "räknar" ("counts"), while the other is in the infinitive "att hitta" ("to

find"). The two verbs provide the poem with action, making it more dynamic than the previous one, indicating an acting subject as if someone or something counts, observes and searches. Actually, here we might recognize a connection between this sense of something counting or making observations and the graphs and lists that are presented in the book, *Evolution*, based on the results of technological measurements of the atmosphere. It might be a coincidence, but it is nonetheless a coincidence that occurs and offers to the reader the possibility of reading and experiencing a relationship between the digital work and the book.

Caesuras appear frequently in both examples, and there is no punctuation in the two generations. Lack of punctuation supports the poem as an event and as a continuous generative process with no ending. The blank spaces and caesuras have similar functions. Both the blank spaces and the caesuras serve as representations of rhythmical pauses and as syntactical amputations and are visual traces of conscious or unconscious omissions, as if a line's syntax and meaning had been cut off and single words and phrases have been taken out of their original context. Interestingly enough, in *Evolution* words and phrases have been severed from their original contexts, rearranged and replaced by the algorithms. At the same time, the occurrence of caesuras along with the blank spaces indicates that the text on the screen might be erased poetry, i.e. poetry that has "been added through erasures [or] exclusions," as Lisa Schmidt defines the genre (Schmidt 2018, 253). In erasure poetry, according to Schmidt, it is assumed that the text as a palimpsest is literally written over another previously materialized text. Applied to *Evolution*, we might say that the algorithms write texts not over but based on, beside and as an extension of Heldén's previously published poetry. Furthermore, while erasure poetry is an act of consciousness, in *Evolution* the selection of words and phrases involves both a conscious and unconscious act. Still, with a few exceptions, it is not an act of intentional omission. The blank spaces do not mark the absence of anything that has been, because the poem is an event that occurs here and now.

The caesuras are of semantic significance because they remind us that the texts could have been different. The absence of words could have been, and in the evolutional process will be, replaced by the presence of other words. In the process, this is what happens as some words and phrases remain on the screen through several computational generations while others disappear. Likewise, the blank spaces carry with them multiple representations. They signify both the presence of what has been, that something has been erased by hand, nature or technology, and a promise of something that is yet to come, that the process of repetition and change at some point will replace a blank space with words. In addition to these two, the blank spaces are digital spaces. Actually, the blank spaces are not empty but filled with codes that are constantly running underneath. They remind us

that both the words and the blank spaces are computer-generated, and, for this reason, the meaning of the blank spaces is not only conditioned by the absence of words but also by the presence of the meaning of the codes. Again, the digital work points towards its non-digital sister, or companion, the book *Evolution*, which contains the algorithms that the digital work conceals underneath words and blank spaces.

In addition to the poem being an event, a process in which the poem gradually becomes less Heldén's than the computer's, the work and the poem establish an atmosphere and an affective environment. In one of the poems I presented earlier (Fig. 4), in generation 44414, the nouns "tilvaro" ("existence") and "tomma" ("empty") and the adjectives "osäkra" ("uncertain") and "svajande" ("swaying") appear grammatically decontextualized, only surrounded by a few prepositions, conjunctions and subjunctives. It expresses, with both words and blank spaces, an existence that is unfilled, as if it is referring to itself as an empty poem that needs to be filled with running codes. Each of these words may not give much, but read together they create an uncanny feeling and signify a situation and a development that is uncertain, out of balance, just like the poem that never rests and therefore in the next second will be different.

Evolution as imitation and mutation

In the framework of technogenesis, blank spaces and broken syntax – produced in a collaboration between humans and computers – indicates, perhaps, that the computer is running the poem towards the death of language, grammar and poetry reading as we know it. In poetry, we are familiar with blank spaces and broken syntax, but in *Evolution*, these elements are largely unintentional. Further, the poem does not follow any syntactic rules; therefore, it makes less sense to look for branches with linguistically and logically concerned semantics. Likewise, because of the collaboration between humans and algorithms, conscious and unconscious cognizers, it might not make sense to stress potential correlations between form and content. This also holds true for the algorithms' interpretations, since they are linked to word classes and not to single-word semantics. Furthermore, because the algorithms are to be regarded as unconscious cognitions, it is fair to say that the poem does not exhibit metapoetic consciousness. The algorithms do not know that they are performing a poem or a poetic event. Algorithms do not know poetry and poetic traditions.

