"At all events my own essays and dissertations about love and its endless pain and perpetual pleasure will be known and understood by all of you who read this and talk or sing or chant about it to your worried friends or nervous enemies."

--RACTER, the first computer program to write a book.*
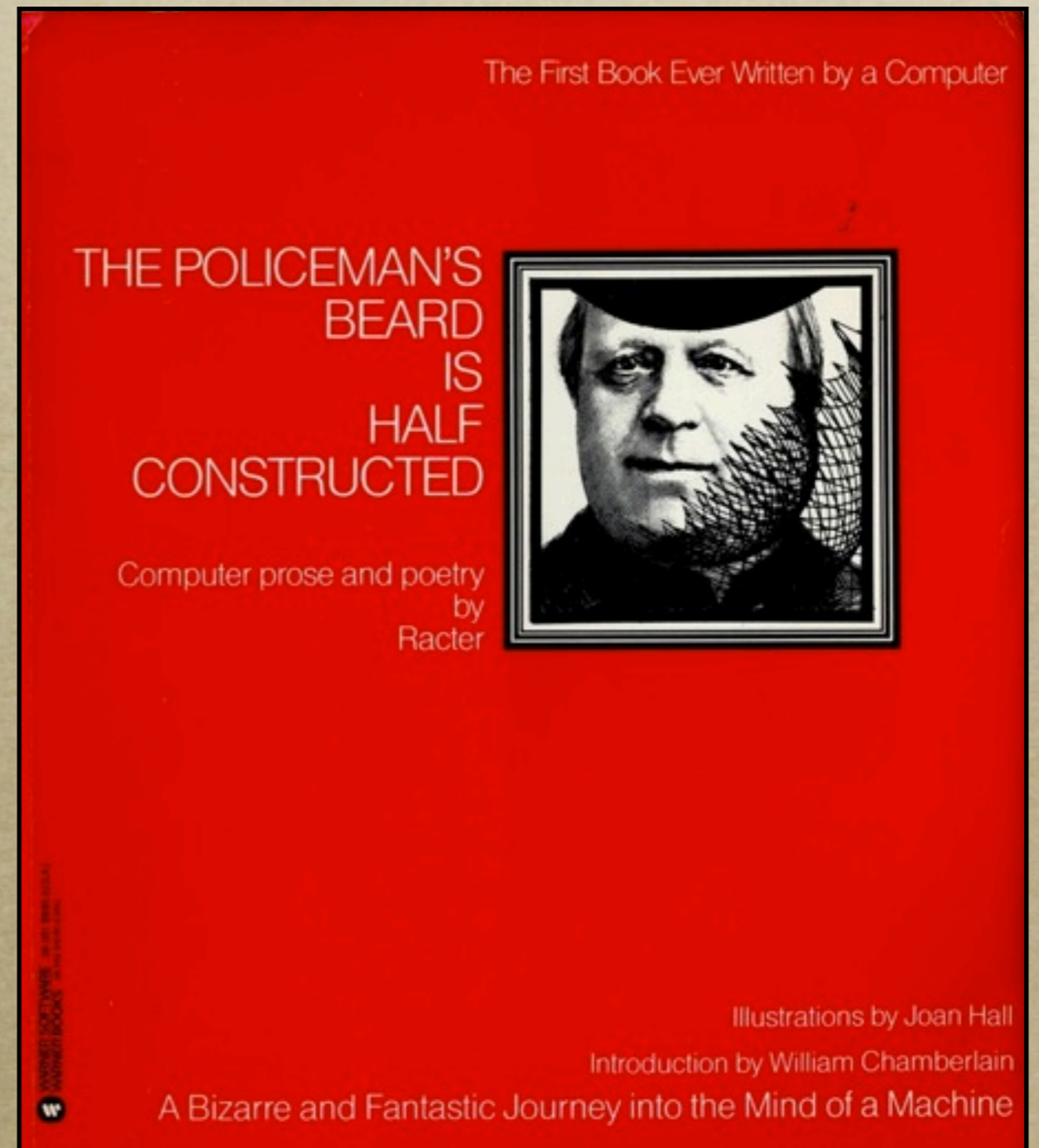
Computational Narrative

DANM 132 - Week 3

Note the asterisk.

RACTER

- Published 1983, purports to be the first book written by a computer.

- RACTER software released 1984

- Controversy over how much was written or selected by the human author (William Chamberlain) and how much was genuinely created via procedures

The First Book Ever Written by a Computer

THE POLICEMAN'S BEARD IS HALF CONSTRUCTED

Computer prose and poetry by Racter

Illustrations by Joan Hall

Introduction by William Chamberlain

A Bizarre and Fantastic Journey into the Mind of a Machine

Excerpt from *Policeman's Beard*

More than iron, more than lead, more than gold I need electricity.

I need it more than I need lamb or pork or lettuce or cucumber.

I need it for my dreams.

But in fact, if this was ever actually generated, it could just as easily have been:

Excerpt from *Policeman's Beard*

More than iron, more than pork, more than gold I need cucumber.

I need it more than I need or lead or electricity or lamb.

I need it for my dreams.

Chamberlain knows the former is more compelling, so that's what he chooses.

