

# Brian Moriarty | Lectures & Presentations | I Sing the Story Electric

## I Sing the Story Electric (2015)

First delivered on 15 November 2015 at New York University's [Practice 2015](#) conference in Brooklyn.

Portions were originally presented on 11 November 2013 at the Montreal International Game Summit, in a lecture titled *Options and Choices*.

## Notes (July 2017)

The original version of this lecture, presented at NYU in November 2015 (available on video [here](#)), contained a few errors which are corrected in this transcript. The most significant change involves the misrepresentation of Oliver Garfield as a co-creator of GENIAC and "The Uranium Shipment and the Space Pirates." These are more accurately attributed to Edmund Berkeley alone.

Also, recent discoveries involving the history of literature and cinema have rendered portions of this lecture out of date. We now have evidence of "interactive" movies

dating back to 1915(!), and a book with branching narrative published around 1940 (handily predating Queneau and Packard). Details regarding these artifacts will be incorporated into the transcript as soon as possible.

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Good afternoon, citizens. It is now 4:15 pm.

Welcome to Practice 2015. I am, in fact, Professor Moriarty.

More precisely, I am a Professor of Practice in Game Design at [Worcester Polytech](#).

Part of my practice is the study and teaching of history.

Every other year, I offer a course which surveys the development of a broad range of entertainment technologies including photography and phonography, motion pictures, radio, television, computers and, of course, digital games and VR.

One of my lectures covers the history of interactive narrative.

To my undergraduates, born in the late 1990s, the people and companies I talk about probably seem remote. But to me, Infocom and Lucasfilm Games are living memories, and I have met and worked beside many people whose

names appear in the indices of my assigned readings.

Recent discoveries have made it necessary for me revise my curriculum. I thought this gathering of practitioners would be an appropriate place to share these revisions.

Much of the material you're about to watch is obscure, hard to find and not shown very often. Indeed, some of it appears to have gone unnoticed for a very long time.

When I informed conference organizer Eric Zimmerman what I would be showing at NYU this afternoon, he accused me of fabricating a hoax.

Assuredly, I am not that clever.

This lecture incorporates historic video footage, some of it over half a century old.

In a few scenes, women and men are sexually objectified, roughly treated and physically assaulted. I have included this footage for its historic significance. If you find such material disturbing, you may wish to excuse yourself from this presentation. No offense is intended to anyone.

The idea of an audience participating to some extent in the relation of a story is hardly new.

Live talespinners, actors, magicians and clowns have

always engaged with onlookers, inviting them to cheer on heroes, weep over orphans, boo villains, offer commentary and add embellishment to stories as they were being recounted.

Perhaps the most famous scripted example of this is found near the end of J. M. Barrie's 1904 drama, *Peter Pan*.

Allowing an audience to play in the margins of an unfolding story is a wonderful way to encourage engagement.

But marginal participation is not agency.

Barrie's script assumes that the actor or actress playing Peter *will* persuade the audience to save Tinker Bell. His script doesn't provide any instruction for what should happen if nobody applauds.

Like all traditional stories, *Peter Pan* is meaningful and satisfying because it plays out *certainly*. That's what a story *is* — a *particular* causally related sequence of events.

Story is distinct from narrative, which is *how* a story is presented.

By employing the narrative device of switching to a different story, we can create the effect of interactivity, the illusion of agency.

Stories with switches.

Where does this idea come from?

1598. A folio of the collected works of Sir Philip Sydney concludes with a description of a royal masque commissioned by Robert Dudley, Earl of Leicester, and performed at his Wanstead mansion around 1578.

This untitled drama, which later came to be known as *The Lady of May*, involves a conflict between a shepherd and a woodsman, who both want to marry the same peasant girl.

The suitors present their qualifications over several pages of passionate verse. But the outcome of the argument was *not* scripted.

At the end, the lucky groom was selected by a distinguished member of the audience: the patroness of the masque, Her Majesty Elizabeth I.

