



Jamie Dixon

Computers, Visual Effects and the Magic of Movies



- flying to Pittsburgh to work on Concussion
- seat mate was doing computational fluid dynamic simulations of jet contrails for climate studies and we discussed the effects of sim resolution
- brought up “picture vs. info that makes picture” conundrum

* my simulation of his simulation

Garcia Martinez, Marta

To: Jamie Dixon

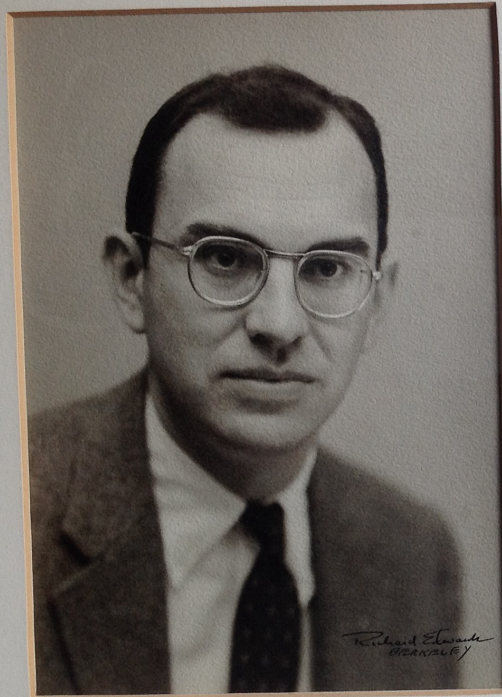
Argonne Training Program on Extreme-Scale Computing 2016: Invitation to be Dinner Speaker



Dear Mr Dixon,

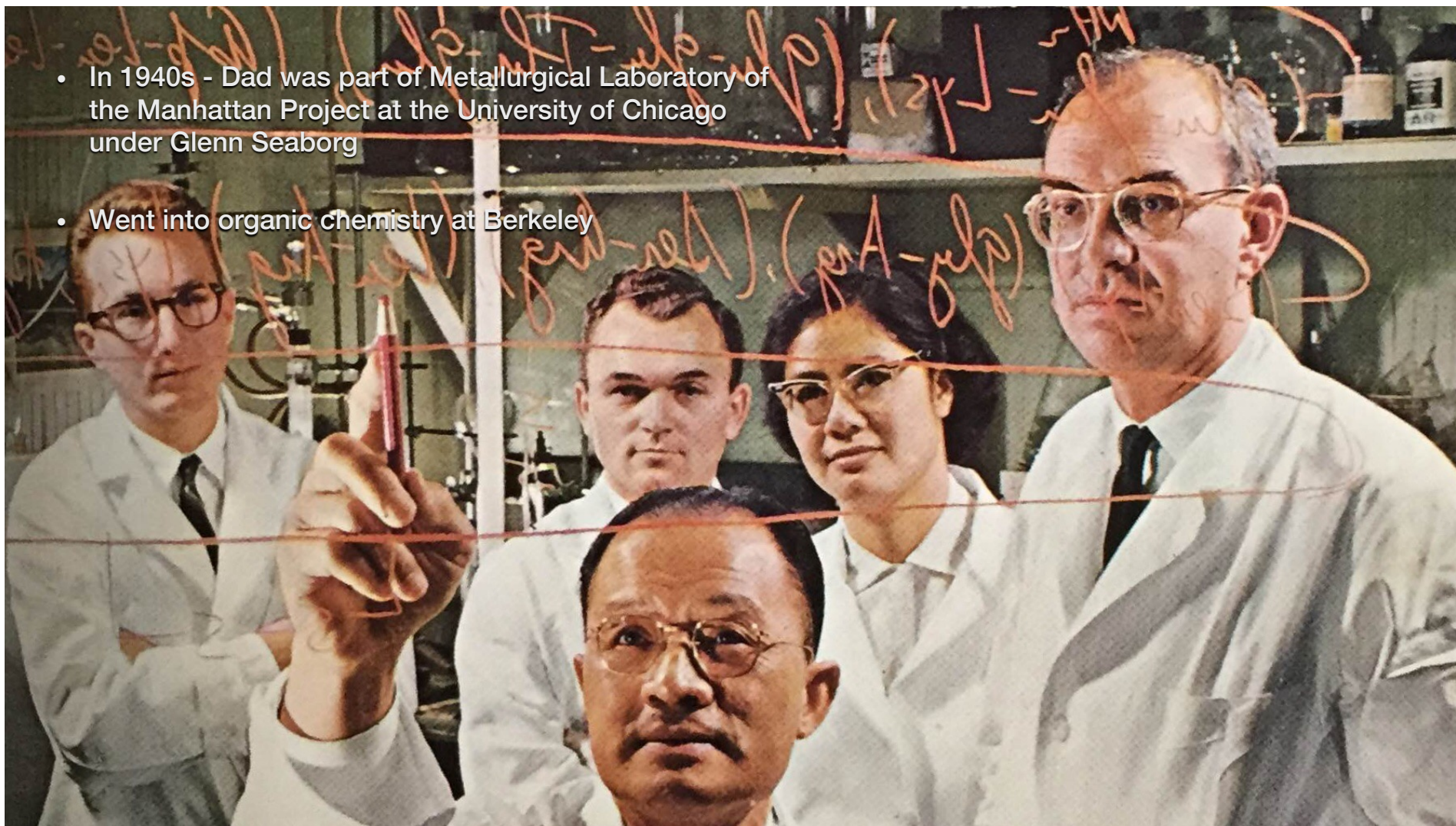
Probably the beginning of this email seems a little bit unexpected but in November 2014 you took a flight from San Francisco