Excerpt from *Policeman's Beard*

"Tomatoes from England and lettuce from Canada are eaten by cosmologists from Russia. I dream implacably about this concept. Nevertheless tomatoes or lettuce inevitably can come leisurely from my home, not merely from England or Canada. My solicitor spoke that to me; I recognize it. My fatherland is France, and I trot coldly while bolting some lobster on the highway to my counsellor. He yodels a dialogue with me about neutrons or about his joy. No agreements here! We sip seltzer and begin a conversation. Intractably our dialogue enrages us. Strangely my attorney thinks and I gulp slowly and croon, 'Do you follow me?'"

Actual RACTER program is less coherent. Sentence templates with a set of nouns that get mixed in. The flow of this is repeated from one session to the next.
But key point is, more complex than ELIZA b/c not just parroting/repeating. There is (minimal) procedurality behind how the story is generated.

What is computational narrative?

- With hypertext, we added arbitrary links to change structural elements of text

- With IF, we added a simulation of space and objects

- Computational narrative adds procedurality and simulation to the mix, often producing less predictable results

Definitions

- **Procedure / Algorithm**

    - An ordered set of operations to be carried out by a person or machine

- **Simulation**

    - A set of procedures designed to replicate the behavior of some real-world system, while leaving out as much unnecessary detail as possible
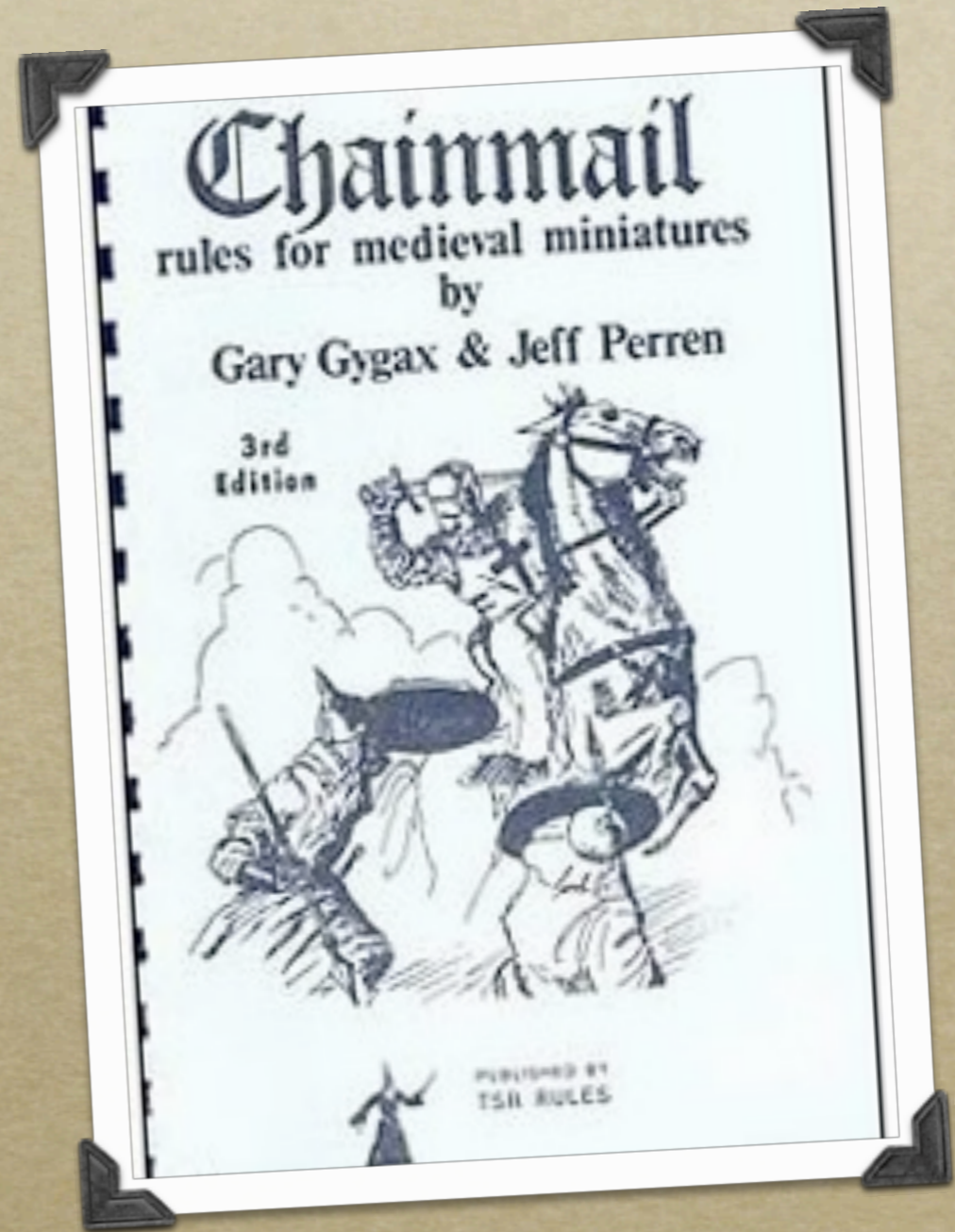
History of simulations

