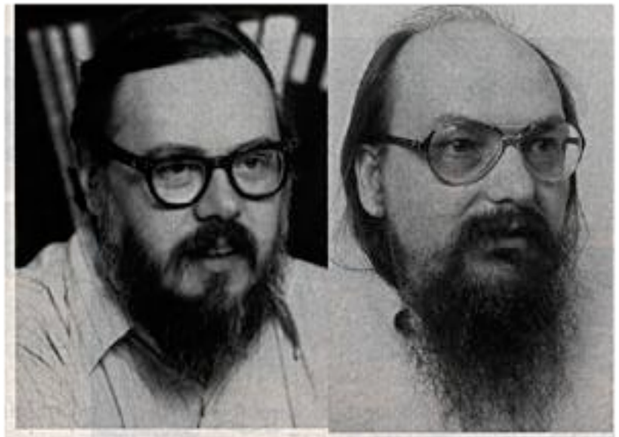
Geschichte und Ästhetik der audiovisuellen und digitalen Medien II

1972-1978

Prof. Dr. Jochen Koubek

Technikgeschichte

UNIX



Dennis Ritchie and Kenneth Thompson: they set the style for software development – and for software developers

1969 Arbeit an MULTICS (Multiplexed Information and Computing Service), Bell Telephone Labs, General Electrics, MIT

Nachdem BTL sich aus dem MULTICS-Projekt zurückzog, entwickelten Ritchie und Thompson den «UNiplexed Information and Computing Service» (UNICS) in der Sprache «B»

3.11.1971 Das erste «UNIX PROGRAMMER'S MANUAL [by] K. Thompson [and] D. M. Ritchie»

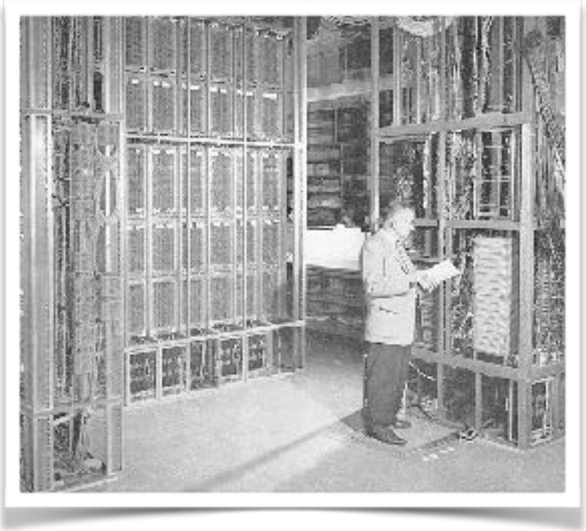
1972 Ritchie entwickelt «C» aus «B». Thompson entwickelt das «Pipeline»-Prinzip

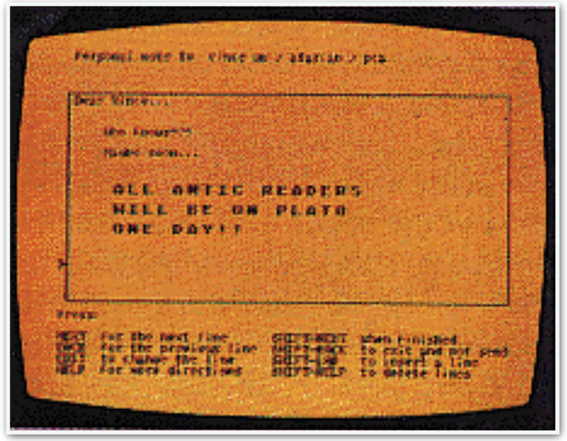
1973 Veröffentlichung von UNIX

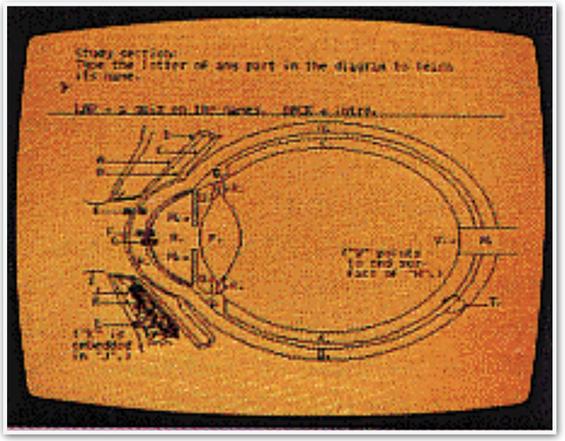
D. Ritchie und K. Thompson an der PDP-11