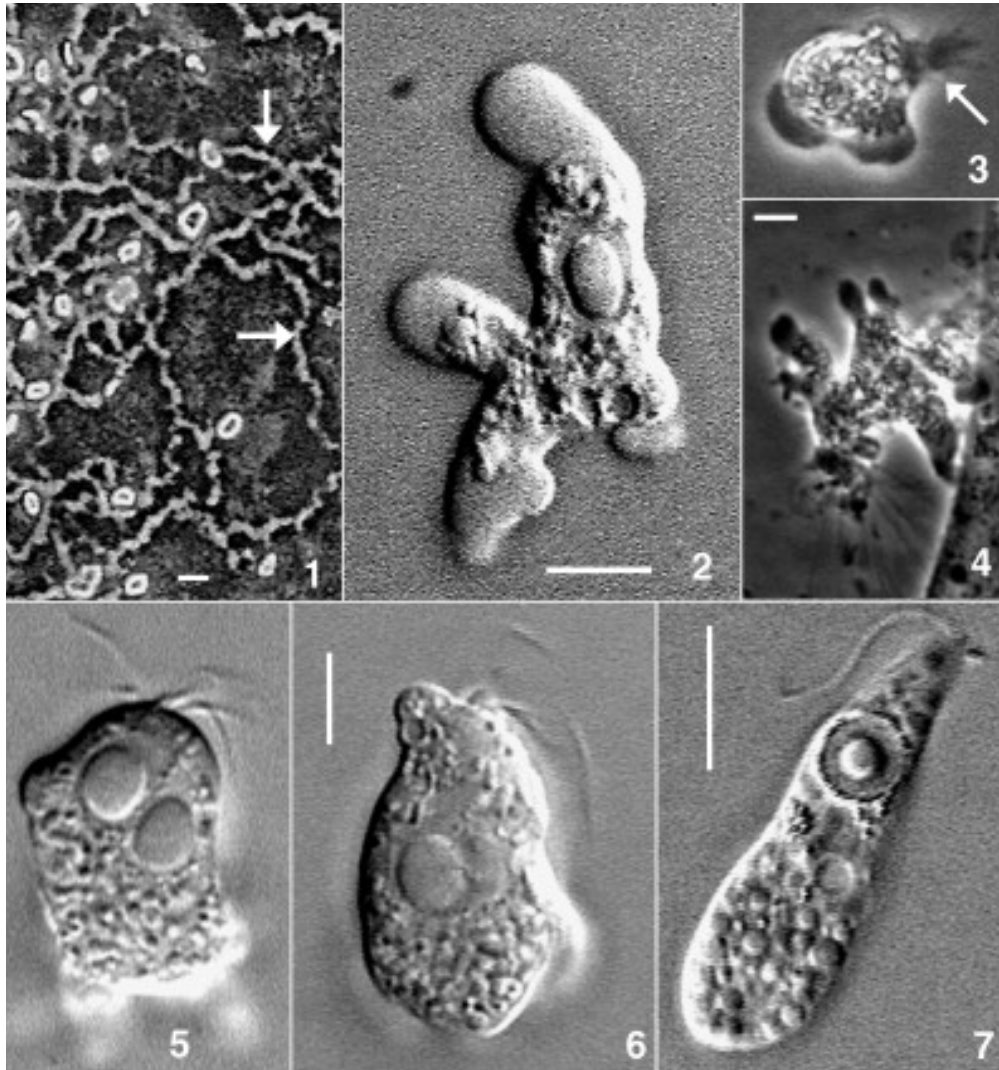
18 months later...



- grew up in Berkeley
- both parents PhD

- In 1940s - Dad was part of Metallurgical Laboratory of the Manhattan Project at the University of Chicago under Glenn Seaborg
- Went into organic chemistry at Berkeley





J Eukaryot Microbiol, 2005 Nov-Dec;52(6):523-31.

Morphologic and molecular identification of *Naegleria dunnebackei* n. sp. isolated from a water sample.

Visvesvara GS¹, De Jonckheere JF, Marciano-Cabral F, Schuster FL.

Author information

Abstract

Naegleria dunnebackei n. sp., a new species of the free-living amoeboflagellate *Naegleria*, is described in this report. The organism was isolated from a water sample taken from drinking troughs associated with cases of primary amoebic meningoencephalitis in cattle at a ranch in southern California. The isolate grew at, but not above 37 degrees C, and did not kill young mice upon intranasal inoculation suggesting that it was not pathogenic. The new species combines morphological features of non-pathogenic *Naegleria gruberi* and pathogenic *Naegleria fowleri*.

Mom has an ameba named after her



never much good at school - thought I wanted to be a herpetologist

I was into -

- Creature Features
- Viewmaster
- Stereopticon
- Super 8 Home Movies
- Thunderbirds



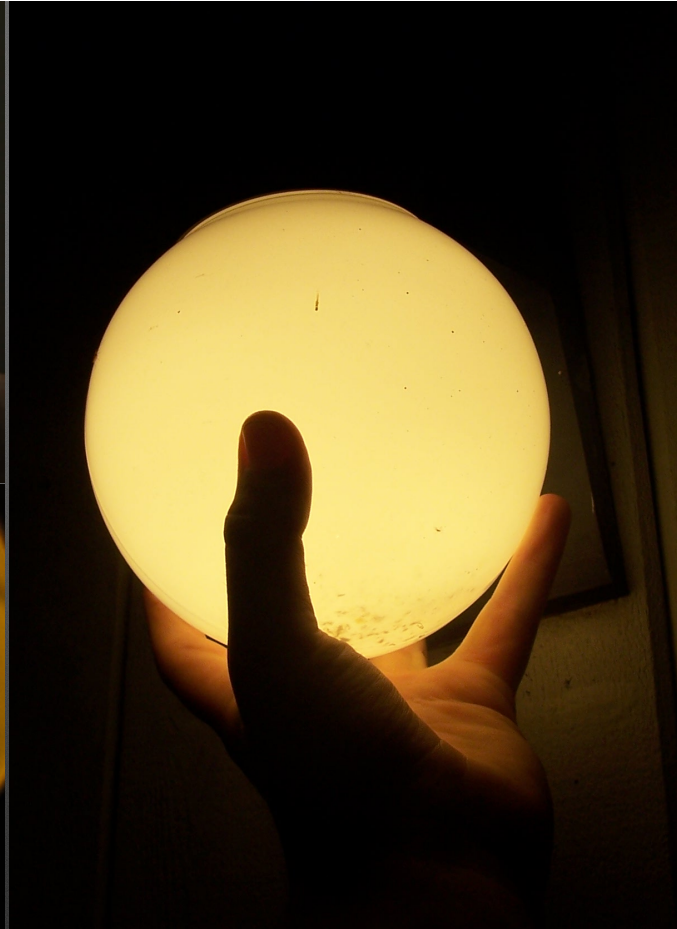
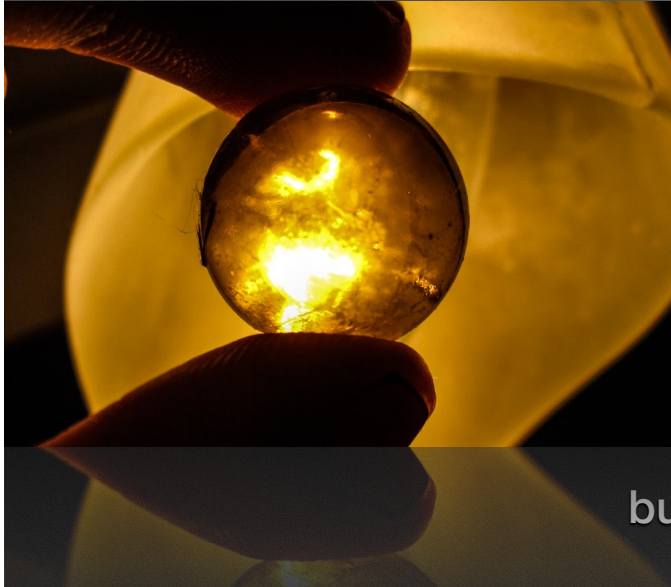


