Streaming the Past:
HAMURABI, the oldest video game set in the past

A companion document for the live-stream at 28-2-2020

VALUE

Depending on when you read this, the footage of this stream may be found in one (or several) of these places:
https://twitch.tv/valuefnd
https://youtube.com/valuefnd
www.interactivepasts.com

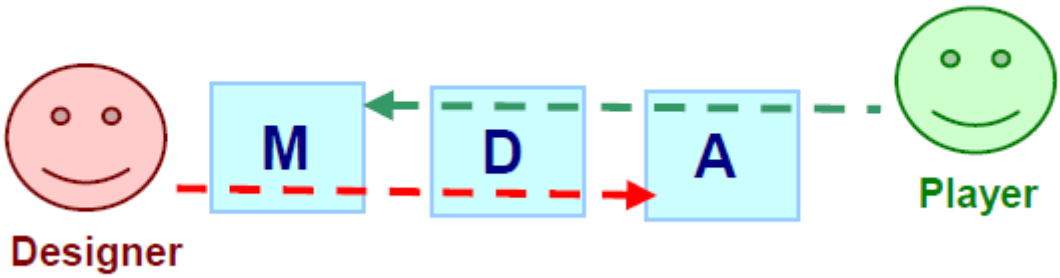
“A great deal could be learned about the human thought process if one could simulate it on a computer”

~ David H. Ahl

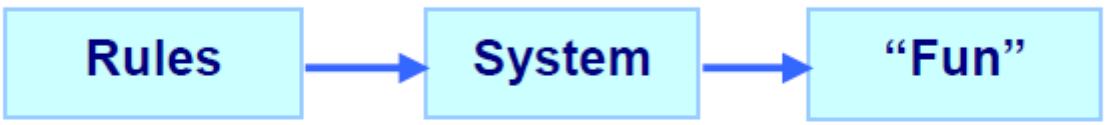
MDA: A Formal Approach to Game Design and Game Research

Robin Hunicke, Marc LeBlanc, Robert Zubek

hunicke@cs.northwestern.edu, marc_leblanc@alum.mit.edu, rob@cs.northwestern.edu



The MDA framework formalizes the consumption of games by breaking them into their distinct components:



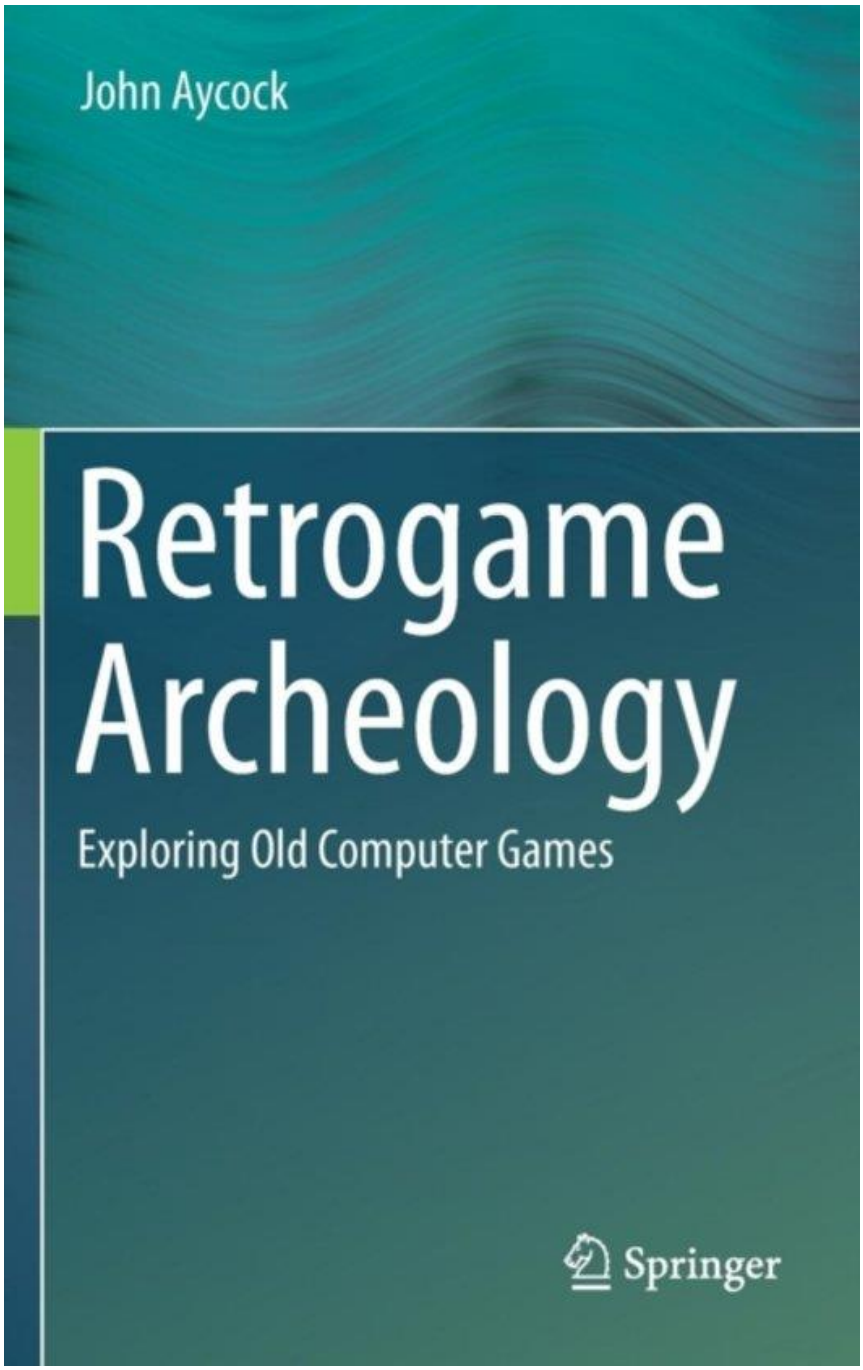
…and establishing their design counterparts:

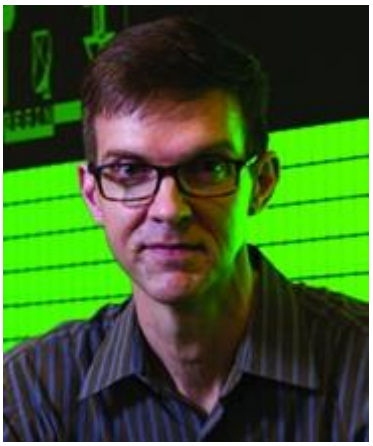
Mechanics describes the particular components of the game, at the level of data representation and algorithms.

Dynamics describes the run-time behavior of the mechanics acting on player inputs and each others' outputs over time.

Aesthetics describes the desirable emotional responses evoked in the player, when she interacts with the game system.