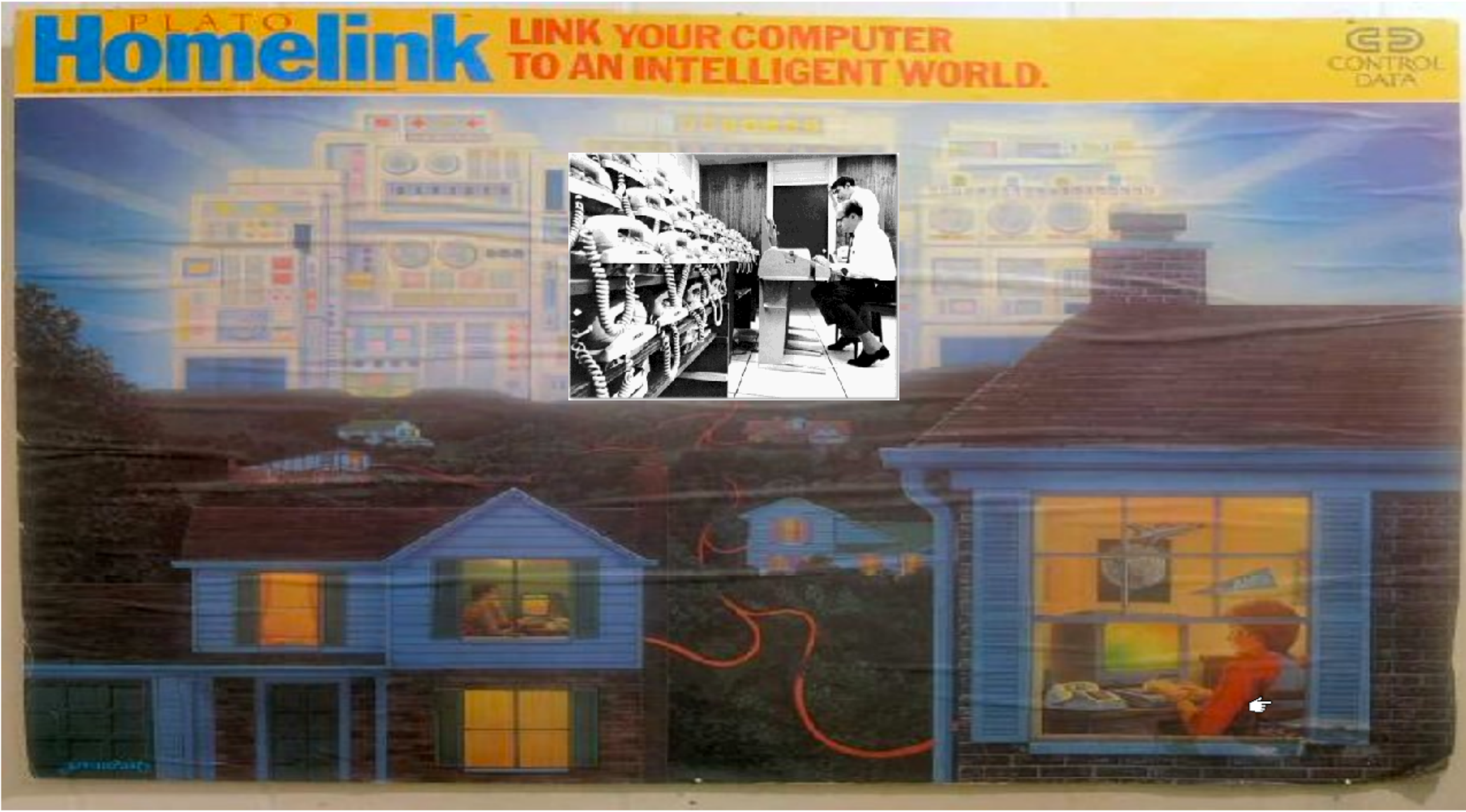
Online-Community PLATO

Plato IV ab 1972

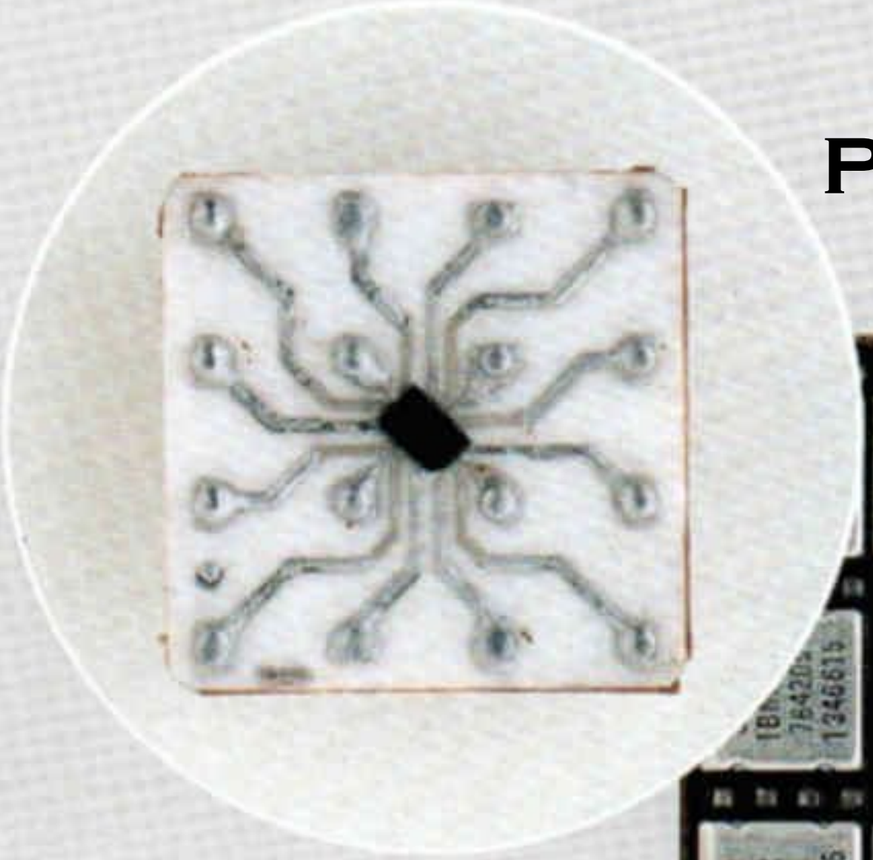


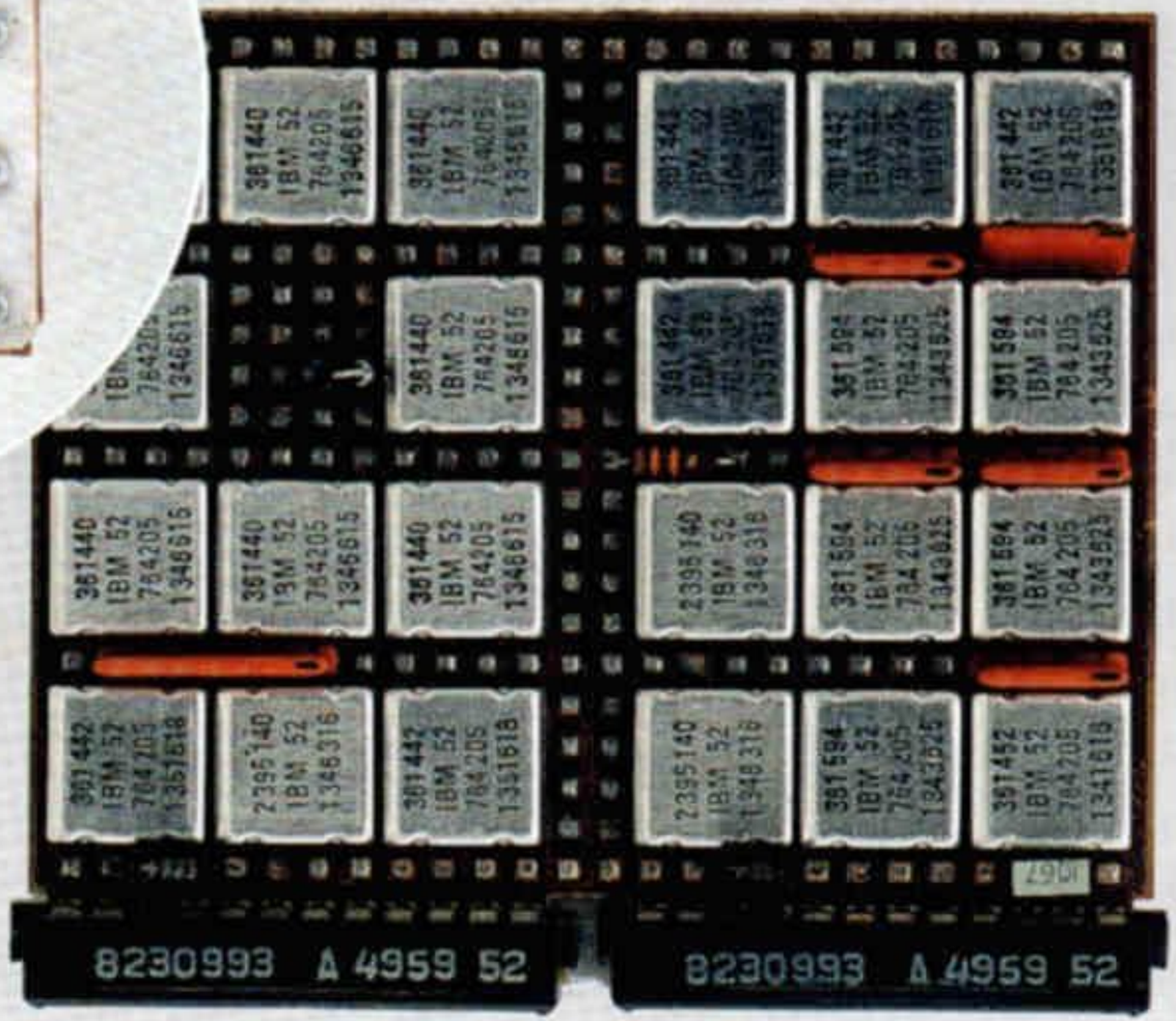





PLATO
Homelink
LINK YOUR COMPUTER
TO AN INTELLIGENT WORLD.
CONTROL
DATA

Personal Computer





MSI

Medium Scale Integration

70er Jahre

Mikroelektronik: Halbleiter-Chips

John Bardeen

Walter H. Brattain

William B. Schockley

Schockley Semiconductor, 1956

Fairchild, 1959

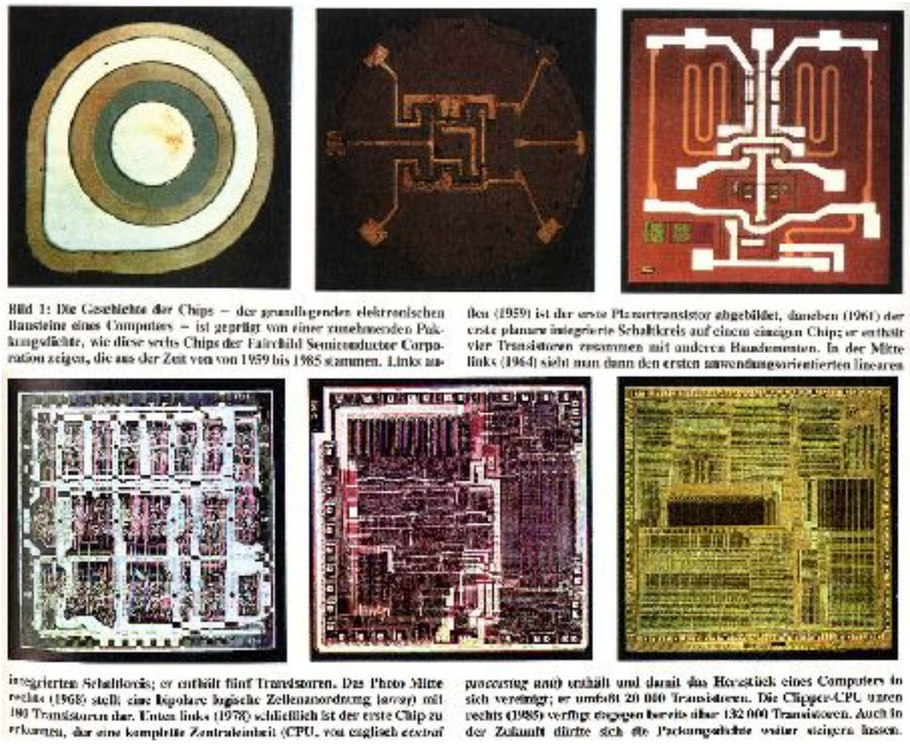


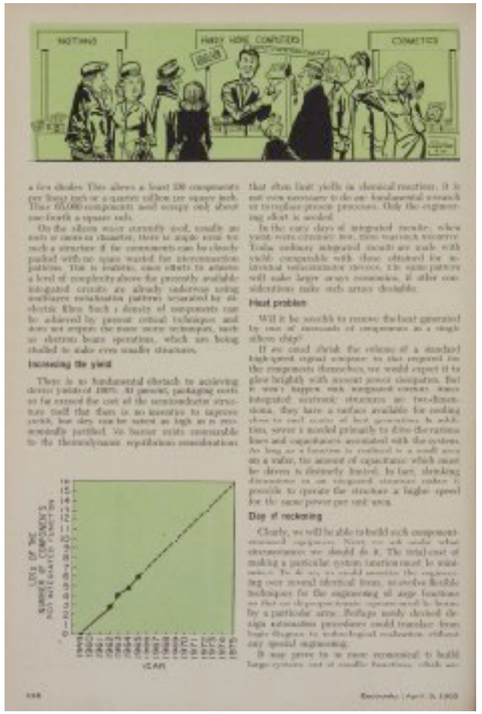
Bild 1: Die Geschichte der Chips – der grundlegenden elektronischen Bausteine eines Computers – ist geprägt von einer zunehmenden Packungsdichte, wie diese sechs Chips der Fairchild Semiconductor Corporation zeigen, die aus der Zeit von von 1959 bis 1985 stammen. Links zeigen (1959) ist der erste Planartransistor abgebildet, daneben (1961) der erste planare integrierte Schaltkreis auf einem einzigen Chip; er enthält vier Transistoren zusammen mit anderen Bauelementen. In der Mitte links (1964) sieht man dann den ersten anwendungsorientierten linearen integrierten Schaltkreis; er enthält fünf Transistoren. Das Photo Mitte rechts (1968) stellt eine bipolare logische Zellenanordnung (array) mit 100 Transistoren dar. Unten links (1978) schließlich ist der erste Chip zu erkennen, der eine komplette Zentraleinheit (CPU, von englisch central processing unit) enthält und damit das Herzstück eines Computers in sich vereinigt; er umfaßt 20 000 Transistoren. Die Clipper-CPU unten rechts (1985) verfügt dagegen bereits über 132 000 Transistoren. Auch in der Zukunft dürfte sich die Packungsdichte weiter steigern lassen.