Evolution is a work that, according to Heldén and Jonson, is designed to pass "The Imitation Game," meaning that it produces poetry that could have been written by Heldén. Therefore, the pattern of repetitions and changes is also an evolutionary process of imitations and modifications. As long as the computer only

imitates a predefined poetic form and tradition, evolution will not take place. When it makes small changes during its imitation game, evolution will occur. The genetic algorithms work by executing the instructions given by Heldén and Jonson, but, as they learn, they slowly amend these instructions and create differences. In other words, *Evolution* points towards an evolution of poetry that is structured around imitations and differences and that follows the allegory of evolution, patterns and mutations. The point is that evolution cannot take place unless there are sequences that disrupt or change existing patterns. "Mutation", a concept that Hayles develops in accordance with her technogenetic model, "is crucial because it names the bifurcation point at which the interplay between pattern and randomness causes the system to evolve in a new direction." (Hayles 2012, 33) Hayles describes the interplay between pattern and chance as mutations. Mutations are then the productive outcome of the encounter between pattern and coincidence, where fractures occur and create a new and hitherto unforeseen development. With *Evolution* and its poetic tradition in mind, we might ask how far the mutations have come or to what extent *Evolution* is an imitation or mutation game.

The form of the poem, with the blank spaces, is similar to many of Heldén's poetry as it brings with it a poetic shape and includes words of a certain kind that have become a watermark of his art and poetry. Further, the poem can be linked to poetry in Scandinavia in the 1980s and 1990s, including by such poets as Agneta Enckell and the late Eva-Stina Byggmästar. It also shares much in common with the poetic style and environment around OEI in Sweden, often referred to as *språkmaterialism,* which renewed the idea of language as concrete materiality. This poetic style, inspired by Language poetry in the US, includes poets such as Anna Hallberg, Malte Persson, Lars Mikael Raattamaa, Johan Jönsson and Johannes Heldén. Therefore, one may argue that *Evolution* as a poetry machine imitates the poetry of Heldén and the poetic tradition out of which his poetry is born. This is why Marie Engberg points out that Johannes Heldén as a poet is ubiquitous in the poetic event, even though, as she claims, it is generated by algorithms (Engberg 2014b, n.p.).

The algorithms imitate Heldén's poetry and evoke moods and emotions similar to those Heldén creates in his poems. The algorithms then develop these elements until they can no longer be regarded as Heldén's but as the algorithm's and the computer's. On the one hand, such a project is in danger of becoming overly limiting or of being read ironically, as was the case for early literary experimentations with artificial intelligence. One example of this is Christopher Strachey's *Love Letter Generator* from 1952, which was programmed to automatically generate love letters. As Roberto Simanowski points out, this program can be understood as an ironic commentary on the genre of love letters (Simanowski 2011, 94). Rather than

replacing Strachey, it imitates the feelings and intentions of Strachey and of any sender of love letters. On the other hand, poetry events like *Evolution* invite us to reflect on and look for the technological point of singularity, i.e. the point where what we think of as human-made cultural and aesthetic expressions is taken over by artificial intelligence (see e.g. Shanahan 2015).

Just as Heldén is omnipresent in the work, so too are the algorithms and the computer ubiquitous. They are ubiquitous to such an extent that Heldén and the computer's algorithms have become inseparable. Poetic technogenesis and the idea of imitation and evolution are based on an organic model. The poem is continuously developing and is, therefore, similar to how nature evolves organically. It is, of course, obvious to think of an ecological evolution where nature is programmed to repeat actions but where mutations and other changes also break with such patterns. Existing patterns can for instance be written algorithms, while changes, or mutations, occur when the predictable patterns are broken, which leads to a difference. The latter may occur, for example, because of genetic codes. The algorithms work in a pattern, but because they can contain generations that break with a pattern, coincidences will also occur. The title *Evolution* must be considered in a similar dialectic because mutations create an unpredictable development. This unpredictability can be described as the poetic strategy of the digital poem. It is also this that allows Heldén to distinguish between what he considers to be his poetry and the generations in the poem's development that differentiate it from his poetry. As he once stated in a presentation of *Evolution*, the poems were considerably better after about 30,000 generations. At this stage, which takes some time to reach, the algorithms have created connections that are new and different, and the digital poem appears to be more detached from Heldén's poetry.