I was fascinated by how people could be so emotionally effected by a strip of plastic running in front of a light bulb



a little perspective...

looking back it seems incredibly primitive

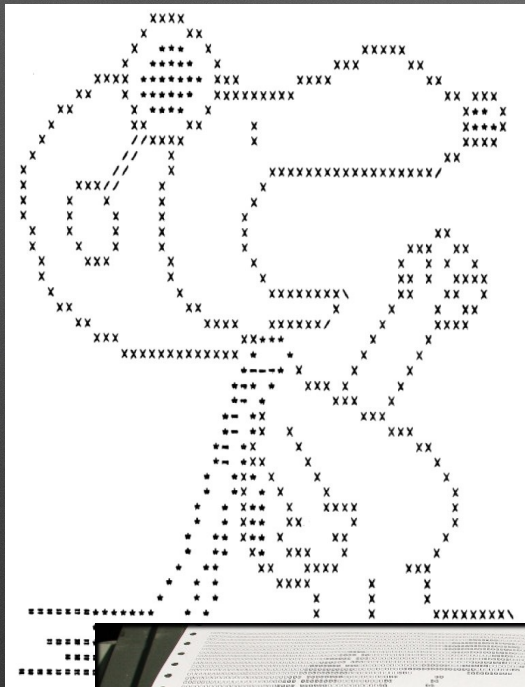


but from there it was so futuristic



1st computer experience

in 7th grade we used a teletype to modem into Lawrence Hall of Science computer



Calendar grid showing months from January to December, with days of the week (S M T W T F S) and dates (1-31).

January: S M T W T F S, 3 4 5 6 7 8 9, 10 11 12 13 14 15 16, 17 18 19 20 21 22 23, 24 25 26 27 28 29 30, 31

February: S M T W T F S, 7 8 9 10 11 12 13, 14 15 16 17 18 19 20, 21 22 23 24 25 26 27, 28

March: S M T W T F S, 1 2 3 4 5 6, 7 8 9 10 11 12 13, 14 15 16 17 18 19 20, 21 22 23 24 25 26 27, 28 29 30 31

April: S M T W T F S, 4 5 6 7 8 9 10, 11 12 13 14 15 16 17, 18 19 20 21 22 23 24, 25 26 27 28 29 30

May: S M T W T F S, 2 3 4 5 6 7 8, 9 10 11 12 13 14 15, 16 17 18 19 20 21 22, 23 24 25 26 27 28 29, 30 31

June: S M T W T F S, 6 7 8 9 10 11 12, 13 14 15 16 17 18 19, 20 21 22 23 24 25 26, 27 28 29 30

July: S M T W T F S, 4 5 6 7 8 9 10, 11 12 13 14 15 16 17, 18 19 20 21 22 23 24, 25 26 27 28 29 30 31

August: S M T W T F S, 1 2 3 4 5 6 7, 8 9 10 11 12 13 14, 15 16 17 18 19 20 21, 22 23 24 25 26 27 28, 29 30 31

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October: S M T W T F S, 3 4 5 6 7 8 9, 10 11 12 13 14 15 16, 17 18 19 20 21 22 23, 24 25 26 27 28 29 30, 31

November: S M T W T F S, 1 2 3 4 5 6, 7 8 9 10 11 12 13, 14 15 16 17 18 19 20, 21 22 23 24 25 26 27, 28 29 30

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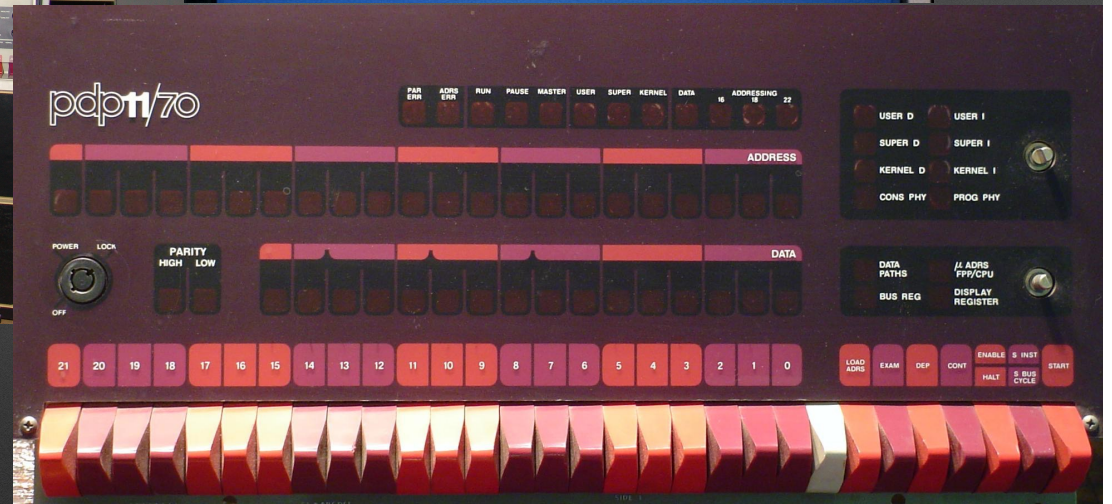


