

Story Size

Abstract: The shortest stories are zero words long. There is no maximum length.

Take a strip of paper with ‘once upon a time there’ written on one side and ‘was a story that began’ on the other. Twisting the paper and fastening the ends produces John Barth’s *Frame-Tale*, which prefixes a token of ‘once upon a time there was a story that began’ to itself.¹ According to its author, *Frame-Tale* is “... the shortest story in the English language (ten words); on the other hand, it’s endless.”² This paper argues *Frame-Tale* is neither the shortest nor the longest story: zero is the minimum story length, and there is no maximum.

One clarification. This paper contributes nothing original, even pedagogically, to mathematics or its philosophy, and its contributions to the philosophy of literature are merely marginal. The purpose of the paper is not to use examples from literature to cast light on philosophical problems. On the contrary, the purpose of the paper is the opposite: to use mathematical and philosophical ideas for the creation of literature. *Frame-Tale* is an example of the fascinating fiction which may be created in this way, but, I shall argue, it falls far short of exhausting the possibilities in the area.

The application of mathematics to the elaboration of novel literary forms has been extensively explored by the Oulipo, a collective writing mainly in French, but to my knowledge they’ve overlooked the possibility of exploiting transfinite numbers.³ The infinite as a theme in literature has been well explored by Jorge Luis Borges. I’ve taken his advice when he says “It is a laborious madness and an impoverishing one, the madness of composing vast books – setting out in five hundred pages an idea that can be perfectly related orally in five minutes. The better way to go about it is to pretend those books already exist, and offer a summary, a commentary, on them.”⁴

There are many microfictions shorter than ten words. Augusto Monterroso’s story *The Dinosaur*, for example, consists of the eight words: ‘When he awoke, the dinosaur was still there.’⁵ Ernest Hemingway is purported to have written a story of just six words: ‘Baby’s shoes: brand new, never worn.’⁶ And Forrest Ackerman’s story *Cosmic Report Card: Earth* consists of a single letter: ‘F’.⁷ According to its author *Cosmic Report Card: Earth* is “... what must be the world’s shortest science fiction story – one letter of the alphabet for which I got paid a hundred dollars.”⁸

But the shortest stories are less than one letter long.⁹ *Metamicrofiction*, for example, is a short story which consists of no letters and exactly zero words.¹⁰ Just as *Frame-Tale* is an infinitely long story about an infinitely long story, *Metamicrofiction* is a zero word story about a zero word story.¹¹ Since *Metamicrofiction* consists of no words, letters or other symbols at all, no story is shorter. (*Metamicrofiction* does have one word in its title. But one can imagine the publication of an untitled sequel, with a similar theme.¹²) So zero is the minimum story length.

It might be objected that *Metamicrofiction* and its sequel are not stories, since they lack, for example, traditional plot and characterization. But *Frame-Tale* also lacks traditional plot and characterization. And insofar as *Frame-Tale* is a traditional narrative whose protagonist is a story which heroically persists despite the odds against it (it isn't), *Metamicrofiction* is a traditional narrative whose protagonist is a story which tragically ceases despite the odds in its favour (it isn't either). So insofar as *Frame-Tale* is a story, *Metamicrofiction* is a story as well.

Some definitions of story exclude *Frame-Tale* and *Metamicrofiction* simply because of their lengths. Aristotle's, for example, defines a story as the imitation of a whole and complete action, which has a beginning, middle, and ending, as well as an appropriate length.¹³ *Frame-Tale* is excluded because it has no beginning nor end and is inappropriately long, whereas *Metamicrofiction* is excluded since, as well as having no beginning nor end it has no middle, it is inappropriately short. But this tells more against Aristotle's definition than it does against the stories.

Other definitions of story exclude *Frame-Tale* and *Metamicrofiction* because they are metafiction, and not because they are microfictions. Most definitions require a causal connection between the events of the story, which excludes *Frame-Tale* and *Metamicrofiction* because they don't feature causation in any obvious way.¹⁴ This is an important difference between *Frame-Tale*, *Metamicrofiction* and other stories. But whether it warrants withholding the word 'stories' is a verbal question that there is no need to resolve.¹⁵

There are many novels longer than ten words. Marcel Proust's *A la recherche du temps perdu*, which consists of approximately nine million six hundred and nine thousand characters including spaces, is often estimated to be the longest.¹⁶ Someone reading *Frame-Tale* at the same time per character as someone reading *A la recherche du temps perdu* would complete about two hundred and eight thousand eight hundred

and ninety-one rotations in the time taken to complete *A la recherche du temps perdu*. Nevertheless, the reader of *Frame-Tale* will still have more to read after the reader of *A la recherche du temps perdu* has finished.