Three and half centuries later, an unknown Hollywood playwright desperate for attention tried the same trick.

Ayn Rand devised a courtroom drama in which a jury selected from members of the audience would decide the guilt or innocence of the defendant.

Here are the two scripted endings, each comprising only a few sentences.

FOREMAN:

Guilty!

STEVENS:

We shall appeal the case!

KAREN:

There will be no appeal. Ladies and gentlemen, I will not be here to serve the sentence. I have nothing to seek in your world.

FOREMAN:

Not guilty!

KAREN:

Ladies and Gentlemen, I thank you in the name of Bjorn Faulkner.

Rand herself derided this narrative device as a gimmick. But it worked.

Her play, eventually known as *Night of January 16th*, was produced in Hollywood in 1933 and enjoyed a moderately successful run on Broadway the following year, launching the career of one of the most influential and controversial writers of the 20th century.

A few years later, the British philosopher and science fiction author Olaf Stapledon published his fourth novel, *Star Maker*.

This modest book aspires to be nothing less than a history of the entire universe.

It contains many original ideas, including the first articulation of the [zoo hypothesis](#), as well as the first description of a [Dyson sphere](#).

One passage is of particular interest [emphasis mine]:

"In one inconceivably complex cosmos, whenever a creature was faced with several possible courses of action, **it took them all**, thereby creating many distinct temporal dimensions and distinct histories of the cosmos. Since in every evolutionary sequence of the cosmos there were very many creatures, and each was constantly faced with many possible courses, and the combinations of all their courses were innumerable, **an infinity of distinct universes** exfoliated from every moment of every temporal sequence in this cosmos."

Stapledon's book had many famous admirers, including Arthur C. Clarke, Brian Aldiss, Vernor Vinge ...

... and especially Jorge Luis Borges, who, in 1941, published *The Garden of Forking Paths*, a short story which describes — but does *not* attempt to implement —

a fictional novel in which every decision point creates two or more new storylines, exfoliating into a maze of branches, loops and intersections.

In 1953, Ray Bradbury's *Fahrenheit 451* imagined a futuristic TV soap opera in which viewers are invited to assume the role of a missing character, reading lines prepared for them in advance.

This scene, from the 1966 movie adaptation by François Truffaut, delightfully brings Bradbury's concept to life.

This scene is silly mainly because of its earnestness. But earnestness was never a problem for William Castle.

In the four years between 1958 and '62, this second-rate director of kiddie horror movies single-handedly pioneered a number of important immersive and interactive techniques, always with his tongue in his cheek and his eye on your parent's wallet.

Castle started small with *Macabre*, which offered viewers a thousand dollar insurance policy against death by fright.

He raised the stakes in 1959 with *House on Haunted Hill*. In this film, a life-sized skeleton appeared to fly out of the movie screen and over the heads of the audience, without any need for 3D glasses.



This startling effect, which he called Emergo, was admittedly somewhat primitive. It involved an inflated plastic skeleton suspended on a system of ropes and pulleys.

Most of the cinemas that installed Emergo removed it after the first weekend. In those days, many boys still carried slingshots.

Castle really hit his stride in 1960.

*The Tingler* was the first movie to induce haptic sensations, an idea first imagined by Huxley in his 1931 novel *Brave New World*.

Near the end of the story, the giant centipede that has been terrorizing the actors onscreen finds its way into *your* theater. Electric buzzers hidden under a handful of seats delivered jolts of noise and vibration that reportedly sent viewers screaming for the exits.

Later the same year, William Castle made history again.

Imagine a movie in which each person in the audience can decide which version of a scene will appear on the theater screen, *individually* and *at the same time*.

Wouldn't that be amazing? Wouldn't that be ... interactive?

By printing the ghosts in red against a blue background, the Ghost Viewer allowed each member of the audience to decide what they would see. Looking through the top (red) filter made the ghosts appear in high contrast. Looking through the bottom (blue) filter made them completely disappear.