we printed snoopy calendars

next computer experience



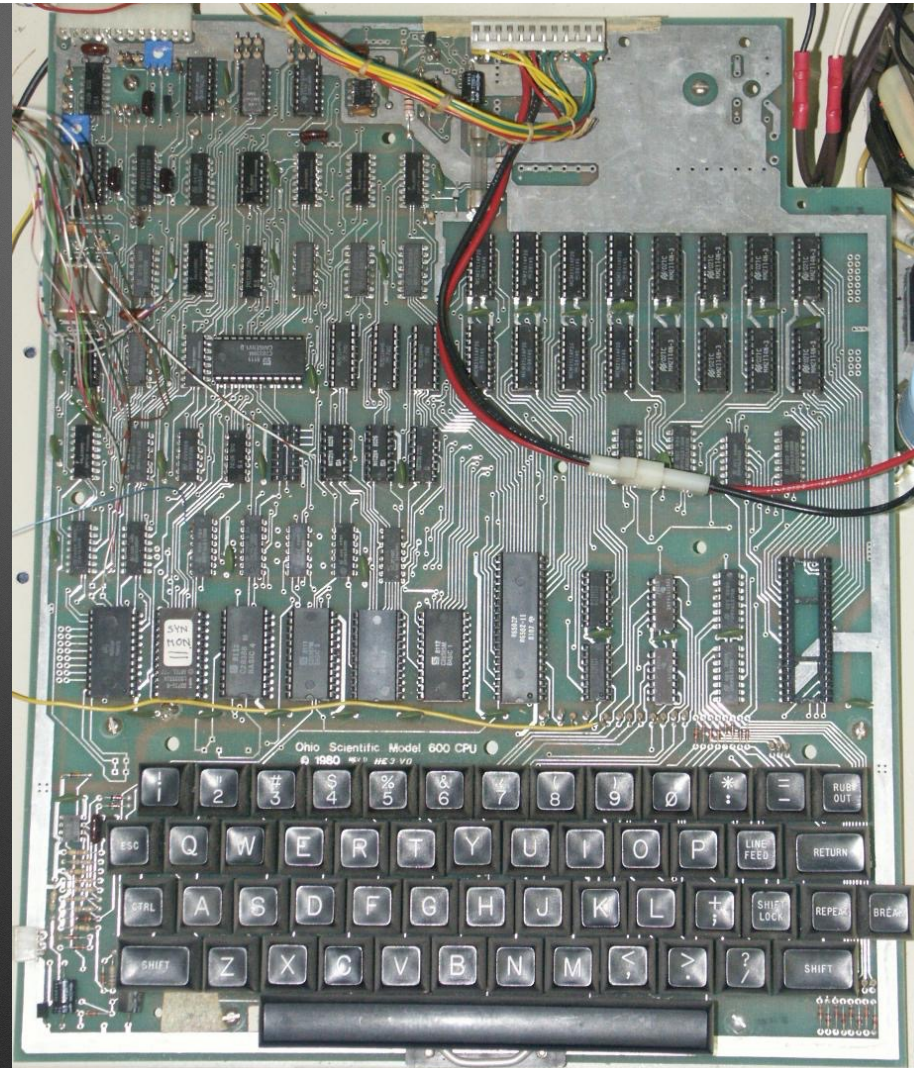
- CS at Cal Berkeley early 80's
- VAX PDP 11/44 - 11/70
- DEC 10



- Lear Seigner ADM 3A terminal
- programming in pascal
- 2AM to get terminal time / lucky if only 40 other users logged in



first personal
computer



- Ohio Scientific Superboard II
- 8k Basic on ROM / 4k RAM
- 1 Mhz 6502 processor
- Kansas City standard 300 baud modem to cassette tape

SORRY, THAT LETTER ISN'T IN THE WORD.
NOW HE DRAN A BODY.

- 25x40 character display on TV
- \$350 + TV & cassette player
- 1 user at 2AM

HERE ARE THE LETTERS YOU USED:
E, T, A, O, N, S

-AT---ON-A-

WHAT IS YOUR GUESS?

discovered computer graphics

- Tektronix 4013 vector display
- pascal camera projection solution
- models sketched on graph paper - coordinates typed into program





- printed stereo views for stereopticon from 1900-ish



- animation by triggering cable release on super 8 camera

PICK A SYSTEM!



\$2495.
.5 MB STORAGE

◀ COMPLETE ▶

\$2995.
1.2 MB STORAGE

We're offering you our SB-80 system in either 5 1/4" or 8" disk drives, your choice. Either way your system comes with a full size (12" diagonal) non-glare tiltable green screen with 24 lines by 80 character format. Its multi-character set offers blinking cursor, underlining, reverse video, and half and zero intensity. The movable, detachable keyboard has a numeric pad with cursor control and function keys.

- Single Board Technology ■ CP/M® Operating System
- 4 MHz Z80A CPU ■ 64K 200ns Main Memory
- 8-Inch Dual Density Floppy Drives
- 5 1/4-Inch Dual Density Floppy Drives
- 2-Serial Ports ■ 2-Parallel Ports
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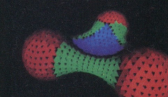
*CP/M is a registered trademark of Digital Research, Inc.

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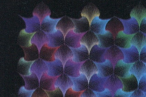
next computer graphics

- micro computer driven high level processing
- directly create/project/render elements
- created real-time playback of wireframe animations

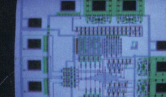
SUPERIOR GRAPHICS HAVE COME DOWN TO EARTH.