Retrogame Archaeology





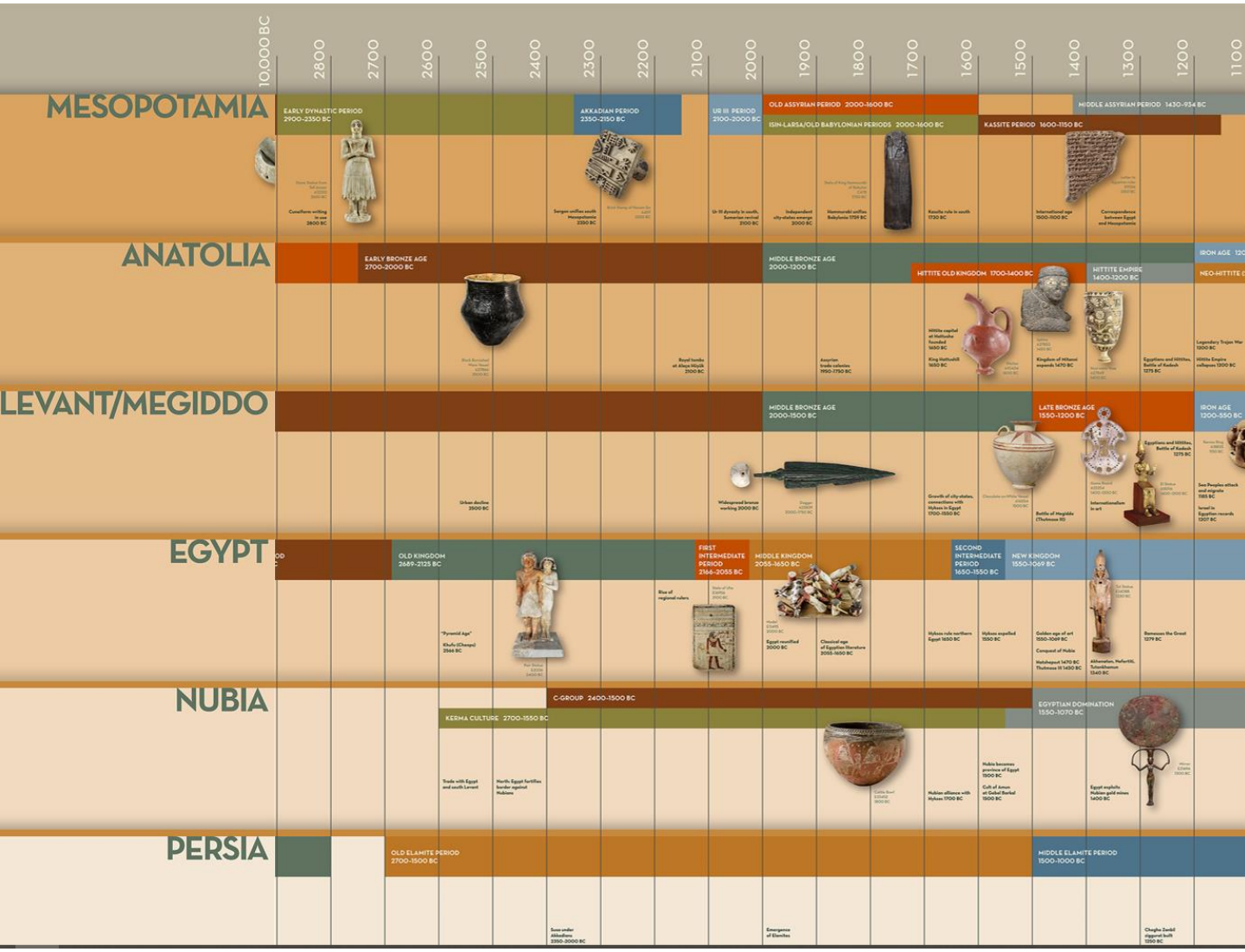
John Aycock
@herrprofdr

Follow these links for John's presentations at:
The Interactive Pasts Conference
The Interactive Pasts Conference 2

Game History: The Sumerian Game to Hamurabi

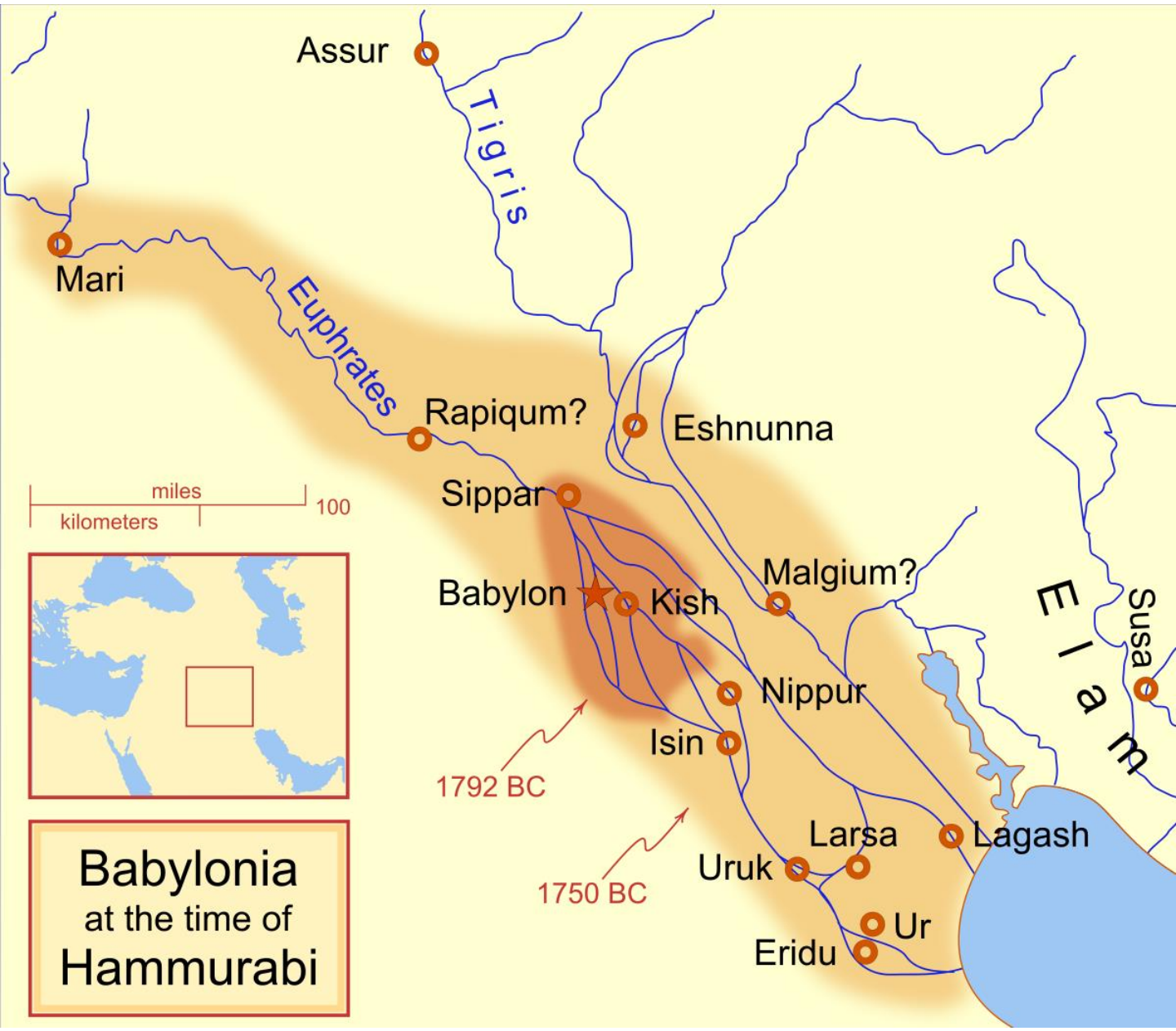
- Research on this has been done by:
  - Tobias Winnerling
    @t_winnerling
    - https://gespielt.hypotheses.org/1796
  - Devin Monnens
    @deserthat
    - Found many of the original game materials and brought them to the Strong Museum of Play
  - Kate Willaert
    @katewillaert
    - patreon.com/acriticalhit
    - The Sumerian Game: The most important game you never heard of

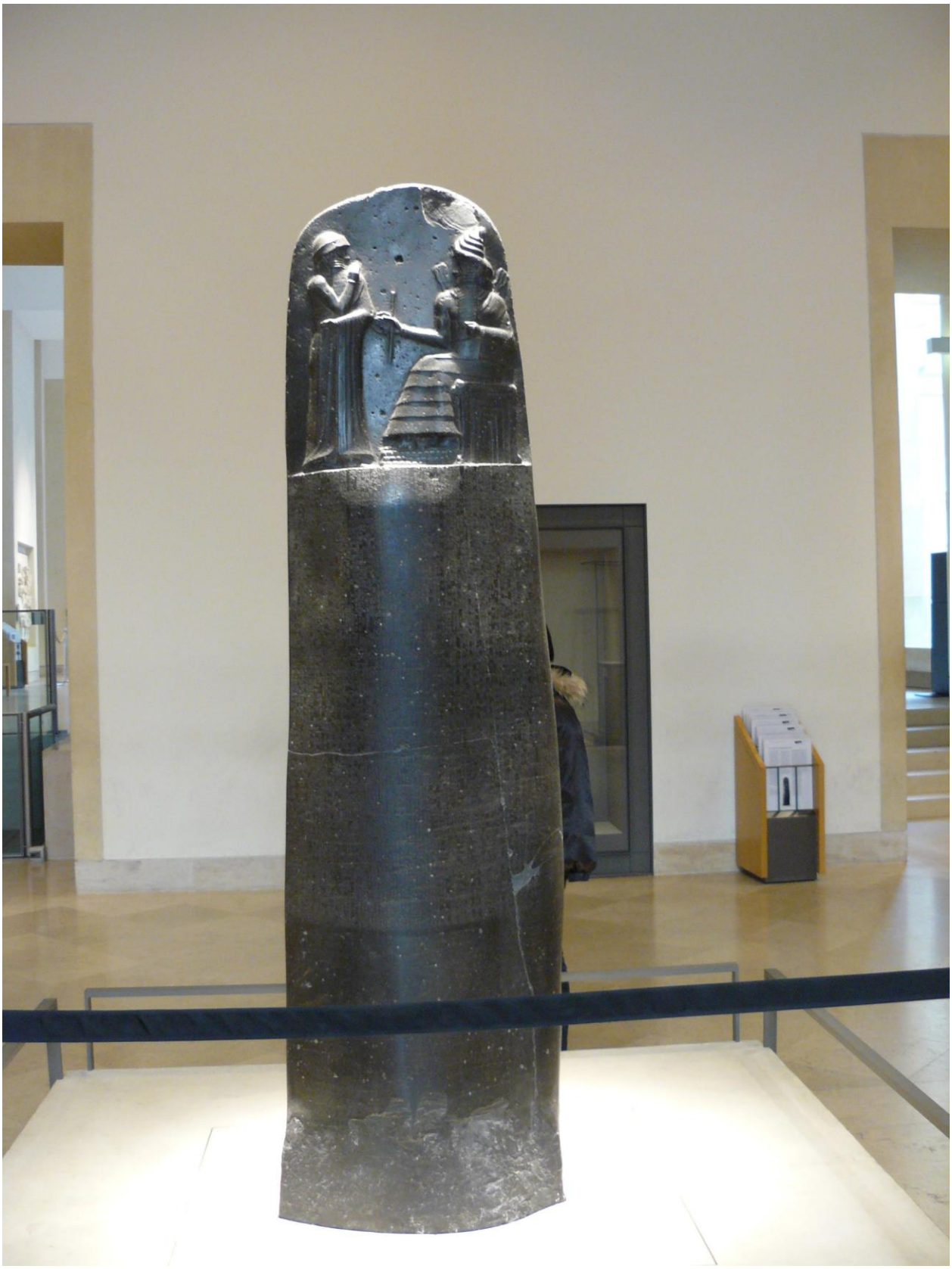
gespielt | Arbeitskreis Geschichtswissenschaft und Digitale Spiele