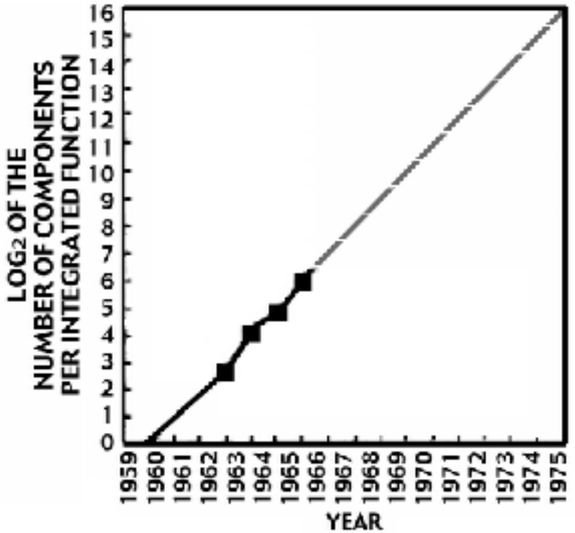
Gordon Moore, Robert Noyce, Intel, 1968

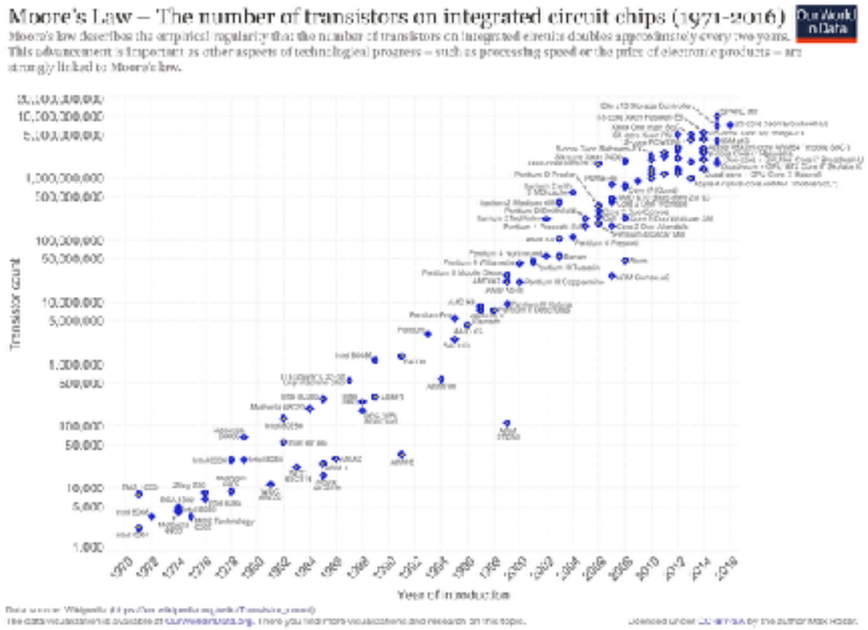
Fairchild
Intel
NSC
AMD
Texas Instruments
Motorola
Zilog