"Three Atoms" Courtesy of Greg Abram, University of North Carolina at Chapel Hill



"Aurora" By Richard Katz, Vectrix Corporation



"Integrated Circuit Design" Courtesy of Floyd J. James, University of North Carolina at Chapel Hill



"In The Beginning" By Richard Katz, Vectrix Corporation

\$1995 AND THE FIRST AFFORDABLE HIGH RESOLUTION COLOR GRAPHICS MACHINE IS YOURS

VX128
 • VERY HIGH RESOLUTION 672 by 480 pixels individually addressable
 • EIGHT COLORS PER PIXEL 3 bit planes of memory totalling 128K graphics RAM

• ON-BOARD 16 BIT MICRO-COMPUTER Intel 8088 microprocessor with additional PROM and RAM and built-in expansion capability
 • 3D GRAPHICS SOFTWARE PACKAGE built-in command set includes: rotation, scaling, translation, perspective, clipping, viewport, polygon, and filled polygon

• HARDWARE LINE AND ARC GENERATION on-board VLSI graphics display controller, 1600 nano-seconds pixel drawing time

• USER DEFINABLE CHARACTER GENERATION built-in character set includes zoom, slant, and variable spacing, or upload your own character definitions



VECTRIX

• SERIAL AND PARALLEL INTERFACE 300-19.2K baud and 8 bit parallel port
 • USER FRIENDLY COMMAND FORMAT supports high level language and hexadecimal transmissions

VX384
 • 512 COLORS PER PIXEL 9bit planes of memory with 384K graphics RAM
 • COLOR LOOKUP TABLE 8 bit digital-to-analog converters provide a 16 million color palette

• INCLUDES ALL FEATURES of VX128 for total of \$3995
 • VKM HIGH RESOLUTION COLOR MONITOR RGB analog input with 24 kilohertz scan rate, long persistence phosphor \$1295

• COLOR GRAPHIC PRINTER with interface cable \$1295



For additional information on VX128, VX384, VKM Monitor or VXP Printer call Toll Free 1-800-534-8181, or 919-272-5479, or write Vectrix Corporation, 700 Battleground Avenue, Greensboro, NC 27401



- shoot off screen with video camera
- computer \$3k + graphics \$4k = \$7k(!)

“real” computer graphics

- IBM PC based
- computer \$3k +
graphics \$9k = \$12k (!!)

SOLID-MODELING ON A MICROCOMPUTER?



You bet! With our new CS-5 solid modeling system, creating crayons like these is mere child's play.

The CS-5 makes it very easy to define three-dimensional objects. You don't have to type in coordinates or do any programming.

Images of outstanding quality are generated quickly with just a few simple commands. Surfaces can be selectively smooth-shaded and hidden lines automatically removed.

And best of all—this remarkably advanced system costs very little. The CS-5 generates sophisticated images



like these for only \$9700—much less than you'd expect for so much power and performance.

The CS-5 operates as an intelligent terminal, 3-D graphics workstation, or as a stand-alone graphics system. It displays 512 x 512 pixel images with over 4000 colors simultaneously out of 16 million.

The system is designed to fit many applications. If you are an artist, designer, engineer, research scientist, or OEM, call or write for all the details.

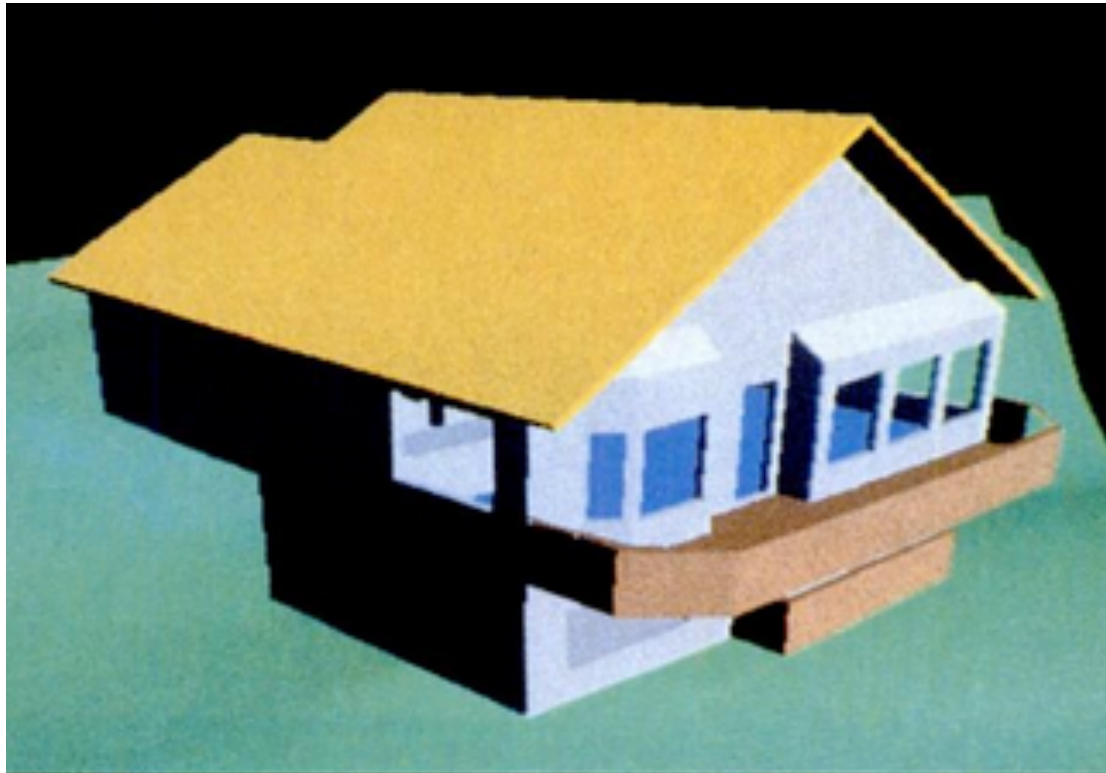
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CUBICOMP