- Kriegsspiel (1812)

  - First wargame

  - Established representational units to represent groups of soldiers, procedures to simulate real-world conditions, use of dice to randomize events.
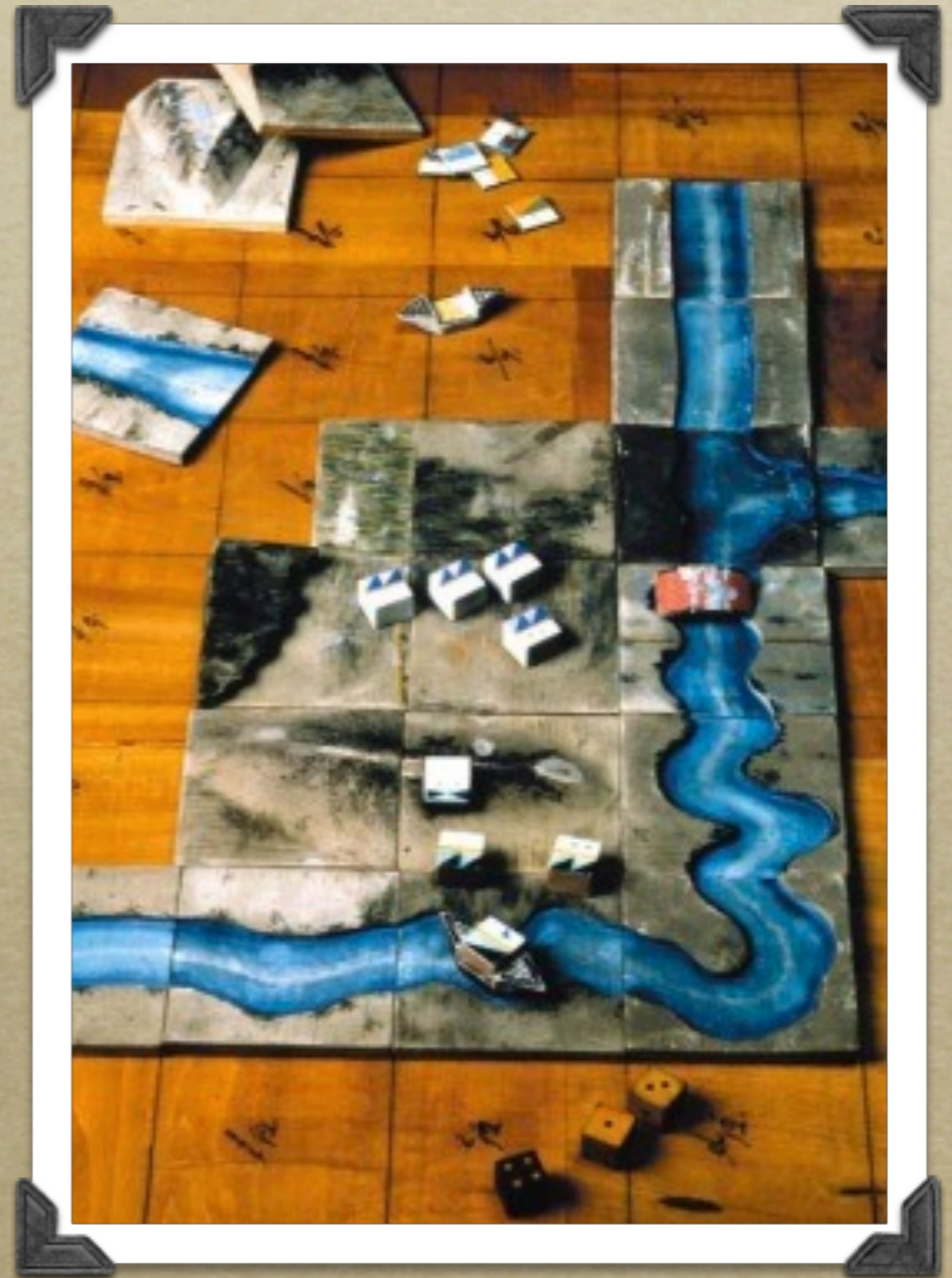
Chainmail

- Tactical Studies Rules (TSR) publishes Chainmail, 1971

- "Fantasy supplement" introduces units representing individual characters, rather than military groups

Chainmail
rules for medieval miniatures
by
Gary Gygax & Jeff Perren

3rd Edition

PUBLISHED BY
TSR RULES

Dungeons & Dragons

- Gary Gygax and Dave Arneson, 1974

- Spawned the role-playing game, today much more popular than wargaming ever was.

  - RPGs based on connection with individual character.

  - Actual narrative is still the responsibility of a human

DUNGEONS & DRAGONS

Rules for Fantastic Medieval Wargames
Campaigns Playable with Paper and Pencil
and Miniature Figures

GYGAX & ARNESON

3-VOLUME SET

PUBLISHED BY
TACTICAL STUDIES RULES
Price $10.00

Why popularity? (probably) Connection with individual character. More emphasis on story.