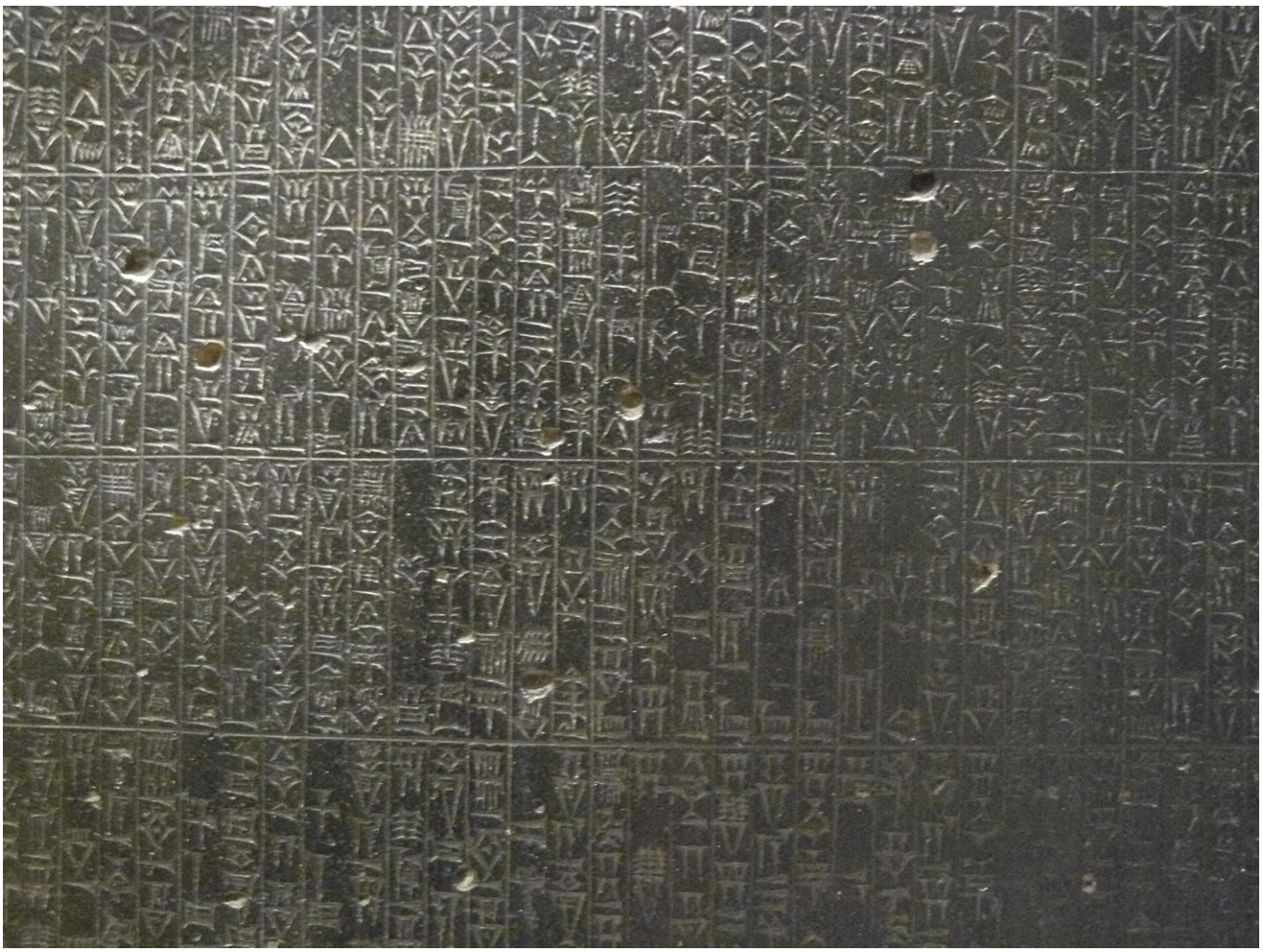


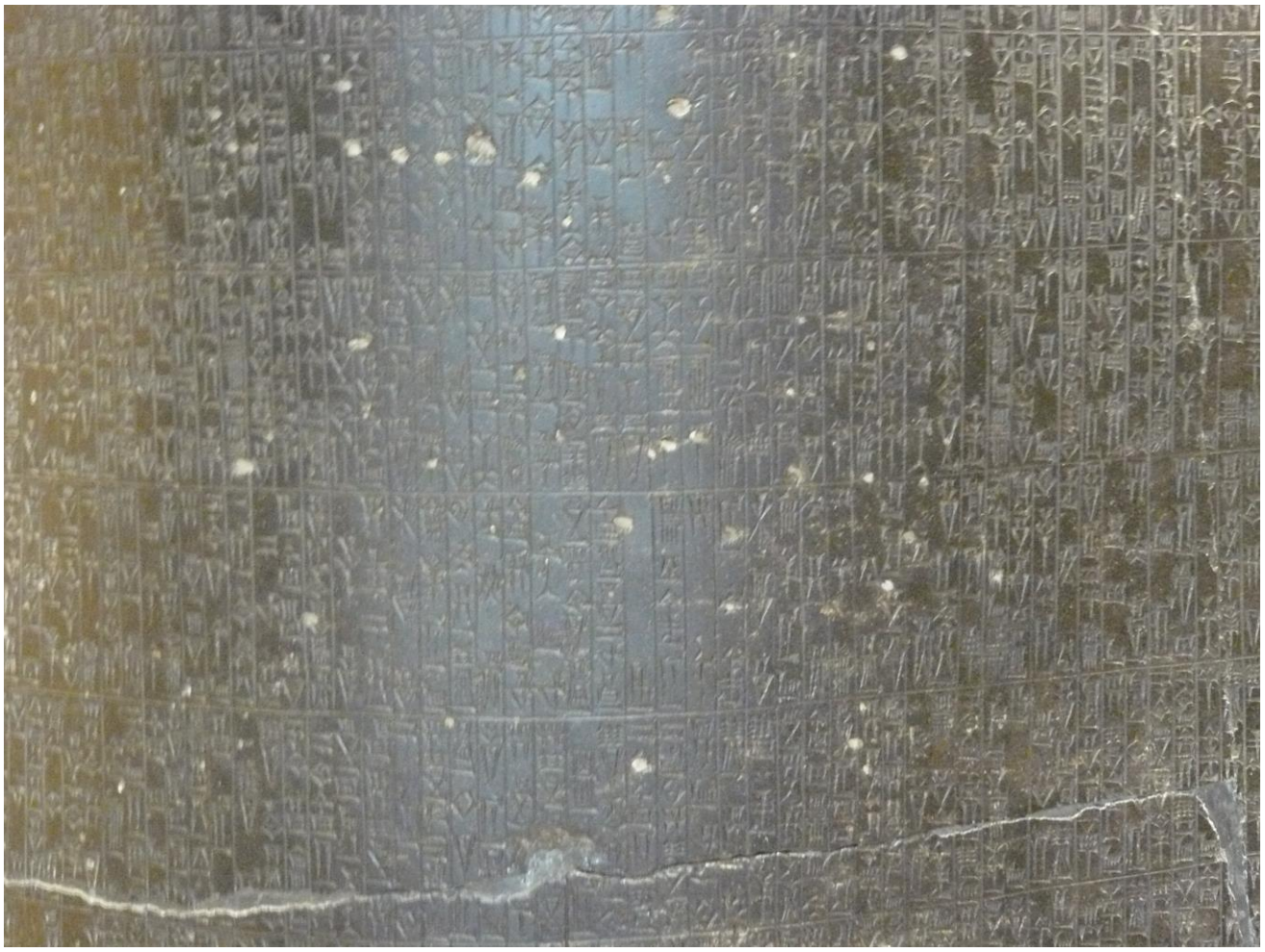
Timeline by the Oriental Institute Museum

Find it here


Assur
Tigris
Mari
Euphrates
Rapiqum?
Eshnunna
Sippar
miles
kilometers
100
Babylon
Kish
Malgium?
Elam
Susa
Nippur
Isin
1792 BC
Larsa
Lagash
Uruk
1750 BC
Ur
Eridu
Babylonia
at the time of
Hammurabi







ED 014 227 24 EM 003 451

THE PRODUCTION AND EVALUATION OF THREE COMPUTER-BASED ECONOMICS GAMES FOR THE SIXTH GRADE. FINAL REPORT.