Some poetry is much longer than *A la recherche du temps perdu*. Raymond Queneau's *A Hundred Thousand Billion Poems*, for example, consists of ten fourteen line poems with identical rhyme schemes.¹⁷ Cutting between the lines allows them to be recombined into a total of ten to the power of fourteen or one hundred thousand billion poems. Queneau estimated that "... someone reading the book 24 hours a day would need 190,258,751 years to finish it", implying a reading speed of one poem per minute, except for rest on leap days.¹⁸ Nevertheless, even if someone finished reading *A Hundred Thousand Billion Poems* at this speed, someone reading *Frame-Tale* at the same speed would still have more to read before and after.

Michèle Métail is composing a poem called *Compléments de noms*, inspired by the long German word 'donaudampfschiffahrtsgesellschaftskapitan'.¹⁹ The first few lines run:

le capitaine de la compagnie des voyages en bateau à vapeur du danube
 la femme du capitaine de la compagnie des voyages en bateau à vapeur
 la fille de la femme du capitaine de la compagnie des voyages en bateau

... and so on, where each line is succeeded by one dropping the last possessive phrase and prefixing a new one. The poem is reputed to be more than twenty thousand lines long, but is intended to be infinite.²⁰

Whereas Queneau's instructions suffice to determine which poems are part of *A Hundred Thousand Billion Poems*, Métail's instructions underdetermine which line of *Compléments de noms* is next, so Métail's intention for *Compléments de noms* to be infinite is unrealised, and the poem is incomplete. (It might also be worried that *Compléments de noms* cannot be infinite, since each line requires new vocabulary, but the vocabulary of French is finite. However, Métail sidesteps this worry by adopting vocabulary from other languages, and one may expect the growth of vocabulary in all languages to outstrip the growth of the poem.²¹)

Nevertheless, there are novels and poems which are infinitely long. Take, for example, ω , which is a verse novel consisting of the following sentences:

I write

I write I write

I write I write I write

... and so on, where each successive line prefixes 'I write' to its predecessor.²²

These instructions, like Queneau's for *A Hundred Thousand Billion Poems*, suffice to determine the next line of ω . So like *Frame-Tale*, ω is endless.

Nevertheless, ω and *Frame-Tale* are not comparable with respect to length. Since ω and *Frame-Tale* are both endless, someone who reads a line of ω in the same time as someone who reads one rotation of *Frame-Tale* will continue reading for as long. But since *Frame-Tale* is beginningless, whereas ω is not, someone who reads one line of ω in the same time as someone who reads one rotation of *Frame-Tale* won't have been reading for as long. The reader of *Frame-Tale* will already have been reading from eternity when the reader of ω has just begun.

In other words, if ω and *Frame-Tale* were comparable with respect to length, then it would be possible for us to compare their lengths by beginning reading at the same time and at the same speed, and discovering whether one of us reads for longer than the other. But although neither of us would read for longer than the other – since neither of us would ever stop reading if we maintained constant speed – we cannot begin reading at the same time, because *Frame-Tale* has no beginning to begin from – to read it at constant speed, one has to have always been already reading it.

Reordering ω so that the lines in which 'I' occurs an even number of times appear first, in descending order according to the number of times which 'I' appears, and the lines in which 'I' occurs an odd number of times appear second, in ascending order according to the number of times which 'I' appears, produces $\omega^* + \omega$, a novel which is equal in length to *Frame-Tale*.²³ Like *Frame-Tale*, $\omega^* + \omega$ has no beginning, since before every line there is either a shorter line in which 'I' occurs an odd number of times or a longer line in which 'I' occurs an even number of times.²⁴

Frame-Tale and $\omega^* + \omega$ are equal and comparable in length, since someone who reads a line of $\omega^* + \omega$ in the same time as someone who reads one rotation of *Frame-Tale* will continue reading for as long, since $\omega^* + \omega$ and *Frame-Tale* are both endless, but will also have been reading for as long, since $\omega^* + \omega$ and *Frame-Tale* are also both beginningless. In other words, if you and I read $\omega^* + \omega$ and *Frame-Tale* at the same constant speed, then we will both continue reading for ever, but we will both also have always been already reading it.

Taking 'I write I write' from $\omega^* + \omega$ and placing it at the end produces $\omega^* + \omega + I$, a novel which is one sentence longer than $\omega^* + \omega$, and so longer than *Frame-*

Tale. $\omega^* + \omega + I$ is longer than $\omega^* + \omega$ because every sentence in which ‘I’ occurs an odd number of times in $\omega^* + \omega$ corresponds to the same sentence in $\omega^* + \omega + I$, and every sentence of $\omega^* + \omega$ in which ‘I’ occurs an even number of times corresponds to a sentence in which ‘I’ occurs twice more in $\omega^* + \omega + I$, but no sentence in $\omega^* + \omega$ corresponds to the final sentence of $\omega^* + \omega + I$.