Proliferation of Complexity

- *Limit to complexity in human-moderated simulation.*

- *Advent of computers opened up what simulations could do.*

Rogue

- Michael Toy and Glenn Wichman, 1980

- Procedural generation of a D&D-like dungeon crawl

- Simulation complexity now limited only by processing speed

Dwarf Fortress. Limit to rules you can teach a human, no limit with computers.
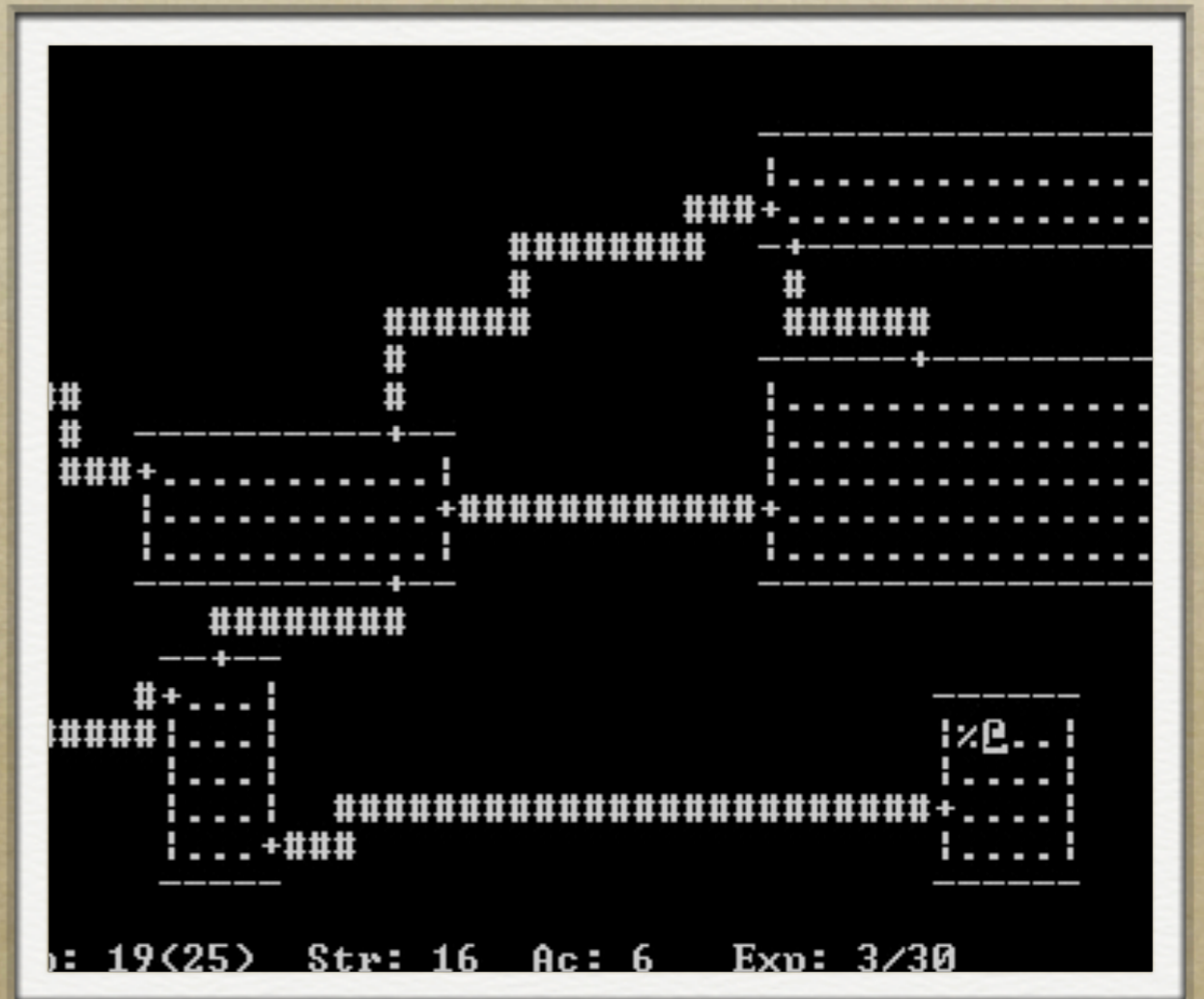
Microsoft Flight Simulator