BY- WING, RICHARD L. AND OTHERS
WESTCHESTER COUNTY BOARD OF COOP. EDUC. SERVICES

REPORT NUMBER CRP-2841 PUB DATE JUN 67

THE PURPOSE OF THE EXPERIMENT WAS TO PRODUCE AND EVALUATE 3 COMPUTER-BASED ECONOMICS GAMES AS A METHOD OF INDIVIDUALIZING INSTRUCTION FOR GRADE 6 STUDENTS. 26 EXPERIMENTAL SUBJECTS PLAYED 2 ECONOMICS GAMES, WHILE A CONTROL GROUP RECEIVED CONVENTIONAL INSTRUCTION ON SIMILAR MATERIAL. IN THE SUMERIAN GAME, STUDENTS SEATED AT THE TYPEWRITER TERMINALS PRETENDED TO BE PRIEST-RULERS IN ANCIENT SUMER. IN THE SIERRA LEONE GAME, THE STUDENT PLAYED AN A.I.D. OFFICER. THE THIRD GAME, FREE ENTERPRISE, HAS BEEN COMPLETED BUT NOT TESTED. RESULTS OBTAINED BY OBSERVATION, INTERVIEW, PRE- AND POSTTESTING OF STUDENTS SHOWED THAT (1) GRADE 6 STUDENTS ARE TECHNICALLY ABLE TO PLAY COMPUTER-BASED ECONOMICS GAMES, (2) THE GAMES WERE AT LEAST AS EFFECTIVE AS CONVENTIONAL INSTRUCTION, (3) THE CONTROL GROUP RETAINED AN UNDERSTANDING OF ECONOMIC PRINCIPLES LONGER THAN THE EXPERIMENTALS, (4) THE AVERAGE EXPERIMENTAL TIME WAS ABOUT HALF THE CONTROL LEARNING TIME, (5) STUDENTS WITH HIGHER INTELLIGENCE AND READING ABILITY GAINED MORE FROM THE GAMES, (6) STUDENTS SPENDING THE LEAST TIME AT THE COMPUTER MADE THE GREATEST GAINS, (7) STUDENT INTEREST WAS HIGH. THE SUMERIAN AND SIERRA LEONE GAMES MAY BE PLAYED WHERE A 1401 COMPUTER WITH OPERATING TERMINALS IS LOCATED. OTHER FINDINGS ARE ALSO MENTIONED. APPENDED IS AN EXTENSIVE BIBLIOGRAPHY ON COMPUTER-AIDED INSTRUCTION. (MS)

The coding language for the first two games was Fortran Assembly Program (FAP) with a few additional control cards for file loading purposes. The Sumerian Game used about 15,000 lines of instructions and approximately 37,000 memory places in the TSM computer system.

Intro to the 1968 report by Richard Wing.

The report can be found at [archive.org]

```
Total population now                          500
Total farm land under cultivation, acres      600
Total grain in inventory, bushels             900
      one season old                          900
      two seasons old                           0
      three seasons old                         0
Total grain just harvested, bushels         13000

Total resources, harvest + inventory        13900

You must now decide how to use your resources.

How many bushels of grain do you wish to FEED your people?
1000
How many bushels of grain do you want PLANTED for the next crop?
2000
This means that 10000 bushels must be placed in storage.  Is this all
right?  Do you wish to 1-let your decisions stand or 2-revise them?
2
How many bushels of grain do you wish to FEED your people?
2500
How many bushels of grain do you want PLANTED for the next crop?
9000
This means that 1500 bushels must be placed in storage.  Is this all
right?  Do you wish to 1-let your decisions stand or 2-revise them?
2
How many bushels of grain do you wish to FEED your people?
2600
How many bushels of grain do you want PLANTED for the next crop?
9999
This means that 401 bushels must be placed in storage.  Is this all
right?  Do you wish to 1-let your decisions stand or 2-revise them?
1
Resulting inventory                           1301

The steward will execute the royal commands and return in 6 months.


Sir, your people don't have enough food to eat and there are 1301
bushels in storage.  Shall we not distribute it to them?  How much?

500
Sir, I am sorry to report that 140 bushels of grain have rotted or
been eaten by rats this past season.
```

```
run 100
Suilxr is running.
Slide 1, hit CR.

     Hello!  Before we begin, will you please type your name, first na
first, then your last name, and then press the Return key.
scott mclaughlin
     Now, SCOTT, you are ready to operate the Sumerian Economic
Model.
```

Imagine that you have just been made Ruler of Lagash, a City-State of Sumer, in the year 3500 B. C. Twice yearly your Royal Steward, Urbaba, will report to you the economic condition of the kingdom. Guided by these reports, you will decide the use of your grain and other resources, trying to keep your population stable and well fed. Between reports, your court advisor will come to you with news of your kingdom.

The Steward will use the typewriter to report and ask for your decisions. When the "Proceed" light comes on, type your answer in figures and press "Return". (If you make a mistake, press "Cancel" instead and try again). Good luck!

Initial Economic Report made to the New Ruler of Lagash by his Humble Steward:

Remember, Luduga, any big change in population will affect your harvest because most of your people are farmers.

Luduga, I fear that the people have angered our god, Ningirsa. He alone could have sent that fire across the fields to destroy half of your crops. This is a very serious loss. I trust that you can cover it from your inventory.

Ne-sag's family became ill with a fever while cutting reeds in the marsh lands. I am sorry to report that he and four grown sons have died. Fortunately the disease did not spread, but any loss of farmers is not to be taken lightly.

Newspaper photo from August 26, 1984 of Mabel Addis at the Somers museum

Image found by Willaert and retrieved from her website

Project initiated by Bruse Moncreiff (IBM)

Programmed by William McKay (IBM)

Let P = the population

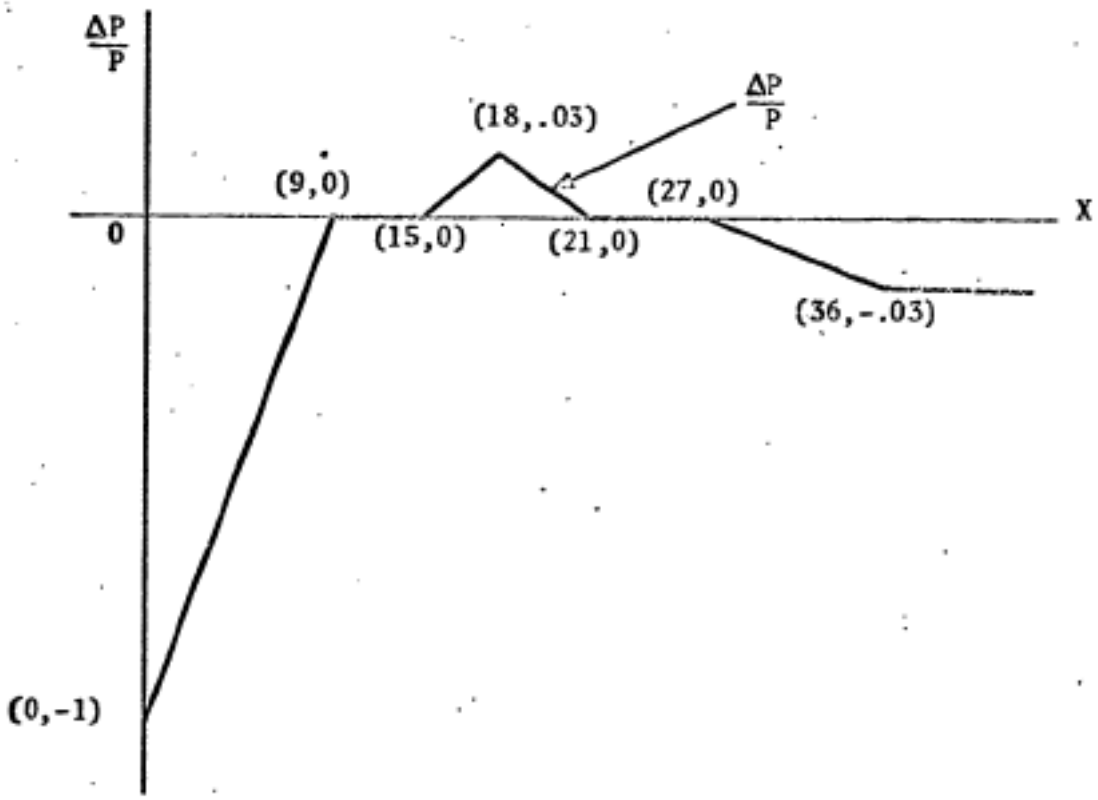
ΔP = the change in population over one season