In other words, $\omega^* + \omega + I$ is longer than $\omega^* + \omega$ since if you and I read and have always been reading $\omega^* + \omega + I$ and $\omega^* + \omega$ at the same constant speed, so that every time I read a line of $\omega^* + \omega$ you read a line of $\omega^* + \omega + I$, then although I will always have more lines to read, every line of $\omega^* + \omega$ will eventually be read by me, whereas the last line of $\omega^* + \omega + I$, ‘I write I write’, will never be read by you. Since it would take forever to read the lines of $\omega^* + \omega + I$ which precede ‘I write I write’, there would be no time left to read the last line.

So *Frame-Tale* is not the longest story.

It might be objected that ω , $\omega^* + \omega$, and $\omega^* + \omega + I$ can’t be read and written in full. But similar objections can be raised about *Frame-Tale* and *A Hundred Thousand Billion Poems*: *Frame-Tale* can be written but not read in full and the one hundred thousand billion poems in *A Hundred Thousand Billion Poems* all have some chance of being read, but most never will be. Likewise, flipping a coin until it lands tails and then writing and reading ‘I write’ as many times as it landed heads gives every sentence in ω , $\omega^* + \omega$, and $\omega^* + \omega + I$ a chance of being read. It doesn’t matter that most of them never will be.²⁵

It might also be objected that whereas it’s possible in principle to read *A Hundred Thousand Billion Poems* in a finite but long period of time, it’s impossible even in principle to read *Frame-Tale*, ω , $\omega^* + \omega$, or $\omega^* + \omega + I$ in a finite period of time. But it is possible in principle to read ω in a finite period of time: if one reads the first sentence in half a minute, the second sentence in a quarter of a minute, the third sentence in an eighth of a minute, ... and so on, then one will be finished before a minute. Of course, it’s not possible to read, say, the sixth sentence in less than a second but, like finishing *A Hundred Thousand Billion Poems* before death, this is a mere impracticability.

Likewise, it is possible in principle to read *Frame-Tale* in a finite period of time: if one reads two rotations in a quarter of a minute each, before reading one in an eighth of a minute as well as after reading one in an eighth of a minute, before reading

one in a sixteenth of a minute as well as after reading one in a sixteenth of a minute, ... and so on, then one will be finished reading before a minute. It may be thought one can't have finished *Frame-Tale* in less than a minute, since one must have broken off after the last rotation. But there was no last rotation, since after every rotation in the last half minute, there was another which was half as long. Similarly, one needn't have begun reading *in medias res*, because there was no first rotation either: before every rotation in the first half minute, there was another which was half as long.²⁶

It's possible in principle to read $\omega^* + \omega$ in the same finite period of time: if one reads two rotations in a quarter of a minute each, before reading one in an eighth of a minute as well as after reading one in an eighth of a minute, ... and so on, then one will be finished reading before a minute. And if $\omega^* + \omega + I$ is read at the same speed, it will be finished in almost the same finite amount of time, with only the addition of the time taken to read the final sentence. (Some of the novels mentioned below may have more elements than there are times, so whether it's possible to read one of these novels depends on whether it's possible for time to have more moments than the novel has elements.)

Let us say that a novel is well-ordered if and only if all of its abridgements have a first part (and let us say that an abridgement of a novel is any collection of the parts of the novel in their usual order, including the whole novel, but excluding the collection of none of its parts).²⁷ ω , for example, is a well-ordered novel, since every abridgement of ω has a first part: its shortest sentence. But $\omega^* + \omega$, on the other hand, isn't a well-ordered novel, since $\omega^* + \omega$ is an abridgement of itself with no first sentence. *Frame-Tale*, likewise, is not well-ordered, because it has no beginning.²⁸

Every two well-ordered novels are comparable in length, because the first part of the first novel corresponds to the first part of the second novel, and the first part of the rest of the parts (if any) of the first novel corresponds to the first part of the rest of the parts (if any) of the second novel, and so on. If every part of the first corresponds in this way to a part of the second and vice versa, then the novels are the same length, whereas if some part of the first corresponds to no part of the second, then the first is longer, and vice versa.²⁹

Taking 'I write I write' from ω and placing it at the end, for example, produces $\omega + I$, a novel which is one sentence longer than ω . $\omega + I$ is one sentence longer than ω , because each sentence of ω corresponds to a sentence of $\omega + I$, but the

last sentence of $\omega + 1$ does not correspond to any sentence of ω : ‘I write’ in ω corresponds to ‘I write’ in $\omega + 1$, ‘I write I write’ in ω corresponds to ‘I write I write I write’ in $\omega + 1$, ‘I write I write I write’ in ω corresponds to ‘I write I write I write I write’ in $\omega + 1$, ... and so on, but ‘I write I write’ in $\omega + 1$ does not correspond to any sentence in ω .