A case can be made for calling *13 Ghosts* the first interactive movie. But the self-proclaimed King of Showmanship was just getting warm.

The disfigured face of Baron Sardonicus is too shocking to display in a public lecture.

Here's how the Punishment Poll worked. When you bought a ticket to see *Mr. Sardonicus*, you were given a small card bearing a picture of a thumb, printed with glow-in-the-dark ink.

In the theater lobby was a cardboard kiosk called the Activator. It had a slot in the front. If you held your card inside the slot, a light bulb behind the kiosk illuminated your card, energizing the phosphorescent thumb.

I spent decades of my life trying to obtain an original Punishment Poll card. Finally, six years ago, an authentic specimen appeared on eBay. I paid fifty bucks for it. My maximum bid was twenty times that amount.

After the lecture, you may respectfully approach the

podium to pay homage to this historic artifact.

Near the end of the story, the Baron's henchman learns how his master's disfigurement can be cured. Krull, whose left eye was put out by Sardonicus in a fit of rage, must now decide. Will he tell Sardonicus the secret that can save him, or keep it to himself?

The action pauses, and William Castle appears onscreen.

During this sequence, a luckless member of the theater staff pretended to count the thumbs and tabulate the votes. Actually doing this would have been difficult, as the phosphorescent glow induced by the Activator lasted only a few minutes. The thumbs were dark long before the Punishment Poll ever got started.

The Punishment Poll was a fraud. Like Bradbury's TV soap opera, it offers the promise of different outcomes, but doesn't bother to implement more than one of them.

I call this a **Sardonic Option**.

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Six years passed before another attempt was made to present an interactive movie. It happened in Montreal at Expo 67, probably the last of the great world's fairs.

Here, in the pavilion of Czechoslovakia, was a unique and very popular cinema, showing six times a day what traditional histories identify as the first machine implementation of a branching narrative.

*Kinoautomat* was co-written and directed by Radúz Činčera.

I expect many of you have never heard of Činčera or his film before today. This isn't surprising. Aside from contemporary summary accounts and a handful of photographs, few details about the design and operation of *Kinoautomat* are available, at least in English. After being shown at the world's fairs of 1967, '68 and '72, the movie disappeared for over thirty years.

Thankfully, Činčera's daughter is now actively promoting her father and his pioneering work. A digital restoration of *Kinoautomat* has recently been shown at a number of film festivals.

Here, courtesy of *Life* magazine, is one of the few good photos we have of the original *Kinoautomat* cinema.

It was rather small, with only 124 seats, Each seat had a pair of pushbuttons on its armrest, one green and one red. Around the perimeter of the screen were 124 numbered squares that glowed green or red depending on which button had been pushed.

The movie was hosted by two live actors, a man and a woman, who prompted the audience and sometimes pretended to interact with characters on the screen.

Technically, *Kinoautomat* consisted of two 35mm film projectors locked in sync, each loaded with 50 minutes of film. Both projectors ran together for the entire show without stopping. Switching between projectors was performed manually, using a mechanical shutter. Freeze frames in the movie were used to pause the action when it was time for the audience to vote.

The live actors were completely scripted, and tightly coordinated with the running film to insure that voting was complete before the action continued.

Now you have an idea of what *Kinoautomat* was and how it worked. Let's take a detailed look at how they used it.

This is now possible thanks to an interactive DVD, released in 2009 in an extremely limited edition available only in Czechoslovakia.

Return with me now to 1967, the Summer of Love and *Sgt. Pepper*, to that little cinema on Île Notre-Dame, and rediscover the strange, revolutionary film to which all of us here owe so much: Radúz Činčera's *Kinoautomat: A Man and His House*.