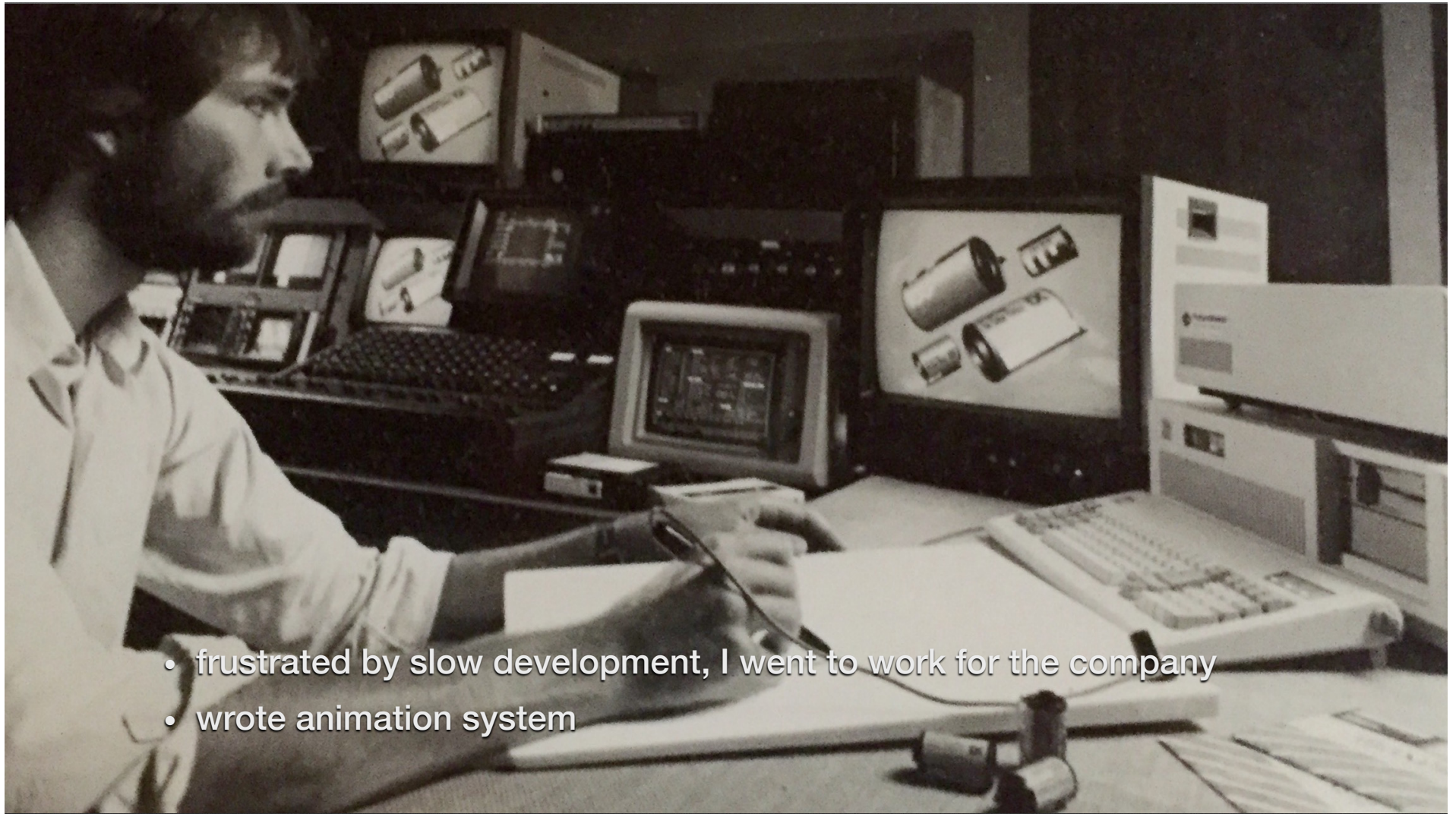
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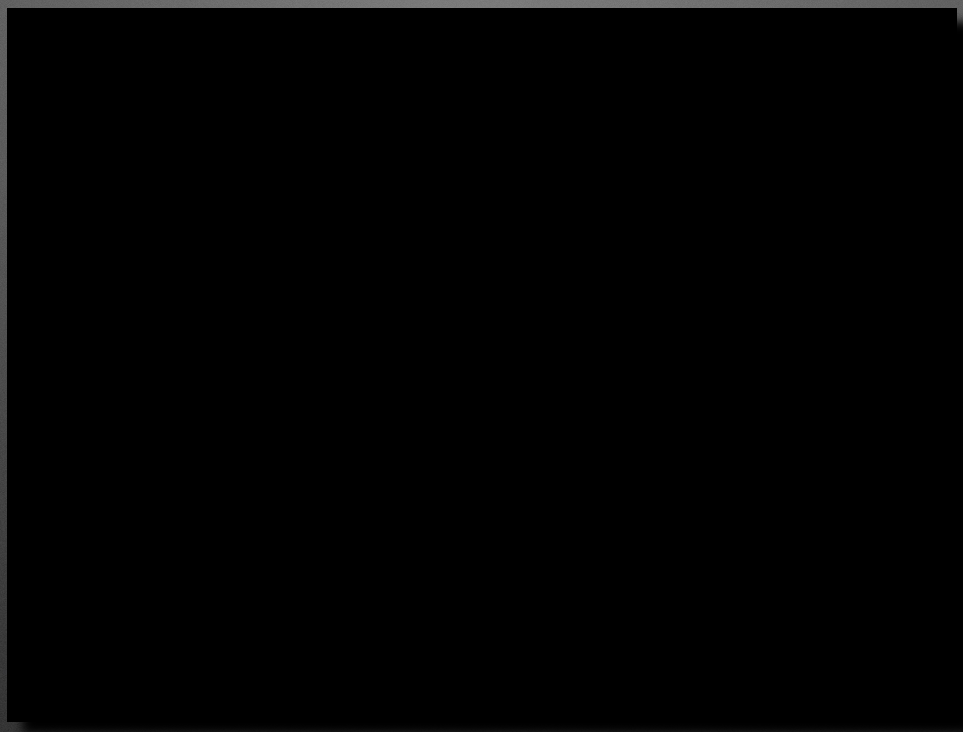