Taking the second and fourth sentences from ω and adding them to the end produces $\omega + 2$, a novel two sentences longer than ω . Taking the second, fourth and sixth sentences produces $\omega + 3$, a novel three sentences longer, taking the second, fourth, sixth and eighth produces $\omega + 4$, ... and so on. Taking every second sentence from ω and adding them to the end produces $\omega + \omega$ or $\omega.2$, which is twice as long as ω . But even $\omega.2$ is not the longest novel: taking its second sentence and adding it to the end produces $\omega.2 + 1$, a novel one sentence longer still.³⁰

In general, for any novel in this series, its sequel is produced, if it has no last sentence, by taking the second sentence from the beginning and adding it to the end or, if it has a last sentence, by counting backwards to find the number of sentences before one with no immediate predecessor, and then counting forwards by twice that number to find the sentence to take to the end. Counting back from the end of $\omega + 4$, for example, one finds four sentences before one with no immediate predecessor, so one takes the eighth sentence from $\omega + 4$ to the end to produce $\omega + 5$.³¹

The novel $\omega.2$, although it is longer than ω , $\omega + 1$, $\omega + 2$, ..., and so on, is not the sequel of any of them; it is produced by collating all its prequels. In general, for an endless sequence of sequels of ω , in which all prequels of all novels in that sequence are included, the next novel is produced by first taking the sentences not preceded by a sentence with no immediate predecessor except the first in *every* novel, and then all sentences which are preceded by a sentence with no immediate predecessor except the first in *any* novel, as well as the second sentence with no immediate predecessor.³²

The next novel after the endless series ω , $\omega + 1$, $\omega + 2$, ..., for example, is the novel consisting of all the sentences with an odd number of occurrences of ‘I’, since these occur in all of ω , $\omega + 1$, $\omega + 2$, ... without being preceded by a sentence with no immediate predecessor except the first, followed by all the sentences with an even number of occurrences of ‘I’, since all of these except ‘I write I write’ are preceded by ‘I write I write’ in ω , $\omega + 1$, $\omega + 2$, ..., and since ‘I write I write’ has no immediate predecessor (and is not the first sentence with no immediate predecessor).

These two processes produce the following series of longer and longer novels, of which ω is merely the shortest:

$$\omega, \omega + I, \omega + 2, \dots, \omega.2, \omega.2 + I, \dots, \omega.3, \dots, \omega^2, \dots, \omega^3, \dots, \omega^\omega, \dots$$

Though the sentences of ω may be stretched into novels of greater and greater length, there is a sense in which all these novels, as well as $\omega^* + \omega$ and $\omega^* + \omega + I$, all have the same size, because they were all produced by reordering the sentences in ω , and so all contain the same number of sentences.³³

Taking each novel in this series as the chapters of a larger novel produces ω_1 , which encompasses all of them. ω_1 is longer than any chapter of ω_1 , because if the first sentence of the chapter corresponds to the first chapter of ω_1 , then the succeeding sentences of the chapter correspond to succeeding chapters of ω_1 , but a succeeding chapter of ω_1 does not correspond to any sentence. Every sentence in chapter ω , for example, corresponds to a chapter preceding $\omega.2$, since ‘I write’ corresponds to ω , ‘I write I write’ to $\omega + I$, ‘I write I write I write’ to $\omega + I, \dots$ and so on, but no sentence of ω corresponds to chapter $\omega.2$ itself.

Not only is ω_1 longer than any of its chapters, it is also larger than any of its chapters, since ω_1 has more chapters than any of its chapters has sentences. For suppose ω_1 had the same number of chapters as its chapters have sentences. Then it would be possible to reorder the sentences of ω so that each sentence corresponds to a chapter of ω_1 . But if it were possible to reorder ω so that each sentence corresponded to a chapter of ω_1 , then since ω_1 encompasses as its chapters all novels stretched from the sentences of ω , this reordering would be a chapter of ω_1 which is also the length of ω_1 . But we have already showed that ω_1 is longer than any of its chapters.³⁴

Taking the second chapter from ω_1 and adding it to the end produces $\omega_1 + I$, taking every second chapter of the chapters from ω_1 preceding $\omega.2$ produces $\omega_1 + \omega$, ... and so on. In general, applying the two procedures mentioned above to chapters instead of sentences produces the following series of longer and longer novels:

$$\omega_1, \omega_1 + I, \dots, \omega_1 + \omega, \dots, \omega_1.2, \dots, \omega_1^2, \dots, \omega_1^\omega, \dots, \omega_1^{\omega_1}, \dots$$

Though the chapters of ω_1 may be stretched into novels of greater and greater lengths, all these novels are the same size, because they are all composed of the same number of chapters, which are all composed of the same number of sentences.