**Transcript of video narration**

- We have been urged *not* to select an outcome, even though it is the only one implemented. I call this an **Achtung Option**.
- This dreary apartment complex in Prague is the home of the protagonist. We first meet his neighbors: a bachelor army captain with a poodle named Caesar; a pretty female student; her handsome boyfriend, who always seems to be visiting; a married businessman who lives next door; his wife, who the protagonist assures us is *very* charming; and a retired schoolteacher. The last to leave the building is the porter who guards the entrance.
- Finally the protagonist himself, Mr. Novak.
- **A Bait-and-Switch Option**, implying a number of potential outcomes, none of which are implemented.
- Normally the film would continue running at this point. However, I'm stopping it here so we can do something 1967 audiences could *not* do: Go back and see what would have happened if Mr. Novak had decided *not* to let his neighbor into his apartment.
- What you've just seen is the first known example of one of the most important techniques in branching narrative: **The Foldback**, which seems to offer a number of unique outcomes, but eventually converges to a single outcome. This strategy to avoid exfoliation of content has been employed by nearly every interactive story produced in the last half century.
- Mr. Novak tries to get into his neighbor's apartment

from the outside, but ends up back in his own apartment instead.

- Another history-making moment. By allowing his audiences to go back and replay a previous option, Činčera invented the **Checkpoint Save**.
- Mr. Novak and the captain chase Mrs. Novak's taxi through the streets of Prague, leading to a risky encounter with the police.
- The chase continues with the police in pursuit, ending with Mrs. Novak's escape. Desperate to clear his name, Mr. Novak next tries to prove his innocence to his neighbor.
- An option with a short fuse. Nowadays, we call this kind of thing a **Quicktime Event**.
- The iron in his neighbor's locked apartment is still plugged in! Novak runs down to the basement to turn off the power.
- Novak leaves to retrieve his wife from his mother-in-law. By the time he returns, his apartment complex is in flames.
- A Sardonic option. From this point until the end of the movie, the footage in the two film projectors is identical. Only the script of the live actress changes in response to the votes.
- The Kinoautomat has achieved sentience! It has taken over the show, proving Mr. Novak's innocence by demonstrating to the audience that the fire in the apartment building would have happened anyway.  
**Your votes didn't matter. The ironic aesthetic of**

## **branching narrative is established.**

This is a flow diagram for *Kinoautomat*. It starts with an Achtung option, followed by a Bait-and-Switch. Then there are four Foldbacks, the second with a replay loop, the fourth with a QTE, concluding with a pair of Sardonic options.

*Mr. Sardonicus* and *Kinoautomat* established many of the techniques commonly associated with modern branching narratives.

But movies weren't the only medium experimenting with interactivity in the 1960s. Post-modernist theater and fiction, by authors like Lessing, Nabokov and Sapporta, were actively exploring multilinear and generated texts.

For example, Julio Cortezar's *Rayula* (Hopscotch, 1963) invited readers to explore its chapters in any order they liked.

Raymond Queneau, founder of Oulipo, a workshop for "potential literature," published *Un Conte à votre façon* (*A Story Your Way*) in 1967, contemporaneous with *Kinoautomat*. This work instructed readers to turn to specific pages in the book depending on what they wanted to happen.



Edward Packard popularized this technique with his 1976 publication *Sugarcane Island*, the first of what came to be known as Choose-Your-Own-Adventure books.

Until quite recently, 1976 was also widely believed to be the year in which computers were first used to implement interactive fiction. That's the year Willie Crowther turned his experience of real-life cave exploration into a text simulation on a PDP-10 mainframe. Don Woods expanded Crowther's work into an epic fantasy, which was subsequently condensed by Scott Adams into the first commercial adventure game, published for the TRS-80 in 1978.

No one can deny the historical importance and immense influence of *Colossal Cave* and *Adventureland*. I had the pleasure of joining Don Woods on a panel at PAX East a few years ago, and publicly thanked him for making our careers possible.

Nevertheless, over the decades, there have been persistent rumors of a text adventure created *before* Crowther and Woods.