Moore's Law

1965

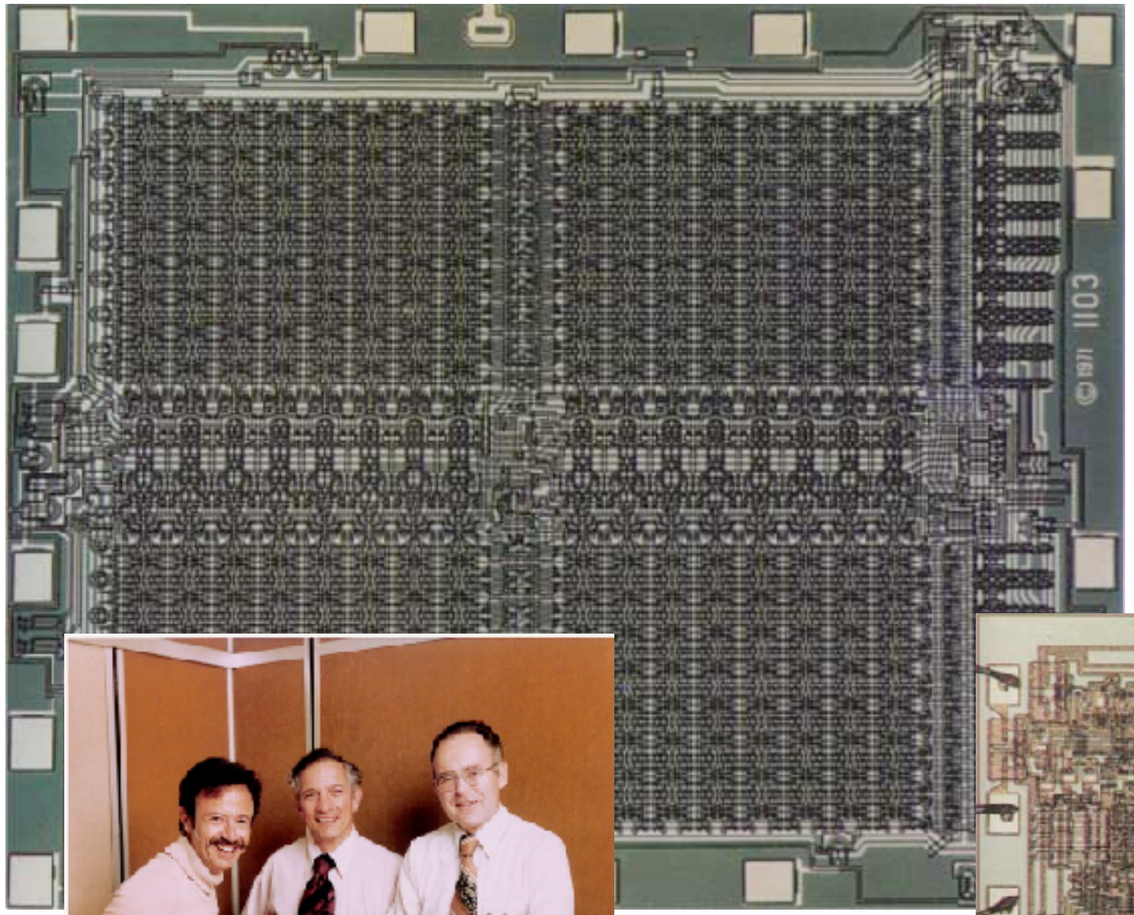






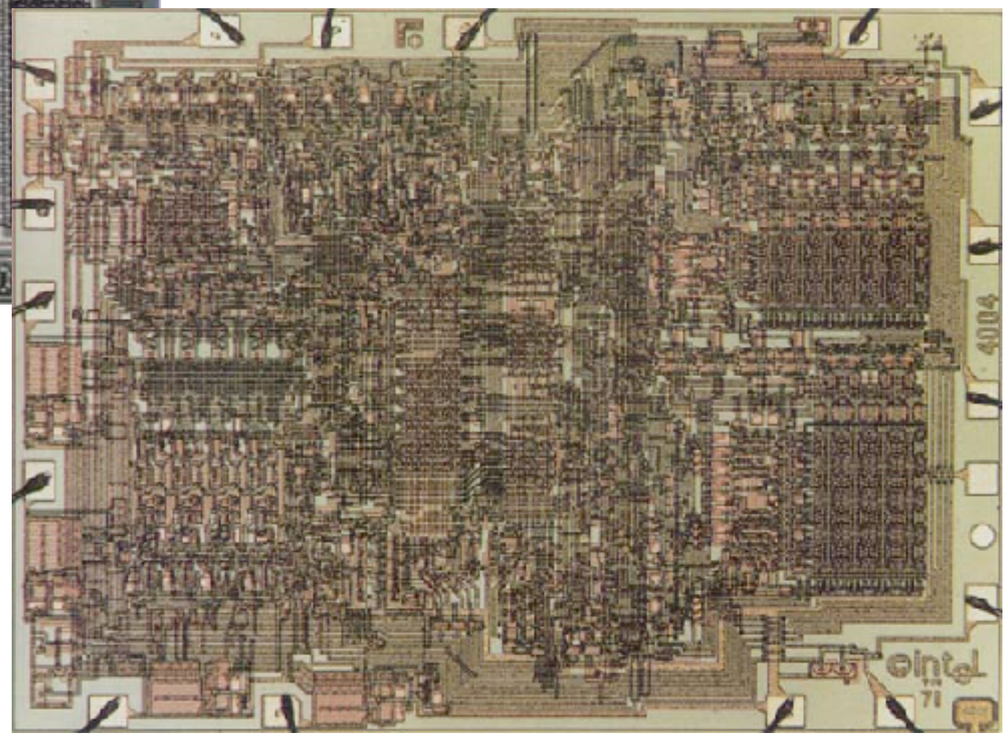
Mikroprozessor

Intel – Integrated Electronics