Taking all the preceding novels as the volumes of a larger novel produces ω_2 , which encompasses all of them. ω_2 is longer than any volume of ω_1 , because if the first chapter of that volume corresponds to the first volume of ω_2 , then the succeeding

chapters of that volume correspond to succeeding volumes of ω_2 , but a succeeding volume of ω_2 does not correspond to any chapter. Every chapter in volume ω_1 , for example, corresponds to a volume preceding ω_1 , since ω corresponds to ω , $\omega + 1$ to $\omega + 1$, ... and so on until $\omega.2$, which corresponds to $\omega.2$, ..., and so on, but no chapter of ω_1 corresponds to volume ω_1 itself.

ω_2 is not only longer than any of its volumes, but also larger than any of its volumes, since ω_2 has more volumes than any of its volumes has chapters, for the same reason ω_1 has more chapters than any of its chapters have sentences. Reordering the volumes of ω_2 produces longer novels of the same size, which with preceding novels can be gathered into ω_3 , which is also longer and larger than any of them. And reordering ω_3 produces longer novels, which with preceding novels can be gathered into ω_4 , ..., leading to ever larger novels ω_5 , ω_6 , ... ω_ω , $\omega_{\omega+1}$, ..., $\omega_{\omega.2}$, ..., and so on.

In general, by applying the first procedure mentioned above to the direct parts of a novel one produces a sequel to that novel which is one part longer. By applying the second procedure mentioned above to the direct parts of an endless sequence of sequels of those novels, which includes all prequels of all novels in that sequence, one produces the next novel in the series. And by concatenating together all the novels in one of these series into a single novel one produces the first novel of the next series, which is not only longer but also larger than all of them.

It might be thought that it's possible to collate all novels composed in this way into a single novel which encompasses them all, and so is longer than all the novels. But this is not possible. For suppose it were possible to gather all novels composed in this way into a single novel which encompasses them all, and so is longer than all of them. Then by taking this novel's second element and adding it to the end, it would be possible to compose an even longer novel. But since this novel was composed in the same way, this would contradict the supposition we had gathered all novels composed in this way into a single novel which is longer than them all.³⁵

So there is no longest story.

In every novel considered so far, the elements possess a specific order, and reordering the elements produces a different novel. But for some novels, the elements possess no specific order, and reordering the elements simply produces a different version of the same novel. Bryan Johnson's *The Unfortunates*, for example, is published in a box, so the unbound sections, except the first and last, can be read in any order.³⁶ Likewise,

Marc Saporta's *Composition No. 1* consists of a box of unbound pages, which should be shuffled and read in random order.³⁷ Abstracting from the order of sentences in ω produces κ_0 , a novel in which the sentences can be read in any order.³⁸

κ_0 has no determinate length, but since it has the same number of sentences as ω , it has the same size as ω , and as every other novel produced by reordering the sentences of ω . Abstracting from the order of chapters in ω_1 produces κ_1 , which has the same size as ω_1 and every other novel produced by reordering the chapters of ω_1 . Abstracting from the order of volumes in ω_2 produces κ_2 , which has the same size as ω_2 and every other novel produced by reordering the volumes of ω_2 And so on.³⁹

But abstracting from the order of the elements in the novels discussed so far is not the only way to produce novels larger than κ_0 . Taking all subsets of sentences in κ_0 , in no particular order, as the paragraphs, in no particular order, of a new novel produces 2^{κ_0} . 2^{κ_0} is larger than κ_0 , because 2^{κ_0} has more paragraphs than κ_0 has sentences. For suppose the number of paragraphs in 2^{κ_0} were the same as the number of sentences in κ_0 . Then it would be possible to head each paragraph of 2^{κ_0} with a sentence of κ_0 . But this is not possible.

For suppose every paragraph in 2^{κ_0} were headed with a sentence of κ_0 . Then take the paragraph consisting of all and only the sentences of κ_0 not contained in the paragraphs they head. This paragraph could not be headed by a sentence it contains, since it contains only sentences heading paragraphs not containing them. Nor could it be headed by a sentence it does not contain, since it contains all sentences heading paragraphs not containing them. So this paragraph could not be headed by any sentence, which contradicts our supposition.⁴⁰

Since 2^{κ_0} is larger than κ_0 , and since κ_0 is the same size as ω , 2^{κ_0} is larger than ω . So if we can choose a chapter of 2^{κ_0} to be the first, and then choose another chapter to be next, and then the next, ... and then choose a chapter to be next after all these chapters, ... and so on until the chapters of 2^{κ_0} are well-ordered, then 2^{κ_0} will be longer than ω and so at least as long as ω_1 .⁴¹ Since ω_1 is the same size as κ_1 , it would follow that 2^{κ_0} is also at least as large as ω_1 and κ_1 . But whether 2^{κ_0} is exactly the same size as κ_1 depends on the continuum hypothesis, a famously unresolved question.⁴²

Regardless of whether 2^{κ_0} is comparable in size with κ_1 or any larger novel mentioned so far, 2^{κ_0} cannot be the largest novel, since a larger novel is produced by

taking every subset of the paragraphs in 2^{N_0} , in no particular order, as the chapters, in no particular order, of a new novel. This novel has more chapters than 2^{N_0} has paragraphs, since if its chapters numbered the same or less than the number of paragraphs in 2^{N_0} , it would be possible to head all of them with a paragraph from 2^{N_0} . But this is not possible.