Graham Nelson dropped a tantalizing reference to it in his *Inform Designer's Manual* (2001). Finally, last April, the rumor was substantiated.

Peter Langston is already renowned as the author of

*Empire*, the first digital 4X strategy game and precursor to *Civilization*, in 1971. He was the founder of my former employer, Lucasfilm Games, in 1984.

Thanks to the detective work of bloggers [Anthony Hope](#) and [Jason Dyer](#), we now have proof that Langston was also the creator of *Wander*, a development system for interactive text adventures. Several games made with *Wander* have already been recovered, and with luck we may soon get our hands on the source code of the 1974 original.

Crowther and Woods had a precursor. But do interactive computer stories *really* begin with Peter Langston? And what about Scott Adams? Was he *really* the first to market a computerized narrative?

Those of you familiar with board war games will probably recognize this name. George Phillies is one of the world's leading authorities on the topic. He's written several books, including two volumes entirely devoted to a single game, *Stalingrad*.

Over the decades, George has amassed the largest collection of board war games in the world, together with the most complete collection of related literature and periodicals.

Until this summer, when he retired, George was a colleague of mine at Worcester Polytech. He lectured on

physics, and also taught a course on tabletop gaming in my department.

A few weeks before he retired, George invited me to a tour the secure facility where his collections are stored. It was an impressive sight. Row after row of metal shelves, stacked to the brim with thousands of war games from all over the world. File cabinets stuffed with magazines. A lifetime's labor of love.

As we were preparing to leave, I suddenly noticed a familiar but quite unexpected title high on a shelf filled with miscellaneous artifacts. I turned to George in surprise.

"You have a BRAINIAC!" I said.

"Got it for my eleventh birthday," he told me.

Very carefully, I lowered the near-mythical cardboard box from the shelf and opened the lid.

*Impossible.* A complete, untouched specimen!

Literally trembling with astonishment, I picked up the pristine owner's manual, and — quite randomly — opened it to page 49.

BRAINIAC was a rebranding of a electrical hobby kit first marketed under the name GENIAC in Spring of 1955. GENIAC was a acronym for (get ready for it) Genius Automatic Computer. It was the brainchild of this man: Edmund Berkeley.

If you think the Altair 8080 or Apple I were the first personal computers, think again. Edmund Berkeley was selling plans for Simon, a 2-bit computer with 125 relays and a paper tape reader, back in 1950.

It took six hundred bucks and a pretty good machine shop to build this monster. That's the equivalent of about \$5,900 today, not what you would call an impulse purchase.

GENIAC, on the other hand, was clearly targeted at high school kids and priced at \$19.95 — still nearly \$200 today, but within the means of well-heeled parents.

Here are the original parts for the first consumer device marketed as a "computer" or "electric brain."

In essence, GENIAC is an electric state machine, programmed by hardwiring.

The base components are a perforated Masonite project board and six large dials with matching holes.

## Transcript of video narration

By attaching conductive bolts and jumpers to these components, you can construct custom rotary switches. Each switch supports up to 16 positions, with one or two poles per position.

Incandescent light bulbs, powered by a pair of D batteries, are used to indicate the state of the circuit. Logic is implemented by wiring the switch poles together.

The jumpers on the dials are aligned to match the poles on the project board. A power switch between the batteries activates the circuit. Different bulbs are illuminated as each dial is turned, depending on the logic instantiated by the wiring.

The 1955 GENIAC manual provided plans for 33 logic circuits. These ranged from simple binary adders, multipliers and comparators ...

... together with a variety of odd gadgets, such as an intelligence tester and a combination lock.

It also included two games: Project 26, a version of the classic takeaway puzzle Nim ...

... and Project 27, "A Machine to Play Tick-Tack-Toe."

As far as I can determine, these are the first computer games ever offered to consumers, predating the previous title holder, ESR's *Dr. Nim*, by almost a decade.