F = the number of bushels of grain set aside as food for one season

X = food per person in one season

then $X = F/P$

and the ratio $\Delta P/P$ is given in the graph below:



Example: If $P = 600$ and $F = 10,200$

then $X = 17$; $\Delta P/P = .02$

and $\Delta P = 12$

The next population figure would then be 612.

FIGURE 3. GRAPH RELATING POPULATION CHANGE TO FOOD CONSUMPTION

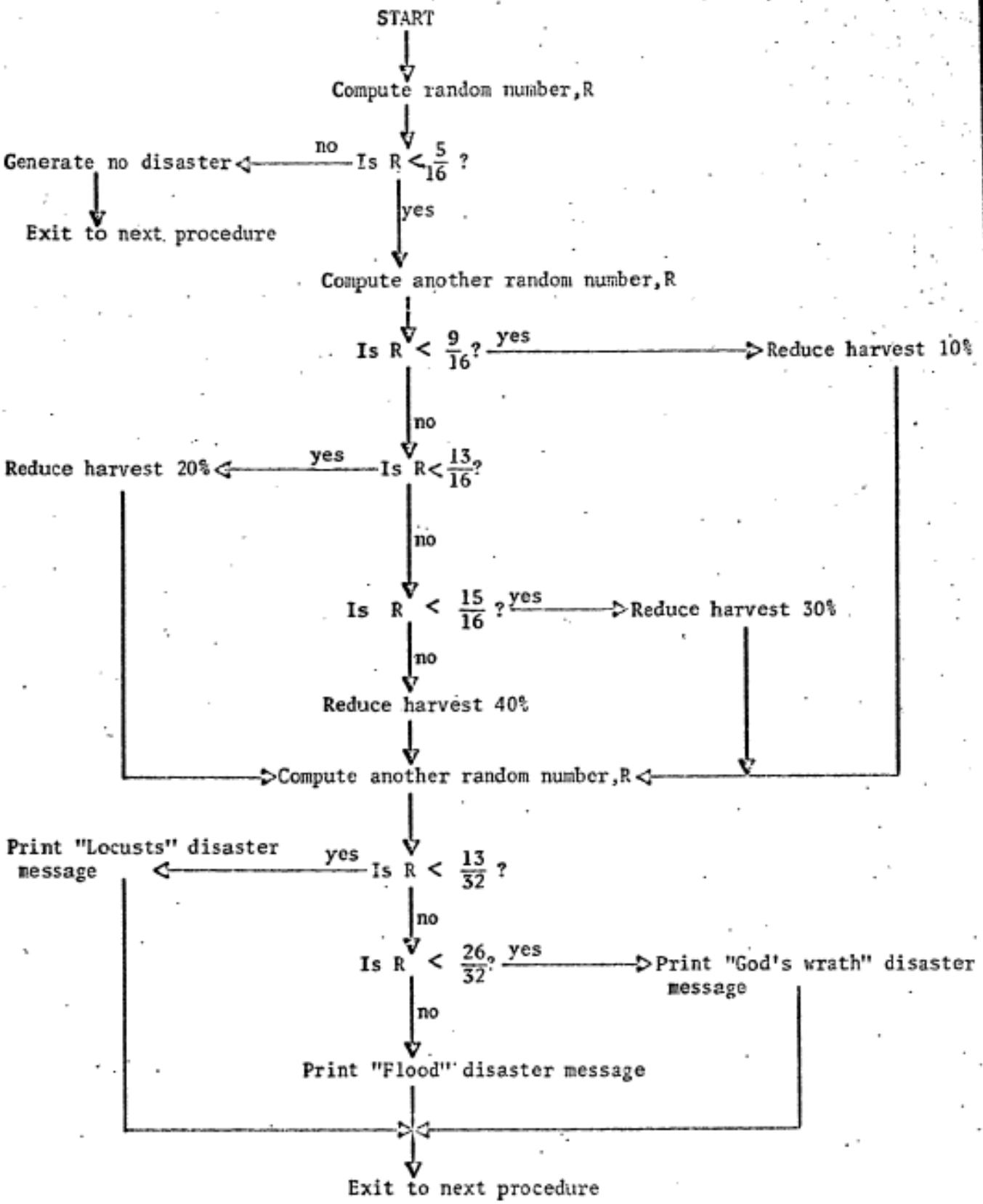


FIGURE 4. NATURAL DISASTER GENERATION PROCEDURE

The idea of constructing a computer model of the ancient Sumerian civilization which could be used for teaching basic economics drew its inspiration from many sources: Rousseau's *Emile;* Dewey's emphasis on the problematic situation; a paper entitled "Teaching through Participation in Micro-simulations of Social Organizations" by Richard L. Meier delivered at the AAAS meeting in 1961; the first chapter of Harrison Brown's *The Challenge of the Future,* in which he discusses the origin of civilization in the Near East river valleys; a luncheon conversation with sociologist James Coleman of The Johns Hopkins University; and finally a PTA meeting at which the fourth-grade social studies curriculum was discussed.

The immediate reason for the choice of the Sumerians was to protest against the growing tendency in school curricula to ignore the pre-Greek civilizations, in spite of the growing weight of scholarly evidence as to the important role which this pre-history and early history should play in our understanding of the processes by which our society has come to be what it is. Childe and others have identified the development of settled farming —the domestication of food plants and animals—as a necessary forerunner of urban, civilized, social organization. This transformation first occurred in lasting form, in the river valleys of Mesopotamia, Egypt and India. It is ironic that as scholarship was discovering the importance of understanding this technological, economic and social revolution, school authorities were dropping the topic from the social studies curriculum.

Bruse Moncreiff, writing in Programed Instruction in 1965

Paper was shared with us by Tobias Winnerling

As usual, the objectives of the project were developed as we went along. Two concerns arose in con-

get. The major problem facing the investigators was to refrain from importing market structures and price mechanisms into the model of the Sumerian economy. It seems likely that prices or rates of exchange were set by the holders of religious and political power, and maintained by custom. This has been described as a prescriptive economy, rather than a market economy.

The second content problem was that of portraying the processes of economic and social development, and to avoid the easier but unsatisfactory antiquarian approach. It takes more than a set of maps, king-names, customs and potsherds to build a socio-economic model of a civilization. It would, of course, be a falsification not to present the model to the student in terms of Sumerian artifacts, but material about the artifacts just is not enough. There must also be a model which includes the function relationships between the major economic and social variables.