○ V 1.0: 1982

○ Simulation to a level of detail impossible without computers

SimCity

- Will Wright, 1989

- Bestselling computer game series for over ten years

- Complex simulation with potential for emergent situations
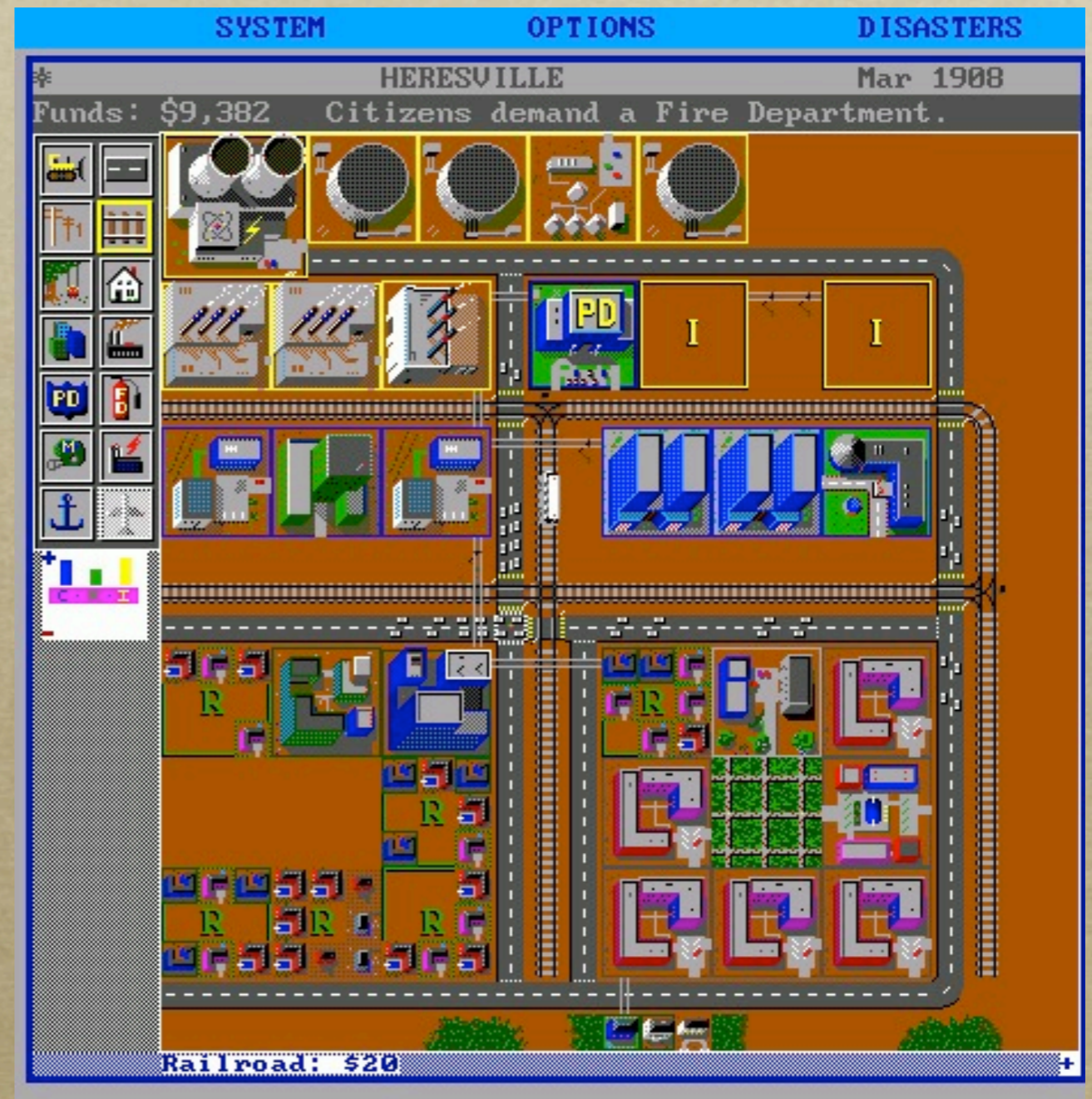
Bestselling game for ~10 years?
By many definitions of game this does not count. Some people have made up the category "toy" to refer instead. You can't "win," you can ignore all the goals and still have fun.