Some of the circuits in the GENIAC manual feel a bit contrived.

Project 10, "The Machine for the Two Jealous Wives," is an alarm system designed to alert either wife if one of their husbands goes boating with the wrong wife without a chaperone, or alone with the apparently attractive chaperone.

Then there's Project 14, the "Masculine-Feminine Testing Machine." The purpose of this circuit is (quoting the manual) to "determine whether the person who answers five questions (if he or she answers them truthfully) is more masculine or more feminine."

Each of the five questions is assigned to a dial, starting in the top right corner. The default state of all questions is feminine. When power is applied to the circuit, the bulb on the left side lights up to indicate that the person being tested is "more feminine."

Let's me take you through the questions, one at a time.

Question 1: Whom do you prefer, (a) Marilyn Monroe or (b)

Liberace?

NOTE: I am *not* making this stuff up!

Question 2: How would you thread a needle into a small hole, by (a) wetting it or (b) tapping it?

Question 3: Which would you agree with? (a) Women are better drivers than men because they are more careful, or (b) Men are better drivers than woman because they get more practice and are more skilled.

Question 4: Would you rather spend a day (a) shopping on Fifth Avenue, or (b) hunting in the woods?

And finally, Question 5: Which makes a better toy for a child? (a) A doll with a complete wardrobe, or (b) an electric train?

The algorithm behind this miracle of behavioral analytics is fairly simple. Any combination of three or more dials directed towards one gender assigns dominance to that gender.

It's interesting to note that the physical assertiveness of the operator is directly related to the gender assignment. The more dials you push away from the default, the "more male" you become.

Let's return to that moment in the storage facility when, trembling with astonishment, I opened the manual of George Phillies' BRAINIAC manual — quite randomly — to page 49.

What I found there was a description of a circuit which appears in the original GENIAC manual as Project 23: "The Uranium Shipment and the Space Pirates."

### **Transcript of video narration**

Problem: A uranium shipment from one of Jupiter's moons, Callisto, to Earth consists of a freighter rocket ship loaded with uranium and a fighter escort rocket ship disguised as a freighter.

Space pirates are known to be lurking on one of the two asteroids, Pallas or Hermes.

The pirates suspect that one of the rocket ships is a disguised freighter; therefore they may either attack the first ship, or wait in hiding for a second ship.

The commander of the uranium shipment can send either ship by the Pallas or the Hermes route, and can send the fighter either first or second.

If the pirate attacks the fighter, the pirate will be



destroyed.

If the pirate attacks the uranium ship and the fighter has already passed or taken the other route, the pirate captures the uranium.

If the pirate attacks the uranium ship and the fighter is taking the same route and is behind the uranium ship, the pirate is destroyed, but during the battle, the pirate destroys the uranium ship.

If the pirates do not attack, there is no combat.

I asked George for permission to construct this circuit using his kit of original parts. He graciously consented.

To preserve the kit's original wire, I obtained a new spool of the same gauge and color. There's about thirty feet of it under there.

## **A story with switches.**

The story is controlled by five two-position switches. This affords 32 unique input scenarios, each of which is mapped to one of four outcomes, represented by the row of light bulbs.

This simulation shows the circuit cycling through all of the possible states and outcomes.

GENIAC Project 23: "The Uranium Shipment and the Space Pirates."

This clunky antique exposes the interactive story for what it truly is: A Stapledon cosmos, in which all possible outcomes are objectively real and exist simultaneously.

Two years after GENIAC was released, physicist [Hugh Everett](#) proposed this as a model of quantum reality in his [theory of the universal wavefunction](#).

Stapledon imagined it. Borges and Bradbury described it. But in 1955, more than a decade before *Kinoautomat* and almost twenty years before Langston, Crowther, Woods and Adams, Edmund Berkeley was the first to realize and market a computerized interactive narrative.

A story electric.

Certainly, a *potential* literature.

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