1103, 1024 Bit-Speicher, 1970

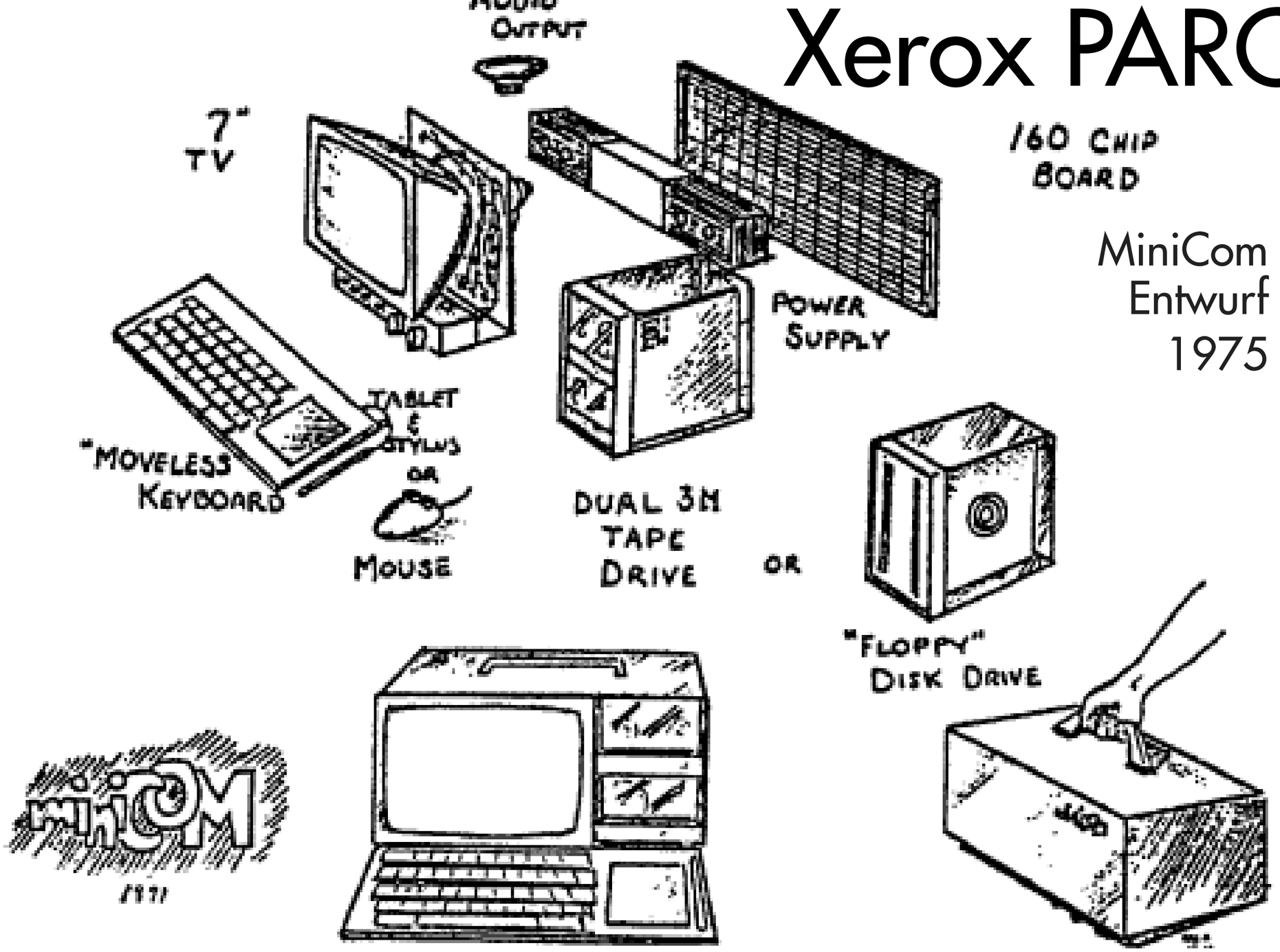
Andrew Grove, Robert Noyce und Gordon Moore, 1968