For suppose all its chapters were headed with a paragraph of 2^{N_0} . Then take the chapter consisting of all and only the paragraphs of 2^{N_0} which aren't contained in the chapters they head. This chapter couldn't be headed by a paragraph it contains, since it contains only paragraphs heading chapters which don't contain them. But nor could it be headed by a paragraph it does not contain, since it contains all paragraphs heading chapters which don't contain them. So this chapter could not be headed by any paragraph.⁴³

It might be thought that there's a single novel which has every novel as one of its chapters, and so is the largest novel. But there cannot be such a novel. For consider the novel which has as its volumes every subset of these chapters. This second novel must have more volumes than the first has chapters, since if its volumes numbered the same or less than chapters in the first, it would be possible to preface every volume of the second with a chapter of the first. But this isn't possible.

For suppose all its volumes were prefaced by a chapter. Then take the volume consisting of all and only the chapters not contained in the volumes they preface. This volume couldn't be headed by a chapter it contains, since it contains only chapters prefacing volumes which don't contain them. But nor could it be prefaced by a chapter it does not contain, since it contains all chapters prefacing volumes which don't contain them. So this volume could not be prefaced by any chapter.⁴⁴

So there is no largest story.⁴⁵

¹ John Barth, *Lost in the Funhouse* (New York: Doubleday, 1968), pp. 1-2. As well as the issues discussed in this paper, *Frame-Tale* raises some interesting questions in the philosophy of language. See my paper "A Never-Ending Story" in *Croatian Journal of Philosophy* 14(40) (2014), pp. 111-120 for some discussion of these issues.

² *Lost in the Funhouse*, p. vii.

³ For accounts of the Oulipo's works see especially Warren Motte (ed.), *Oulipo: A Primer of Potential Literature* (Lincoln: University of Nebraska Press, 1986), *Oulipo*

Laboratory (London: Atlas Press, 1995), Harry Mathews and Alistair Brotchie (eds.), *Oulipo Compendium* (London: Atlas Press, 1998), and “The State of Constraint: New Work by Oulipo”, *McSweeney’s* 22 (2006).

⁴ Jorge Luis Borges, “The Garden of Forking Paths” in *Collected Fictions*, trans. Andrew Hurley (London: Allen Lane, 1999), p. 67.

⁵ Augusto Montessori, *Complete Works and Other Stories*, trans. Edith Grossman (Austin: University of Texas Press, 1996), p. 42.

⁶ *Wired Magazine* 14 (November 2006). Amihud Gilead discusses these examples in “How Few Words Can a Short Story Have?” *Philosophy and Literature* 32 (2008), pp. 119-129. The attribution of the story to Hemingway is dubious: see Frederick A. Wright, “The Short Story Just Got Shorter: Hemingway, Narrative, and the Six-Word Urban Legend”, *Journal of Popular Culture* 47(2) (2014), pp. 327-340.

⁷ Forrest Ackerman, “Cosmic Report Card: Earth”, *Vertex Magazine* 1 (January 1973). See also “Going for the Limit” in *Oulipo Compendium*, pp. 177-178, which mentions “A poem comprising of a single letter: T” amongst twenty-five other possibilities.

⁸ Forest Ackerman, “Through Time and Space with Forry Ackerman”, *Mimosa* 16 (1994), pp. 4-6.

⁹ Zero word poems are discussed briefly in *Oulipo Compendium*, p. 251. Paul Fournel’s “Suburbia”, trans. Harry Mathews in *Oulipo Laboratory*, pp. 37-60 purports to be a zero word novel. Craig Dworkin, *No Medium*, (Cambridge, Mass: MIT Press, 2013) discusses similar examples in several media. And see also Dennis Upper, “The Unsuccessful Self-Treatment of a Case of “Writer’s Block””, *Journal of Applied Behavior Analysis* 7(3) (1974), p. 497. For discussion of related examples in music, see Andrew Kania, “Silent Music”, *Journal of Aesthetics and Art Criticism* 68(4) (2010), pp. 343-353.

¹⁰ *Journal of Microliterature* (July 2012). It might be objected that *Metamicrofiction* is not about itself (and so mistitled) because it has no words. But so long as it exists, it is capable of being about something, and so capable of being about itself.

¹¹ This interpretation of *Metamicrofiction* is supported by its title, according to which it is about a short fiction – since it is about a short fiction, and it is a short fiction, it is reasonable to conclude that it is the short fiction it is about.