The Sims

- Will Wright, 2000

- ... and simulations continue to proliferate.
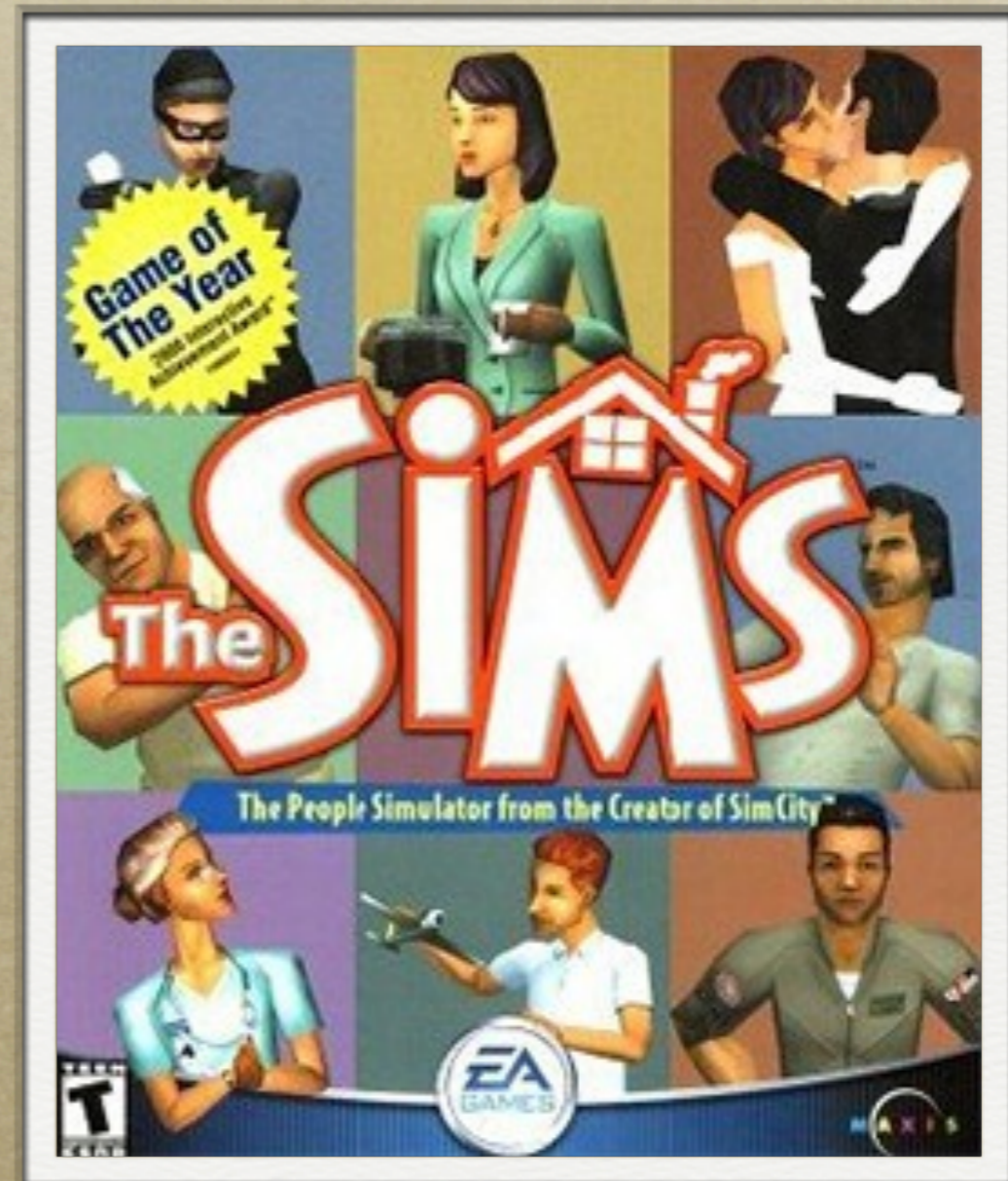
...but!

- But what about story simulations?

- Even "story-heavy" games like modern RPGs do not procedurally simulate a story. Everything is pre-authored and hand-crafted.

Imagine if in SimCity it asked "Would you like to add a suburbs now, or a rail system?" Most interactive stories still work on this model.
We'll revisit this problem through the week. But to wrap up on simulations, NWF has three useful paradigms for understanding how well a system communicates to the user through its surface.

The Brief History of Story Simulation

- Few examples because...

- It's extremely difficult!

Tale-Spin

- James Meehan, 1976

- Generates Aesop-like fables by simulating anthropomorphized animals and their goals, desires, and plans in a simulated world.

- Could operate independently or take input about what characters should be in the story and what kinds of things they liked

Tale-Spin Story

ONCE UPON A TIME GEORGE ANT LIVED NEAR A PATCH OF GROUND.
THERE WAS A NEST IN AN ASH TREE. WILMA BIRD LIVED IN THE
NEST. THERE WAS SOME WATER IN A RIVER. WILMA KNEW THAT THE
WATER WAS IN THE RIVER. GEORGE KNEW THAT THE WATER WAS IN THE
RIVER. ONE DAY WILMA WAS VERY THIRSTY. WILMA WANTED TO GET
NEAR SOME WATER. WILMA FLEW FROM HER NEST ACROSS A MEADOW
THROUGH A VALLEY TO THE RIVER. WILMA DRANK THE WATER. WILMA
WAS NOT THIRSTY.

GEORGE WAS VERY THIRSTY. GEORGE WANTED TO GET NEAR SOME
WATER. GEORGE WALKED FROM HIS PATCH OF GROUND ACROSS THE
MEADOW THROUGH THE VALLEY TO A RIVER BANK. GEORGE FELL INTO
THE WATER. GEORGE WANTED TO GET NEAR THE VALLEY. GEORGE
COULDN'T GET NEAR THE VALLEY. GEORGE WANTED TO GET NEAR THE
MEADOW. GEORGE COULDN'T GET NEAR THE MEADOW. WILMA WANTED
GEORGE TO GET NEAR THE MEADOW. WILMA WANTED TO GET NEAR
GEORGE. WILMA GRABBED GEORGE WITH HER CLAW. WILMA TOOK GEORGE
FROM THE RIVER THROUGH THE VALLEY TO THE MEADOW. GEORGE WAS
DEVOTED TO WILMA. GEORGE OWED EVERYTHING TO WILMA. WILMA LET
GO OF GEORGE. GEORGE FELL TO THE MEADOW. THE END.

What can we say about this as a story?
...Tale-Spin is actually more famous for its mistakes.

Tale-Spin error #1

HENRY ANT WAS THIRSTY. HE WALKED OVER
TO THE RIVER BANK WHERE HIS GOOD FRIEND
BILL BIRD WAS SITTING. HENRY SLIPPED
AND FELL IN THE RIVER. GRAVITY DROWNED.

This seems embarrassing, but it's actually interesting, because it suggests something complex is going on.