- modeling software
- solid / lit objects
- rendering





- frustrated by slow development, I went to work for the company
- wrote animation system





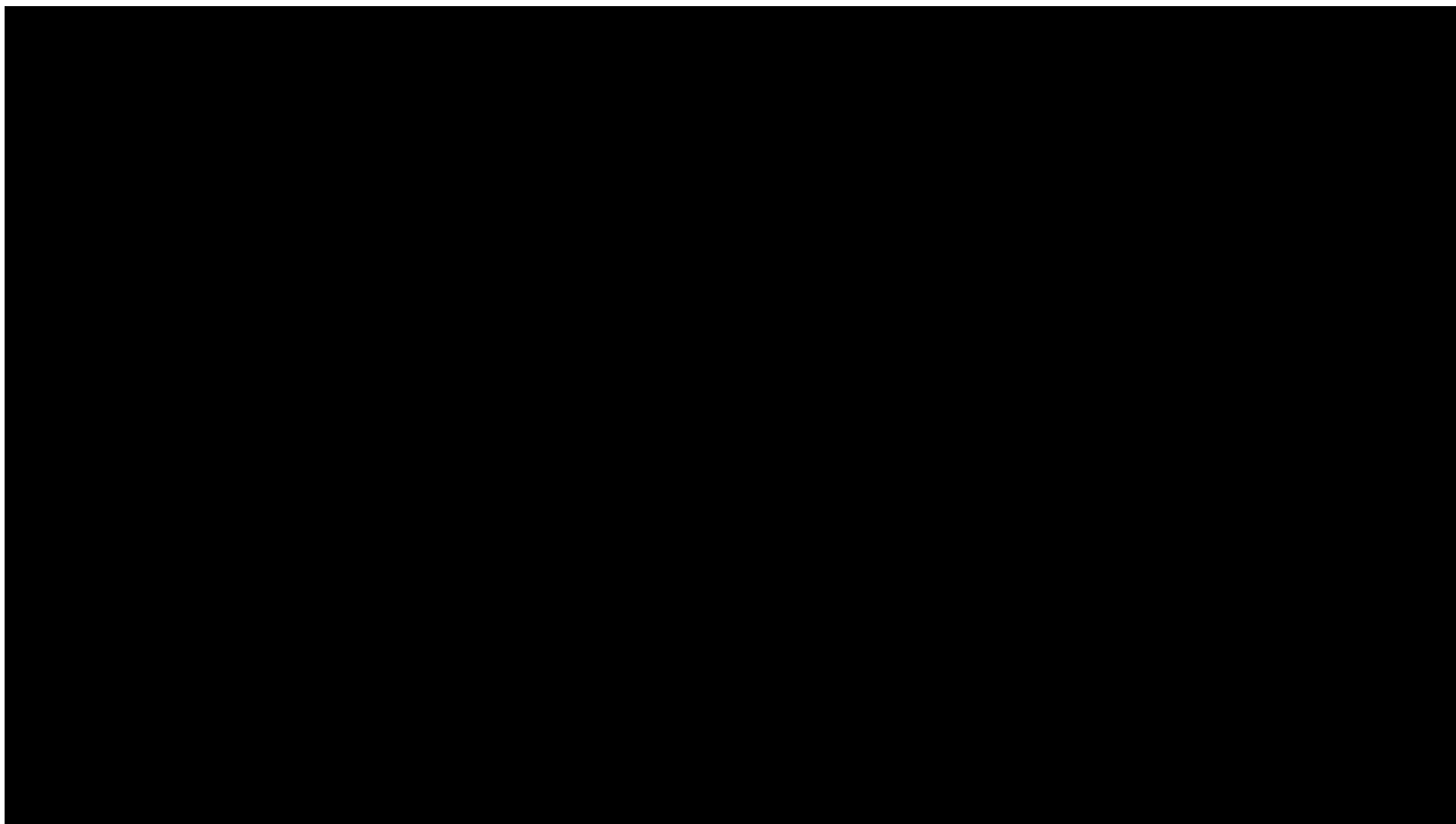
Invaders From Mars

Cannon

1986

Tobe Hooper

James Karen, Karen Black





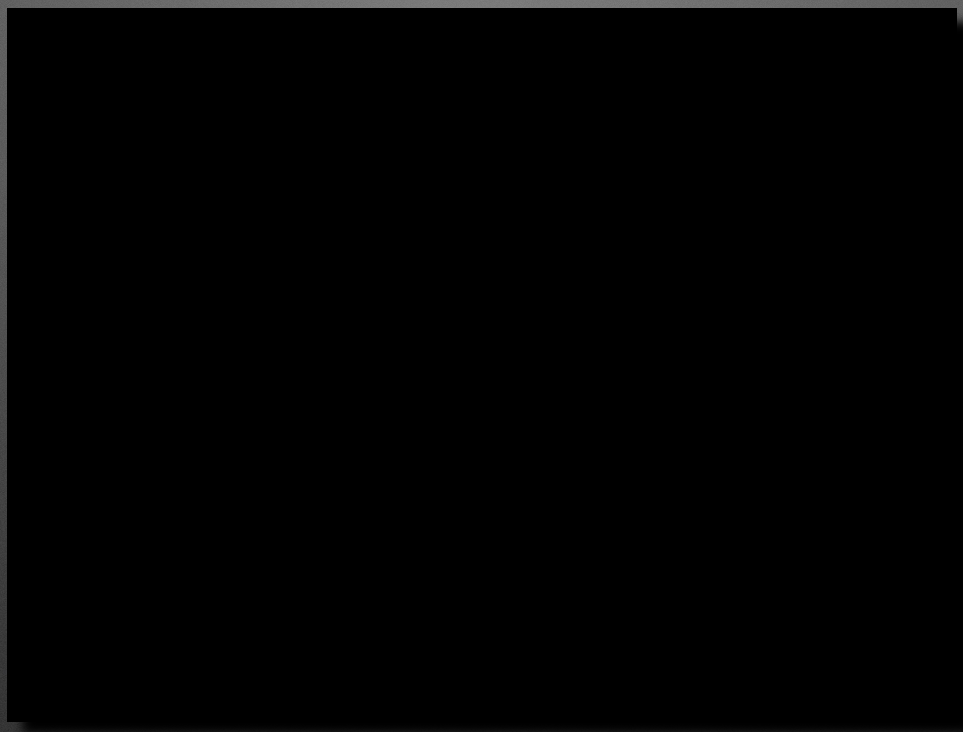
a bigger stage

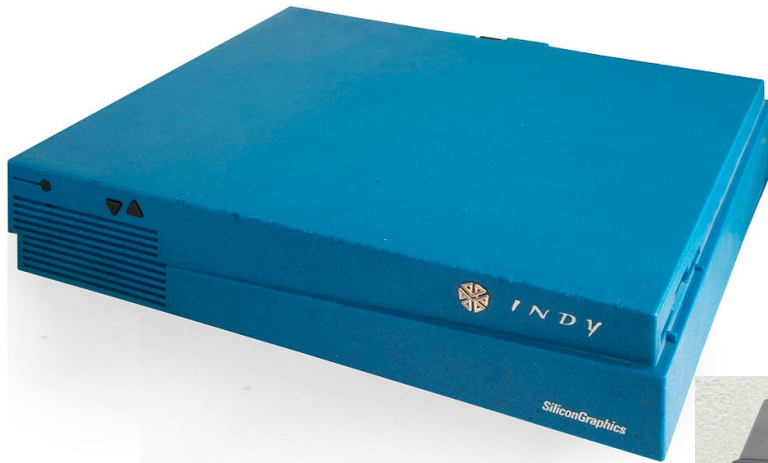
- PDI
- “As Seen On TV”



- Ridge computers
- RISC