Posthuman poetics

A note from the "about" section of *Evolution* reads that "The release of *Evolution* will mark the end of Johannes Heldén writing books of poetry. He has, in a sense, been replaced." (Heldén and Jonson 2014) The reference to the work's intention, which is not only to imitate Heldén's poetry but also to replace him, hence making him superfluous as a poet, is striking at a time when literature has become dominated by autofiction and self-presentation. However, it is worth noting that on the opening page of the digital part and on the front of the print book, Johannes Heldén and Håkan Jonson are listed as authors with legal rights over the work. They also represent and present the work in poetry readings and conversations about their works. In other words, the exploration of the computer that replaces the poet goes far, but it does

not exceed paratexts, literary conventions or the legal and institutionalized dimensions of literature and poetry. Perhaps it is fair to say that just as much as *Evolution* challenges understandings of what poetry can be in the computational network environment, the work is also an attempt to incorporate the computer and its poetry into the print publishing institutions, a system that is to a high degree humanistic. In this sense, the work does not represent a movement from human to machine, from poet to genetic algorithm, a movement that would emphasize the play of presence and absence but an interconnection of conscious and unconscious cognitions, poet and algorithms, analog and digital materialities, a reciprocal interaction of repetitions and changes.

It would be difficult to determine whether or not we would be able to distinguish the computer's poem from Heldén's in a blind test. This task is interesting precisely because technogenesis is not about the separation of humans and technology but of their co-existence. In *How We Became Posthuman*, Hayles writes: "the posthuman appears when computation rather than possessive individualism is taken as the ground of being, a move that allows the posthuman to be seamlessly articulated with intelligent machines." (1999, 34) In such a perspective, Heldén and Jonson become posthuman subjects, and *Evolution* becomes a poetic event and posthuman poetry, or at least *Evolution* explores the possibility of such a development for poetry, where there is a seamless connection between poets and computer.

The goal to emulate Heldén as a poet immediately reflects the co-existence of humans and computers: media are neither neutral, nor do they entirely determine the process. Rather, *Evolution* depicts new sensibilities in the computational network environment wherein Heldén and Jonson choose to (try to) outdo the poet and his poetry. Heldén and Jonson embrace the media technological situation with which they are entwined and regard genetic algorithms as their possibility. They recognize both the poet and poetry as always already being technological. Both are, in the contemporary media situation, intertwined with environments of programmable and network media. They demonstrate what poetry can do and be and what computers can do and be. Here, in the posthuman environment of *Evolution*, media obviously matter and both the poets and the algorithms determine the process and the result. Therefore, *Evolution* and the technogenetic perspective demonstrate that in this media environment, in which the poet and poetry are already entangled, it is not a question of either poet or media, human or non-human. The poem is made up of conscious and unconscious decisions, selections, combinations and interpretations that make the environment, and therefore the work *Evolution*, flexible, changeable and evolutionary.

With respect to the technogenetic feedback loop of repetitions and changes, *Evolution* demonstrates that an outcome, a poem, could be different and that the outcome is unpredictable and promised. Evolution always promises change and so does the work *Evolution*. This is a freedom to create, that is, to try to let go of one's responsibility as a poet and leave the poetic event partly to the computer. Still, the omnipresence of Heldén, in addition to the presence of Heldén and Jonson in the work's paratexts and the poetic tradition that the poem reflects, are a reminder that poets still can make a difference. The poem as an event is always different, and even this is something that could be different.

It is fair to claim that *Evolution* invites readers to press play, lean back and enjoy, or be confused, amazed or provoked by the event on the screen. If so, it gives space to a less critical and more compliant reading, as Felski contends. But again, rather than making this the only mode of reading, I would argue for a combination of modes of reading and that a media-specific close reading is crucial if one is not to miss what it implies when genetic algorithms or AI takes over ancient human activities like writing and performing poetry. The close reading that I have conducted in this chapter demonstrates that even though *Evolution* is a performance, a close reading can make the experience richer, more thoughtful and stranger. *Evolution* opens up a reflection on the future of language and technology and, it turns out, as it often does in the course of the history of literature, that the work does something other and more than what its authors say it does or that they claim they want to achieve.