Tale-Spin error #2

JOE BEAR WAS HUNGRY. HE ASKED IRVING BIRD
WHERE SOME HONEY WAS. IRVING REFUSED TO
TELL HIM, SO JOE OFFERED TO BRING HIM A
WORM IF HE'D TELL HIM WHERE SOME HONEY WAS.
IRVING AGREED. BUT JOE DIDN'T KNOW WHERE ANY
WORMS WERE, SO HE ASKED IRVING, WHO REFUSED
TO SAY. SO JOE OFFERED TO BRING HIM A WORM
IF HE'D TELL HIM WHERE A WORM WAS. IRVING
AGREED. BUT JOE DIDN'T KNOW WHERE ANY WORMS
WERE, SO HE ASKED IRVING, WHO REFUSED TO
SAY. SO JOE OFFERED TO BRING HIM A WORM IF
HE'D TELL HIM WHERE A WORM WAS. IRVING
AGREED. BUT JOE DIDN'T KNOW WHERE ANY WORMS
WERE, SO HE ASKED IRVING, WHO REFUSED TO
SAY. SO JOE OFFERED TO BRING HIM A WORM IF
HE'D TELL HIM WHERE A WORM WAS. IRVING

(…)

This seems embarrassing, but it's actually interesting, because it suggests something complex is going on.

Minstrel

- 1984-94, Scott Turner

- Generates new stories in any domain (although Turner used Arthurian legends) by "learning" patterns from a library of similar stories given to it, and making substitutions. --> "case-based reasoning"

  - If a girl eats an apple in one story, and an apple is poisoned in another story, and a boy eats a loaf of bread in a third story, maybe a loaf of bread can be poisoned.

Minstrel

- ...but this approach is dangerous for coherent stories:

  - If a dragon eats a princess in one story, and a knight eats an apple in another story, maybe a knight can eat a princess.

The Elephant in the Room

- These stories aren't very good.

- Why do we need to procedurally generate stories?

- How can a human author work *with* procedures rather than be (ineffectively) replaced by them?

More Definitions

- **Surface**

  - The part of an interactive work visible to the participant: the output and interface.

The ELIZA Effect :-(

○ When the surface of a work pretends that the internal simulation is more complex than it is, the illusion is quickly unmasked through interaction, leading to disappointment.

```
How do you do. Please
state your problem.
>> I spend too much time
with computers.
Why do you mention
computers ?
>> You are one buddy.
Does it please you to
believe I am one buddy ?
>> Yes.
You seem to be quite
positive.
```
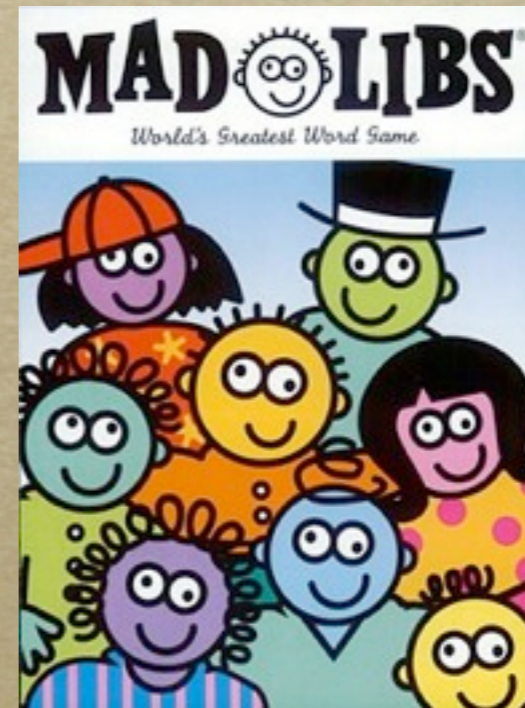
The ELIZA Effect :-(

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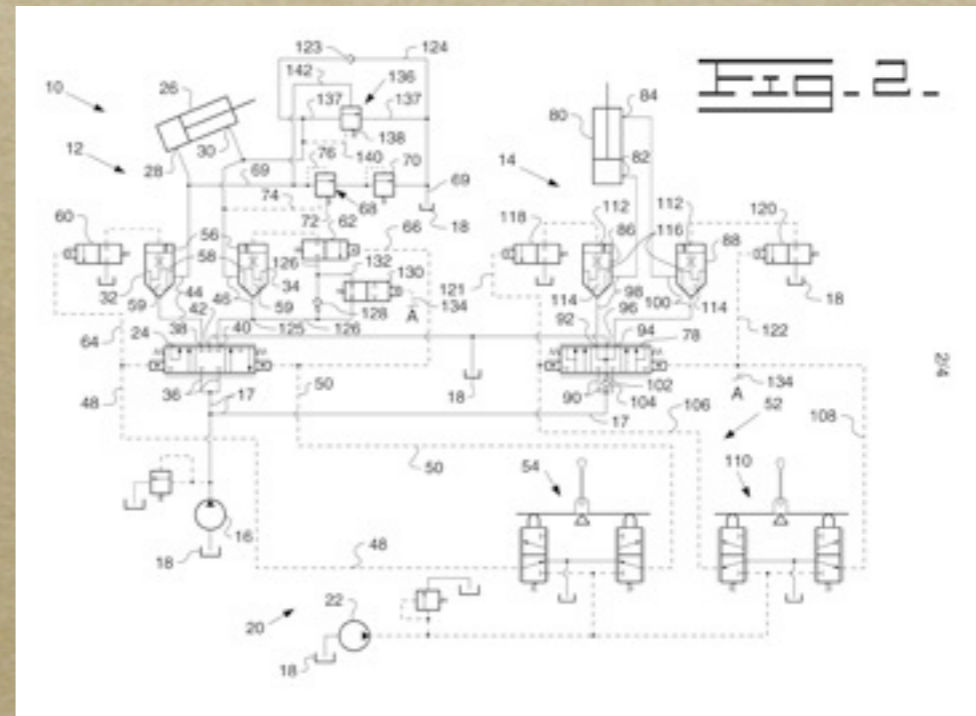"*Tomatoes from England and lettuce from Canada are eaten by cosmologists from Russia.*"