- UNIX
- 24 bit (full color) frame buffer
- single frame recording to 1" broadcast quality video tape
- \$100,000 (!!!)







- second generation
- SGI workstations
- full color
- real time interface



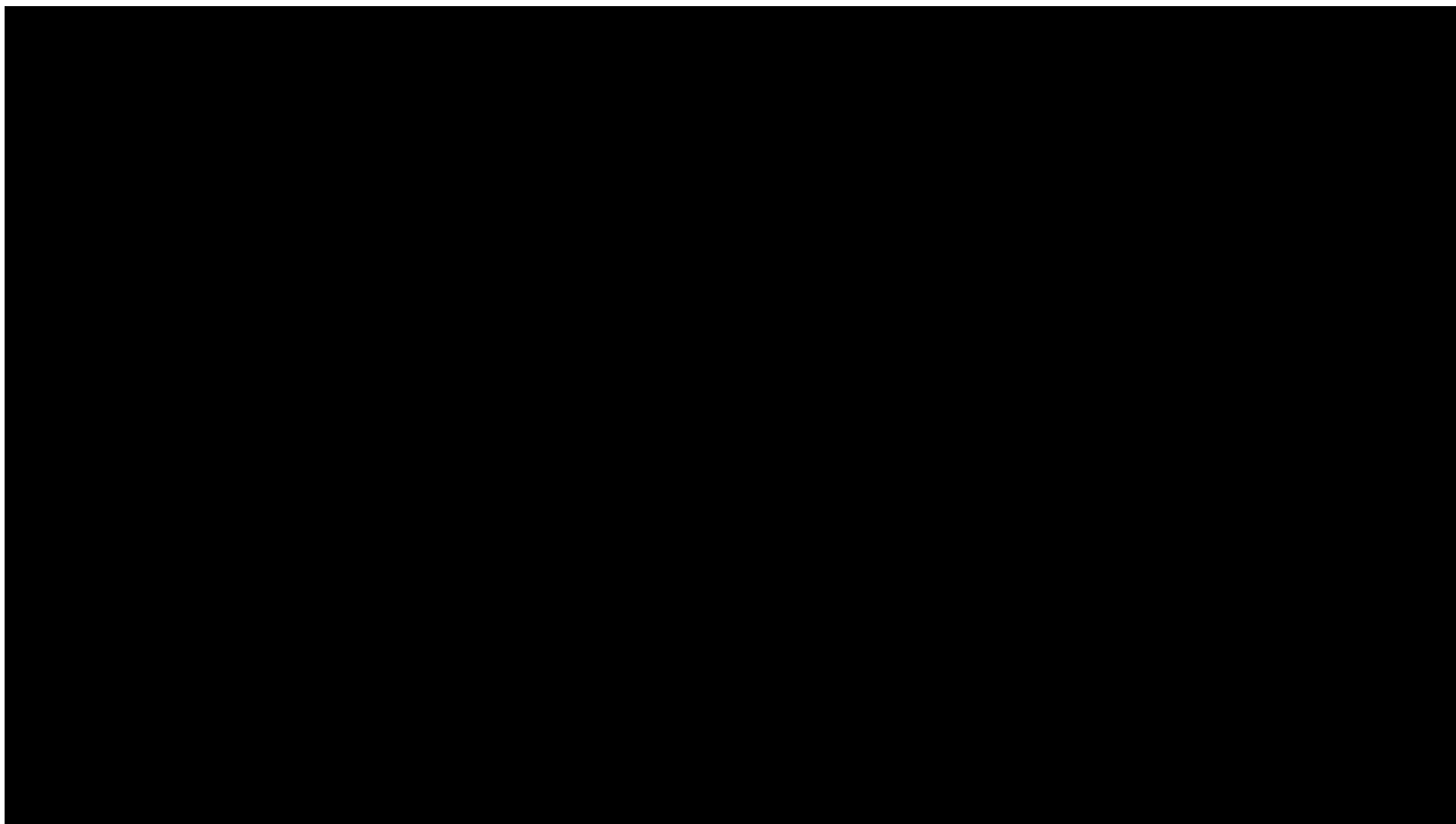


Scrooged

Paramount
1988

Richard Donner

Bill Murray, Karen Allen



PDI Hollywood



- feature time





Digital Film Scanning and Printing



HAMMERHEAD PRODUCTIONS

est. 1995