Bruse Moncreiff, writing in Programed Instruction in 1965

Paper was shared with us by Tobias Winnerling

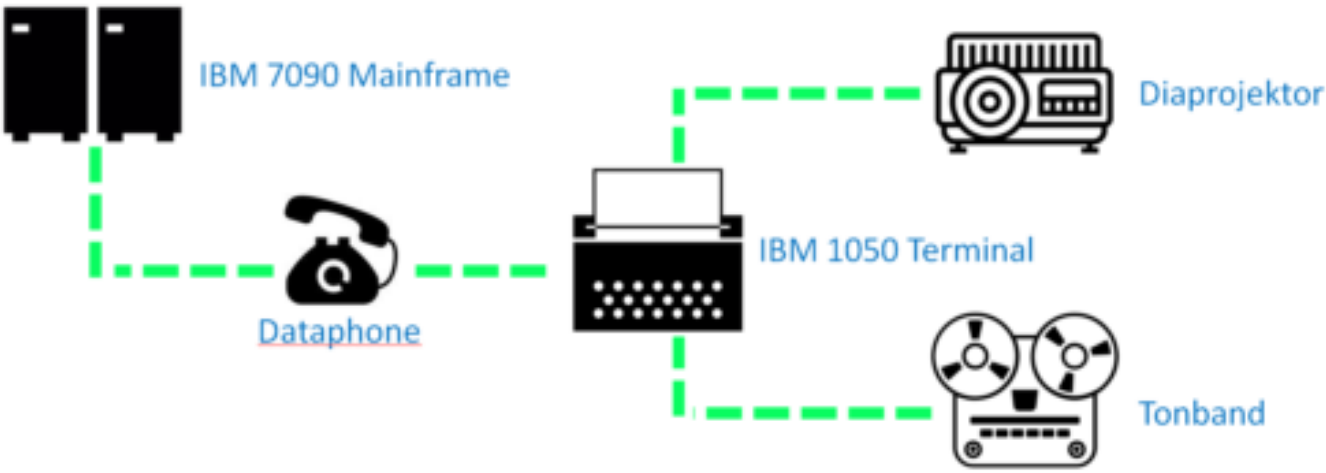
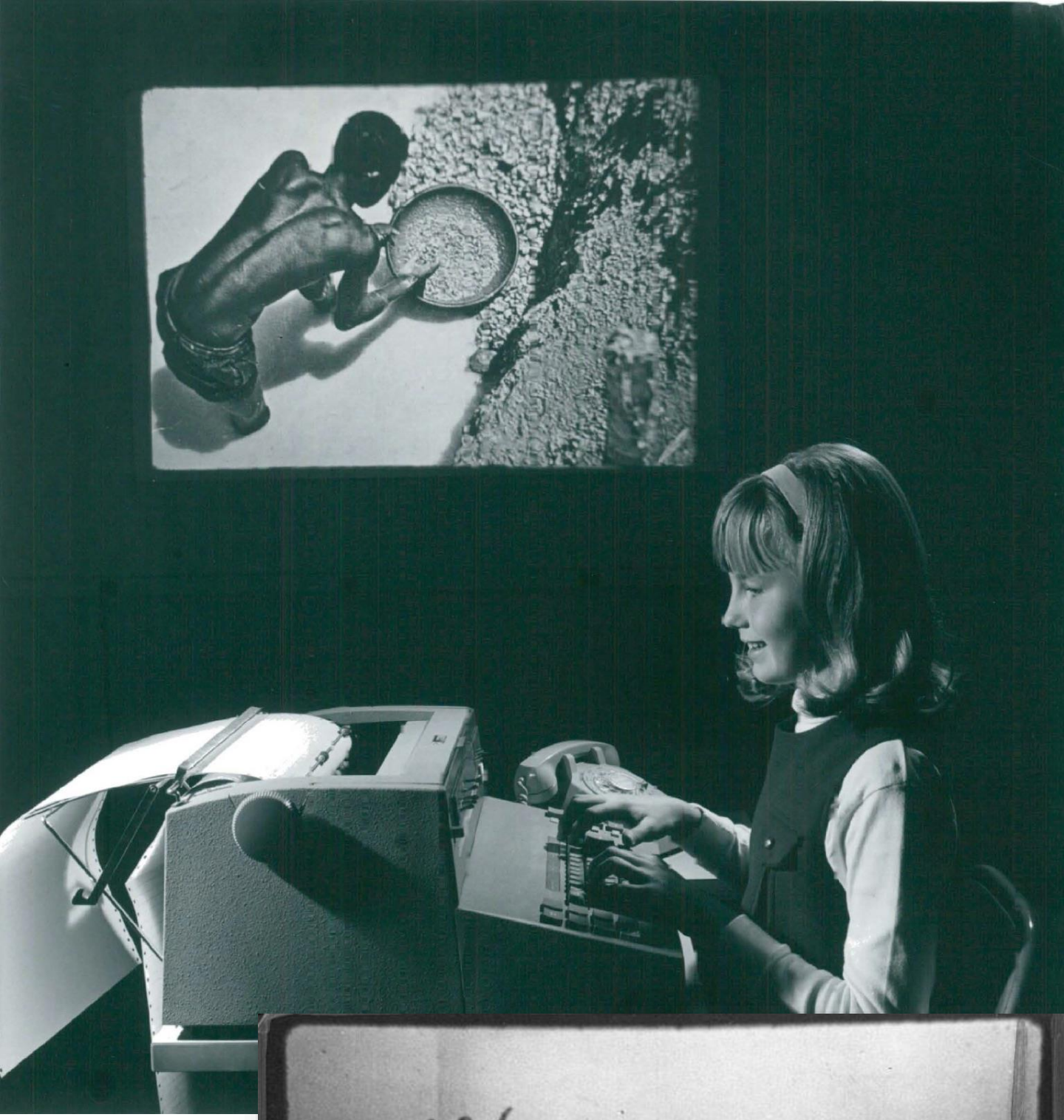


Image by Tobias Winnerling

Image from a promotional piece in 1968 retrieved from Winnerling's article



Images from a promotional piece in 1968 retrieved from Willaert's article

Although philosophers of education agree that reform is needed in the direction of individualizing instruction, the present educational system is constrained by factors which have produced instead relatively rigid, sterile, and insensitive procedures. Simulation is one method of organizing learning environments to provide for individualization in a broad sense. New technologies have been invented and, to a limited degree, explored for educational uses.

The purpose of the experiment here reported was to produce and evaluate computer-based economics games as a method of individualizing instruction for sixth-grade pupils.

Implications.--

Although no one can look accurately into the future, it is possible to speculate about some of the changes in staff roles which may occur as a consequence of the introduction of the electronic technologies. Basically we don't expect that there will be any reduction in the total numbers of persons employed by the educational establishment, but it is undoubtedly true that the roles of teachers and other educational personnel will be changed. Perhaps some of the directions will be these:

a. There will be a need for persons able to create instructional programs.

b. There will be a need for technicians.

c. There will be a need for teachers to master the skills of diagnosis in order to make proper use of the opportunities for individualization presented by the machines.

d. There will be opportunity for teachers to spend more of their personal time with students because some routine instructional activities can be performed by the media systems.

4. Would you like to have the computer for a teacher all day long? half a day? not at all?

   4 - all day
   9 - half day
   1 - not at all

5. Were you excited (or scared) the first day that you were to run on the computer?

   9 - excited
   2 - scared
   2 - both
   1 - neither

These future of education in the 60ies sounds a lot like the future of education today...

2. **Is there anything about the courses that you specifically did not like? If so, what**

4 - no
10 - yes(2 - machine errors - ("Print out"; "machine didn't under-)
((stand (spelling) mistakes like)
((teacher")
(5 - too long, boring-3 refer specifically to sumer
(2 - sumer too repetitious
(1 - "sumer forces right answer to discussion - couldn't do otherwise"

16. **Which game did you like the best? Why?**

8-liked Sumer best-5 of the 8 that liked Sumer best also indicated above that they were tired or bored by Sumer-("Sumer more interesting because it had taken place"; kingly thing to do";"master of game"; "dying population...knew better as game went on"; was more to do, had to think harder"; "liked special messages")
4-liked S.L. best-3 learned more about country in SL than Sumer,liked doing different things
2 - liked both

18. **If you played another computer game, what subject would you like it to be on? (science, math, English, reading, history, etc.)**

5 - Science
2 - English
5 - History ("Italy long ago"; "Middle Ages")
2 - no preference

These brilliant kids were 11-12 in 1966!

They are 65+ now!

In June 1966 BOCES received a grant under Title III of the Elementary and Secondary Education Act to become a center for demonstration of computer assisted instruction, a closed-circuit television system for training teachers, and a dial selection system. During the first year of the grant approximately one thousand people have visited the center to see demonstrations of the computer-based economics games and the uses of other complex media.

Doug Dyment was a Software Support Manager at DEC (Digital Equipment Corporation) in Canada in the '60s. After giving a talk at a university in Alberta, a grad student described to him a program called *The Sumerian Game*.

"I thought that this would make a good demonstration program," Dyment told me. "The game as I wrote it was titled *King Of Sumeria*."

Excerpt from the article by Kate Willaert

PDP-8 System by Digital Equipment Corporation
With a memory for about 4k words (6kb)
Find out more about the Programmable Data Processer here!

DECUS No. FOCAL-5

The Sumer Game

Doug Dyment, Digital Equipment of Canada, Ltd., Carleton Place, Canada

This is a simulation program/game which will run on a minimal PDP-8 system. The economy of a Sumerian city in the year 3000 B.C. is simulated in the fashion of a modern-day "business game."