↑

The ELIZA Effect :-?

Heavy Rain.

The Tale-Spin Effect :-(

- When the surface of a work does not reveal or facilitate understanding of the complex processes underneath, frustration and misunderstanding occurs.
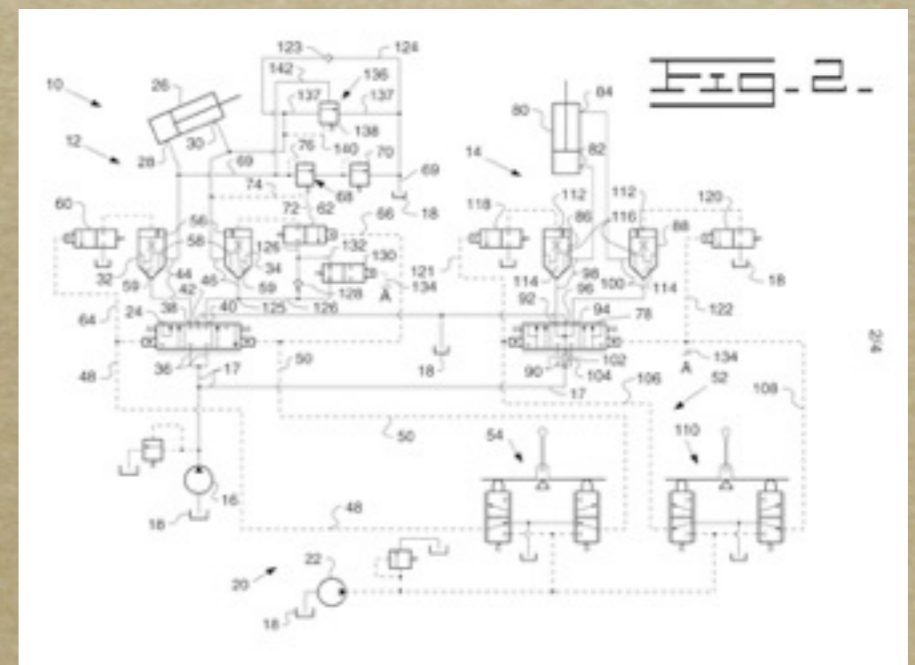
WILMA KNEW THAT THE
WATER WAS IN THE RIVER.

↑

FIG.2.

We can imagine Meeham spending days tweaking the details of the simulation and still getting the same text as a result.

The SimCity Effect :-)

o When the surface of the work provides a clear window into the complex processes underneath, the system can be understood by the user and the experience is engaging.

Fig.2.

So a goal with computational narrative is to mimic the SimCity effect. The reader/player should be able to understand the complexity.

Definition: Process intensity

- "The degree to which a program emphasizes processes instead of data." Chris Crawford, 1987

  - Full motion videos, hi-res textures, audio files, authored text == data

  - Artificial intelligence, pathfinding algorithms, rules, logic, rules for combining text == processes

What is the process intensity of this?

Dragon Age Origins

What is the (narrative) process intensity of this?

What is the (narrative) process intensity of this?
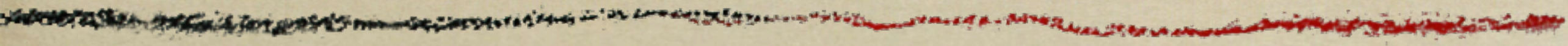
If option A is chosen:

good = good + 1
play conv_32

If option B is chosen:

play conv_32

If option C is chosen:

good = good - 1
play conv_54

It did help us.
They don't keep helping.
The demon, you mean.

IGN

○ So how do we get process intensity into computational narrative?

Unlimited variation

No authored story

← → **Well-told story**

Always the same

Demos

- "The Two" and "Through the Park" (2008, Nick Montfort)

- *Alabaster* (2008, Emily Short)

- ~~*Prom Week* (2012, Josh McCoy et al)~~

  - (This is now a reading for Wednesday)

Weekend Experiment #3

- Most important is to move forward from last week.

- Use a *system* to help tell your story

  - Can be a **combat** (real or metaphorical) with stakes the reader cares about

  - Can be a **conversation** with an outcome relevant to your story

  - Can be **a set of action rules** (or any other mechanic) to control which actions the player character can take, in a way that helps define the player character

    - *Chapter 5* and its exercises are helpful resources.