¹² Jorge Luis Borges and Adolfo Bioy Casares describe the publication of an untitled zero word story in “A List and Analysis of the Sundry Books of F. J. C. Loomis”, *Chronicles of Bustos Domecq*, trans. Norman Thomas Di Giovanni (New York: Dutton, 1979), pp. 49-55. See also “”, *Philosofict* 1 (March, 2013).

¹³ Aristotle, *Selections*, trans. Terence Irwin and Gail Fine (Indianapolis: Hackett, 1995), pp. 544-547. Aristotle’s uses ‘muthos’ for story or plot. See *Selections*, p. 544.

¹⁴ See, for example, Noël Carroll, “The Narrative Connection” in *Beyond Aesthetics* (Cambridge: Cambridge University Press, 2001) and Gregory Currie, *Narratives and Narrators* (Oxford: Oxford University Press, 2010). Carroll distinguishes a narrative, which involves causation, from a story, which is merely a sequence of events. It’s not obvious to me whether *Frame-Tale* or *Metamicrofiction* are stories even in this sense.

¹⁵ Kendall Walton distinguishes between the standard features of a category – those features which are necessary for a work to have in order to belong to the category – and the variable features of a category – those features which are neither necessary for a work to have to belong to the category nor sufficient for the a work not to belong to the category. Walton admits that which features of a category are standard is vague. In the case of stories, it is vague whether it is a standard feature of a story that it has a beginning middle and end, or is of an appropriate magnitude, or has traditional plot and characterization, so *Frame-Tale* and *Metamicrofiction* are borderline cases of the category of stories. See Kendall Walton, “Categories of Art”, *Philosophical Review* 79(3) 1970, p. 339.

¹⁶ Marcel Proust, *A la recherche du temps perdu* (Paris: Bernard Grasset, 1913-27). The character count is given in *Guinness World Records* (London: Guinness World Records, 2011), p. 163.

¹⁷ Raymond Queneau, “A Hundred Thousand Billion Poems”, trans. Stanley Chapman in *Oulipo Compendium*, pp. 15-33.

¹⁸ *Oulipo Compendium*, p. 14.

¹⁹ Michèle Métail, “L’infini moins quarante annuités”, *Le cahier du refuge* 214 (September 2012) and Michèle Métail, *2888 Donauverse aus einem unendlichen Gedicht* (Vienna: Edition Korrespondenzen, 2006). Similar examples are discussed by Izzy Grinspan in “Verse by the Yard”, *Poetry Foundation* (April, 2008).

²⁰ Daniel Levin Becker, *Many Subtle Channels: In Praise of Potential Literature* (Harvard: Harvard University Press, 2012), p. 200. Métail writes “Il me dit « c’est très

bien, mais il n’y en a pas assez ». Qu’à cela ne tienne, le poème sera donc infini!”, “L’infini moins quarante annuités”, p. 5.

²¹ “L’infini moins quarante annuités”, p. 6.

²² The opening lines of ω resemble the opening lines of Georges Perec’s *Species of Spaces*, trans. John Sturrock (London: Penguin, 1997). Although the title resembles that of Perec’s *W, or the memory of childhood*, trans. David Bellos (London: Harvill, 1988), ω is named after the ordinal number which it’s like. An accessible introduction to ordinal numbers is in Bertrand Russell’s *Introduction to Mathematical Philosophy* (London: George Allen and Unwin, 1919), pp. 89-96.

²³ $\omega^* + \omega$ is named for its likeness to the series of negative and positive integers. See Bertrand Russell, *Principles of Mathematics* (Cambridge: Cambridge University Press, 1903), p. 320.

²⁴ Roy Sorenson writes “...there are palindromes of every finite length. Therefore, there are infinitely many palindromes. Yet no palindrome is infinitely long. After all, a palindrome must read the same way backwards. If the sentence went on forever, where would one begin the reversal?” (“A Plenum of Palindromes for Lewis Carroll”, *Mind* 109 (2000), p. 20). But $\omega^* + \omega$ illustrates that if it had no beginning as well as no end, a palindrome could be infinitely long.

²⁵ By stipulating that the first half of a blank line abbreviates ‘I write’, the first half of the second half abbreviates ‘I write I write’, the first half of the third half abbreviates ‘I write I write I write’... and so on, ω can also be abbreviated into a single line. See Roy Sorenson, “Blanks: Signs of Omission”, *American Philosophical Quarterly* 36(4) (1999), p. 310. $\omega^* + \omega$ and $\omega^* + \omega + I$ can be abbreviated via similar stipulations. If space is continuous, then some stories of size 2^{\aleph_0} , but no greater, may also be abbreviated in similar ways. And whether stories of size larger than 2^{\aleph_0} can be abbreviated in this way in principle depends on whether there can in principle be more than 2^{\aleph_0} spaces in which to abbreviate them.