Listing in the DECUS Catalog
(we found this via a post by Monnens)

```
 WRITE
C-FOCAL,1969

01.10 S P=95;S S=2800;S H=3000;S E=200;S Y=3;S A=1000;S I=5;S Q=1

02.10 S D=0
02.15 T !!!!
02.20 D 6;T "I BEG TO REPORT THAT LAST YEAR"D," DIED OF STARVATION,
02.25 T !I," PEOPLE CAME TO THE CITY, ";S P=P+I;I (-Q)2.3
02.27 S P=FITR(P/2);T "HALF THE PEOPLE DIED FROM A CITY PLAGUE,"!
02.30 T "AND THE POPULATION IS NOW"P,!!"THE CITY NOW OWNS
02.35 T A," ACRES OF LAND."!!;I (H-1)2.5;T "WE HARVESTED
02.40 D 3.2;T "THE HARVEST WAS"H," BUSHELS."!E
02.50 T " BUSHELS OF GRAIN WERE DESTROYED BY RATS AND YOU NOW HAVE
02.60 T !S," BUSHELS IN STORE."!!!"DO YOU WISH TO CONTINUE?
02.70 A " (ANSWER YES OR NO)"Q,!;I (Q-0NO)2.8,7.4
02.80 I (Q-0YES)2.7,3.1,2.7

03.10 D 6;D 8;S Y=C+17;T "THIS YEAR LAND MAY BE TRADED FOR
03.20 T Y," BUSHELS PER ACRE; ";S C=1
03.30 A !"HOW MANY ACRES DO YOU WISH TO BUY?"!Q;I (Q)7.2,3.8
03.40 I (Y*Q-S)3.9,3.6;D 4.6;G 3.3
03.50 D 4.5;G 3.3
03.60 D 3.9;G 4.8
03.70 S A=A+Q;S S=S-Y*Q;S C=0
03.80 A ! "TO SELL?"!Q;I (Q)7.2,3.9;S Q=-Q;I (A+Q)3.5
03.90 S A=A+Q;S S=S-Y*Q;S C=0

04.10 T !"HOW MANY BUSHELS OF GRAIN DO YOU WISH TO DISTRIBUTE
04.11 A " AS FOOD?"!Q;I (Q)7.2;I (Q-S)4.2,4.7;D 4.6;G 4.1
04.20 S S=S-Q;S C=1
04.30 A !"HOW MANY ACRES OF LAND DO YOU WISH TO PLANT WITH SEED?"!D,!
04.40 I (D)7.2;I (A-D)4.45;I (FITR(D/2)-S-1)4.65;D 4.6;G 4.3
04.45 D 4.5;G 4.3
04.50 D 7;T A," ACRES."!
04.60 D 7;T S," BUSHELS IN STORE."!
04.65 I (D-10*P-1)5.1;D 7;T P," PEOPLE."!;G 4.3
04.70 D 4.2
0
 4.80 D 6;T "YOU NOW HAVE NO GRAIN LEFT IN STORE, SO YOU HAVE
04.90 T !"NONE LEFT TO USE AS SEED THIS YEAR."!;S D=0

05.10 S S=S-FITR(D/2);D 8;S Y=C;S H=D*Y
05.20 D 8;S E=0;I (FITR(C/2)-C/2)5.3;S E=S/C
05.30 S S=S-E+H;D 8;S I=FITR(C*(20*A+S)/P/100+1);S C=FITR(Q/20)
05.40 S Q=FITR(10*FABS(FRAN()));I (P-C)2.1;S D=P-C;S P=C;G 2.15

06.10 T !!"HAMURABI:"!

07.10 I (C)7.2;S C=C-1;D 6;T "PLEASE THINK AGAIN. YOU HAVE ONLY";R
07.20 T !"HAMURABI HAS GONE ON STRIKE! YOU WILL HAVE TO STOP
07.30 T !"AND FIND YOURSELF ANOTHER STEWARD!"!!
07.40 T !"GOODBYE!"!!;QUIT
07.50 A ?A S P?;GOTO 3.1

08.10 S C=FITR(5*FABS(FRAN()*2))-4
*
```

Part of the code of Hamurabi in FOCAL
(big whoops, in our info collecting frenzy, Angus forgot where he found this: apologies and let us know who we should reference and we will fix this!)

HAMURABI - A FOCAL SIMULATION PROGRAM

A fascinating FOCAL program that simulates the decision making required in the management of a small city was written by Doug Dyment of DEC in Ontario, Canada. Bob Becker (1970) has modified this program so that it will run on the Lexington computer system. Mr. Dyment has written the following rules of play:

Imagine that you are living in the city of Sumer in the year 3000 B.C. You are the king and each year you must decide how much of the city's store of grain will be given to the people as food, how much will be used for seed, and how much will be kept in storage.

At the beginning of each year your steward, Hamurabi, makes a report and asks for your decisions. The following information will assist you in formulating those decisions.

Each person needs 20 bushels of grain per year as food. If insufficient food is distributed, some people die of starvation. Half a bushel of grain is needed to plant one acre of land, and one person can plant and harvest 10 acres. The average harvest is 3 bushels per acre, but better or poorer harvests are common.

Land may be bought or sold. The price varies from year to year, but averages one acre for 20 bushels of grain.

Varying factors include the immigration of new people to the city (which is influenced by the city's prosperity), the fact that rats occasionally eat a portion of the grain left in storage, and the occasional epidemic of plague.

To use this program on the Lexington system, you should:

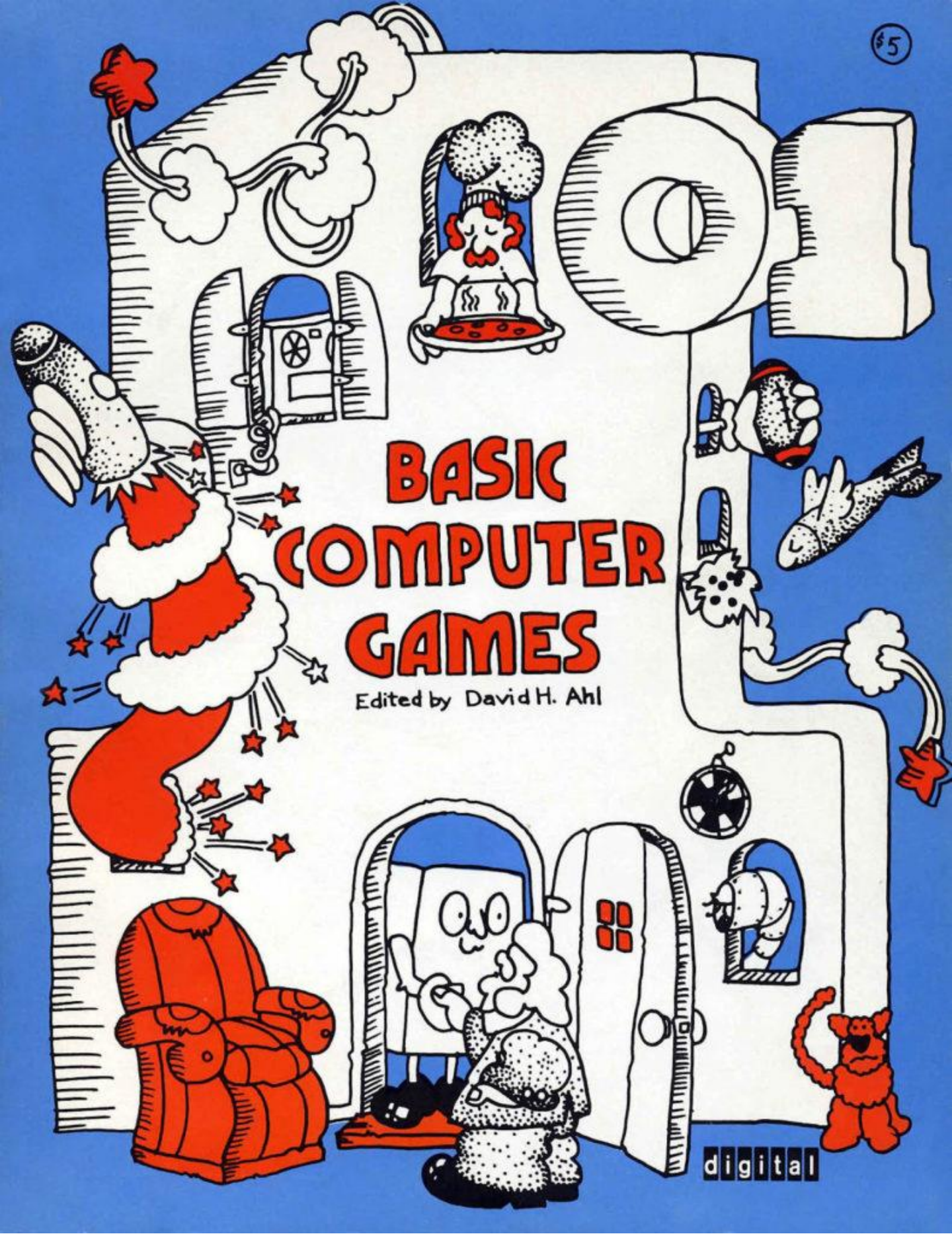
1. Gain the attention of monitor
2. Type DUPLEX ↵
3. Type RUN 400 HAMURA ↵
4. After * is typed, you type GO ↵ and the program will begin.*
5. Type ↵ or space after each response you give while using the program.
6. When you have finished, don't forget to type ↑BS ↵ to return to monitor so you can LOGOUT.