²⁶ Reading ω , *Frame-Tale*, $\omega^* + \omega$ and $\omega^* + \omega + I$ in this fashion involves the performance of a super task. See James Thomson, “Tasks and Supertasks”, *Analysis* 15(1) (1954), pp. 1-13, which argues for the in principle impossibility of these tasks, and Paul Benacerraf, “Tasks, Super-Tasks, and the Modern Eleatics”, *Journal of Philosophy* 59(24) (1962) pp. 765-784, which argues – correctly I think – for their in principle possibility.

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- ²⁷ *Introduction to Mathematical Philosophy*, pp. 92-93.
- ²⁸ *Frame-Tale's* order is cyclical, see *Introduction to Mathematical Philosophy*, pp. 40-41.
- ²⁹ For detailed explanation see Karel Hrbacek and Thomas Jech, *Introduction to Set Theory*, 3rd Edition, (New York: Marcel Dekker, 1999), pp. 104-106.
- ³⁰ *Introduction to Mathematical Philosophy*, pp. 90-92.
- ³¹ This is a variation of Cantor's first principle of generation. See Georg Cantor, *Contributions to the Founding of the Theory of Transfinite Numbers*, trans. Philip Jourdain (London: Open Court, 1915), p. 169.
- ³² This is a variation of Cantor's second principle of generation. See *Contributions to the Founding of the Theory of Transfinite Numbers*, p. 169.
- ³³ *Introduction to Mathematical Philosophy*, p. 92.
- ³⁴ *Introduction to Set Theory*, pp. 103-110 and pp. 129-132.
- ³⁵ This is a manifestation of the Burali-Forti Paradox. See *Principles of Mathematics*, p. 324 and Abraham Fraenkel, Yehoshua Bar-Hillel and Azriel Levy, *Foundations of Set Theory*, 2nd Edition (Amsterdam: Elsevier 1973), p. 8.
- ³⁶ Bryan Stanley Johnson, *The Unfortunates* (London: Secker & Warburg, 1969).
- ³⁷ Marc Saporta, *Composition No. 1*, trans Richard Howard (London, Visual Editions, 2011).
- ³⁸ Though the title resembles that of Borges' "The Aleph" in *Collected Fictions*, pp. 274-85, \aleph_0 is named for the cardinal number to which it's similar. See *Introduction to Mathematical Philosophy*, p. 83.
- ³⁹ *Introduction to Mathematical Philosophy*, p. 92.
- ⁴⁰ This is an application of Cantor's diagonalisation argument. See *Introduction to Mathematical Philosophy*, pp. 85-86.
- ⁴¹ This argument depends on the axiom of choice. See *Introduction to Mathematical Philosophy* p. 92, pp. 122-124.
- ⁴² See *Introduction to Set Theory*, p. 101.
- ⁴³ A possible world is sometimes defined as a complete and consistent novel – a novel in which all the sentences are compatible with each other, but are jointly incompatible with any sentence not in the novel. A common criticism of this definition is that since in an ordinary language there are only \aleph_0 sentences, it follows that there will be at most 2^{\aleph_0} possible worlds (since that is the number of sets of the \aleph_0 sentences). This

objection is not undermined by the point that there is a novel with more chapters than there are paragraphs in 2^{\aleph_0} , since the number of these chapters exceeds the number of complete and consistent novels only by containing many repetitions of the same \aleph_0 sentences, and so the different chapters do not correspond to distinct possibilities. See Richard Jeffrey, *The Logic of Decision* (Chicago: University of Chicago Press, 1965), p. 208 and David Lewis, *Counterfactuals* (Harvard: Harvard University Press), p. 90 and *On The Plurality of Worlds* (Oxford: Blackwell, 1986), pp. 143-144 for the definition and criticism respectively. For a surprising connection between the philosophy of possible worlds and the Oulipo, see Jacques Roubaud, *On The Plurality of Worlds of Lewis*, trans. Rosmarie Waldrop (Normal: Dalkey Archive Press, 1995).

⁴⁴ This is a manifestation of Cantor's Paradox. See *Principles of Mathematics*, pp. 362-368.

⁴⁵ I would like to thank David Bourget, David Chalmers, Alex Sandgren and Weng-Hong Tang, as well as Sam Baron, Daniel Levin Becker, Derek Baker, Mark D'Cruz, John Paul Foenander, Daniel Friedrich, Axel Gelfert, John Holbo, Cliff Kerr, June Mahadevan, Daniel Nolan, Shaun Oon, Angela Mendelovici, Michael Pelczar, Andrew Hao-Yen Shih, Neil Sinhababu, Sarindranath Tagore, Liling Tan, David Wall, Zach Weber, Cecilia Wee, Brenton Welford, Zi Wei Yap, anonymous referees for *Philosophical Papers* and audiences at the Australasian Association of Philosophy conference at the University of Victoria Wellington, the University of Sydney, and Humboldt University Berlin for help with this paper.