* If you desire to start the program with a special set of starting conditions, type GO 7.5 ↵ . The program will request starting values for the number of acres of land (A), the amount of grain in storage (S), and the city's population (P). The program will then proceed in the normal fashion. Using this technique will enable you to continue a simulation that was previously interrupted for some reason.

If you have a spare fifteen minutes, try this program. Then challenge your history teacher to manage Sumer better than you. This simulation might well be of interest to your history teacher, so please demonstrate the program for him or her. Mention that a history class demonstration can be easily arranged by contacting Mr. Koetke in the computer room.

Please let us know if you successfully manage Sumer well enough to maintain the population at 130 or higher for at least three years.

Instruction for kids who want to play HAMURABI
(big whoops, in our info collecting frenzy, Angus forgot where he found this: apologies and let us know who we should reference and we will fix this!)


$5
BASIC
COMPUTER
GAMES
Edited by David H. Ahl
digital

HMRABI

GOVERN ANCIENT SUMERIA

Description

In this game you direct the administrator of Sumeria, Hamurabi, how to manage the city. The city initially has 1,000 acres, 100 people and 3,000 bushels of grain in storage.

You may buy and sell land with your neighboring city-states for bushels of grain--the price will vary between 17 and 26 bushels per acre. You also must use grain to feed your people and as seed to plant the next year's crop.

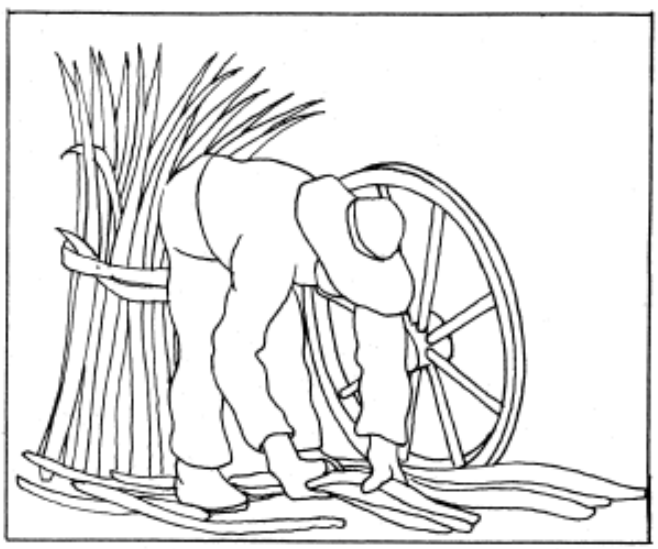
You will quickly find that a certain number of people can only tend a certain amount of land and that people starve if they are not fed enough. You also have the unexpected to contend with such as a plague, rats destroying stored grain, and variable harvests.

You will also find that managing just the few resources in this game is not a trivial job over a period of say ten years. The crisis of population density rears its head very rapidly.

Source

This is translated from the original FOCAL program which has been floating around DIGITAL for nine or more years.

Digital Equipment Corp.
Maynard, MA 01754



HMRABI in 101 BASIC Computer Games (1975)
Find it on archive.org

It is felt that these are desirable qualities in a game to be used for simulating an environment for educational purposes. The educational objectives cluster around two main themes: (1) an understanding of the processes at work in a developing civilization; and (2) the ability to make decisions regarding multifactored situations taking account of several conflicting values or goals.

Moncreiff 1965

DECUS No. FOCAL-5

The Sumer Game

Doug Dyment, Digital Equipment of Canada, Ltd., Carleton Place, Canada

This is a simulation program/game which will run on a minimal PDP-8 system. The economy of a Sumerian city in the year 3000 B.C. is simulated in the fashion of a modern-day "business game."

Listing in the DECUS Catalog
(we found this via a post by Monnens)

APPENDIX A

FAMILIES OF GAMES

Land Management, Government, History

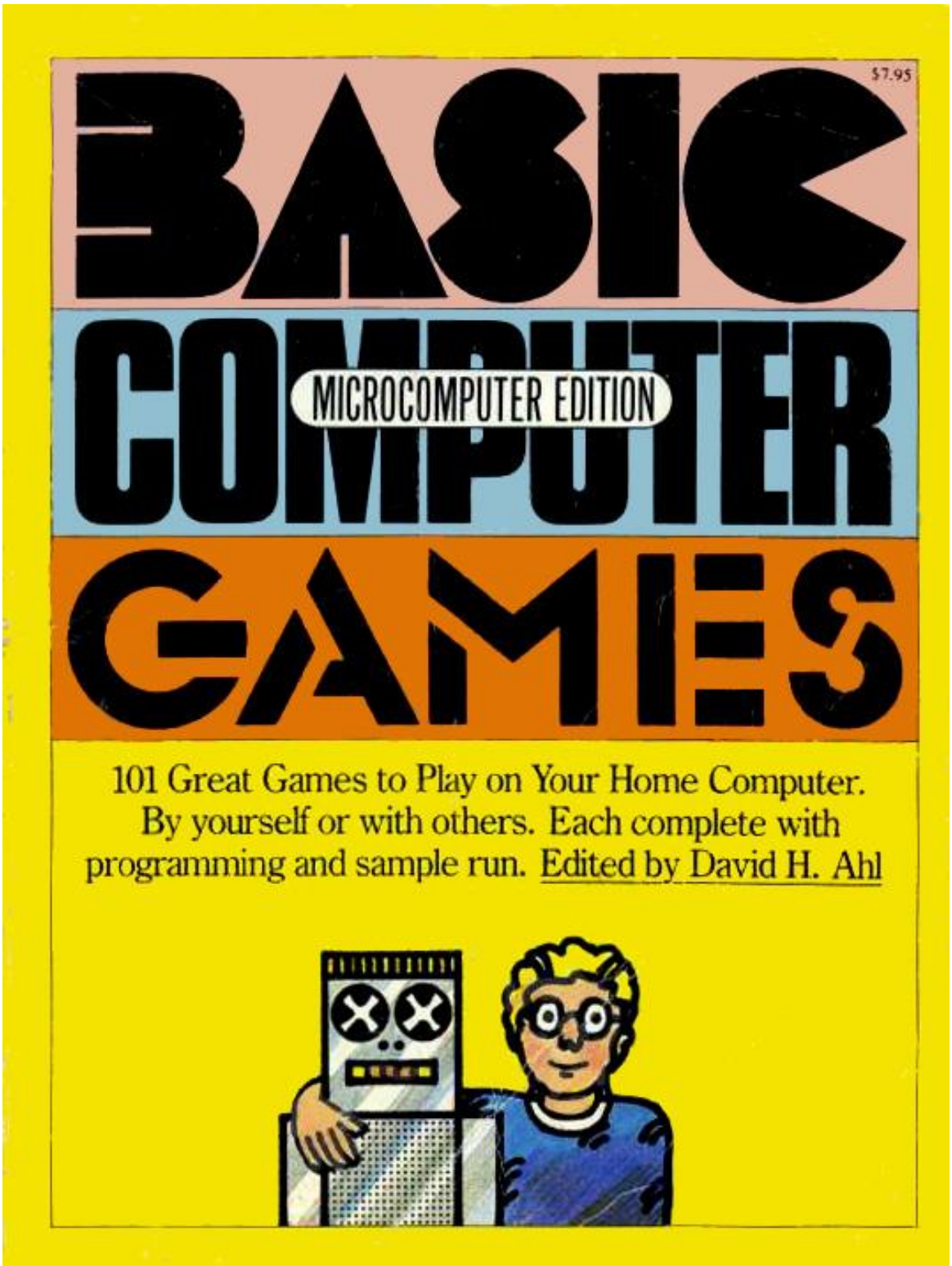
CIVILW
FURS
HMRABI
KING
STOCK

Game family from 1975's 101 Games with BASIC

Index by Game Category

Educational

Game category from 1978's BASIC Computer Games



The 1978 edition, which went on to sell more than a million copies (as the first computer book ever)

This book is archived at AtariArchives.org

A “Microcomputer”:
The Commodore64
Also the best sold computer model ever!

We’ve programmed Hamurabo and are playing it on this very cool emulator by [Retrogames Ltd.]