4040, der erste Mikroprozessor, 1971

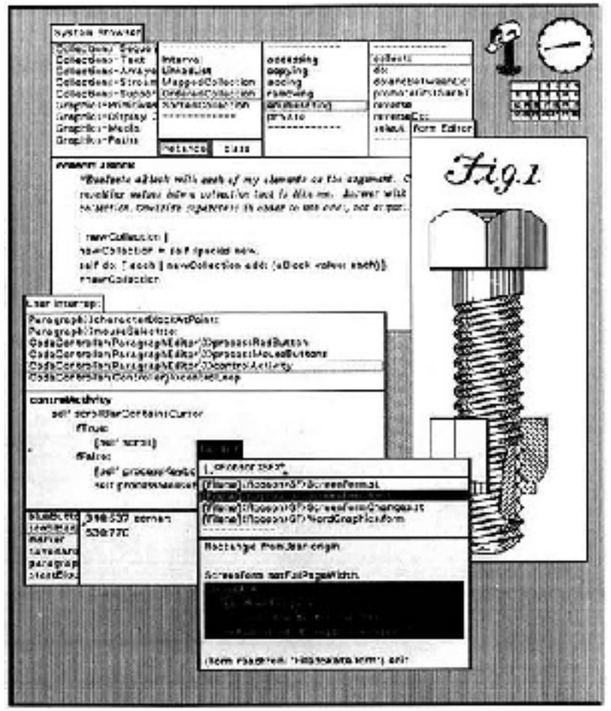
Xerox Parc

Xerox PARC



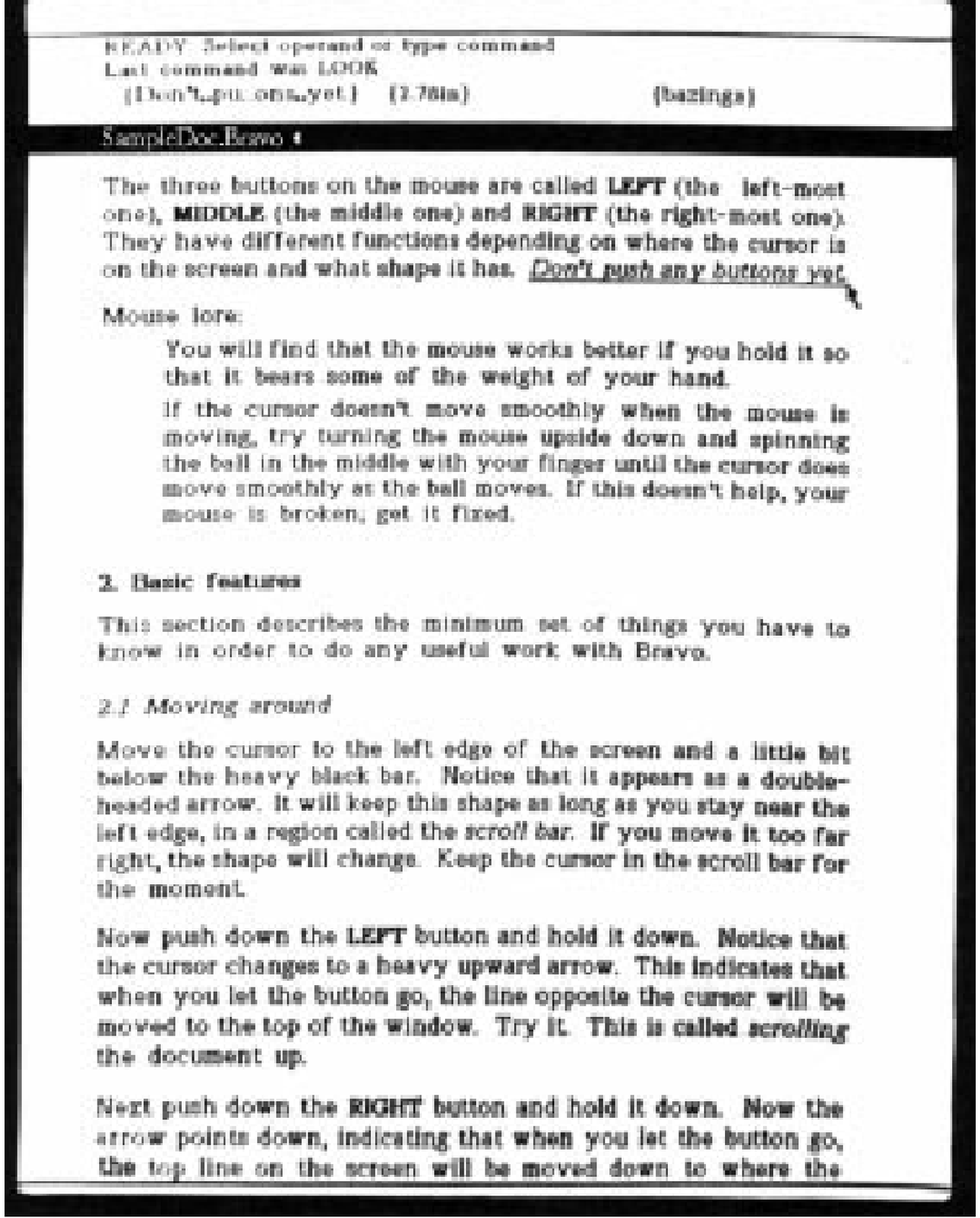
MiniCom
Entwurf
1975

Xerox Alto



Rastergrafik
3-Tasten-Maus
GUI: Windows, Icons, Menus, Pointer (WIMP)
Ethernet
Email

1973



READY Select operand or type command
Last command was LOOK
{Don't_pu_ons_yet} {2.78in} {bazings}

SampleDoc.Bravo

The three buttons on the mouse are called **LEFT** (the left-most one), **MIDDLE** (the middle one) and **RIGHT** (the right-most one). They have different functions depending on where the cursor is on the screen and what shape it has. *Don't push any buttons yet.*

Mouse lore:

You will find that the mouse works better if you hold it so that it bears some of the weight of your hand.

If the cursor doesn't move smoothly when the mouse is moving, try turning the mouse upside down and spinning the ball in the middle with your finger until the cursor does move smoothly as the ball moves. If this doesn't help, your mouse is broken, get it fixed.

2. Basic features

This section describes the minimum set of things you have to know in order to do any useful work with Bravo.

2.1 Moving around

Move the cursor to the left edge of the screen and a little bit below the heavy black bar. Notice that it appears as a double-headed arrow. It will keep this shape as long as you stay near the left edge, in a region called the *scroll bar*. If you move it too far right, the shape will change. Keep the cursor in the scroll bar for the moment.

Now push down the **LEFT** button and hold it down. Notice that the cursor changes to a heavy upward arrow. This indicates that when you let the button go, the line opposite the cursor will be moved to the top of the window. Try it. This is called *scrolling* the document up.

Next push down the **RIGHT** button and hold it down. Now the arrow points down, indicating that when you let the button go, the top line on the screen will be moved down to where the

Xerox Alto

WYSIWYG Editor **Bravo**

Charles Simony

Butler Lampson

Xerox Alto

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

Pane menus (often different in different panes) can also be invoked by option-click (and hold) in most panes, and window menus can be invoked by cmd-click. Many menu commands can also be invoked by cmd-key combinations, indicated in the menus. The global 'screen menu' can be invoked simply by clicking in the gray area within the Squeak screen, but outside any Squeak windows.

(a)

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

Pane menus (often different in different panes) can also be activated by option-click (and hold) in most panes, and window menus can be invoked by cmd-click. Many menu commands can also be invoked by cmd-key combinations, indicated in the menus. The global 'screen menu' can be invoked simply by clicking in the gray area within the Squeak screen, but outside any Squeak windows.

(b)

(c)

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

Pane menus (often diff es) can also be activated by ld) in most panes, and win invoked by cmd-click. s can also be invoked by s, indicated in the menus. menu' can be invoked s the gray area within the S side any Squeak windows.

find...(f)
find again (g)
set search string (h)
do again (j)
undo (z)
copy (c)
cut (x)
paste (v)
do it (d)
print it (p)
inspect it (i)
accept (s)
cancel (l)
show bytecodes
more

(d)

up/down/jump scrolling (try them now), and the fourth indicates availability of a pop-up menu relating to the pane you are in.

Menus

Pane menus (often different in different panes) can also be invoked by option-click (and hold) in most panes, and window menus can be invoked by cmd-click. Many menu commands can also be invoked by cmd-key combinations, indicated in the menus. The global 'screen menu' can be invoked simply by clicking in the gray area within the Squeak screen, but outside any Squeak windows.

Smalltalk
Cut-Copy-Paste

Laserdrucker

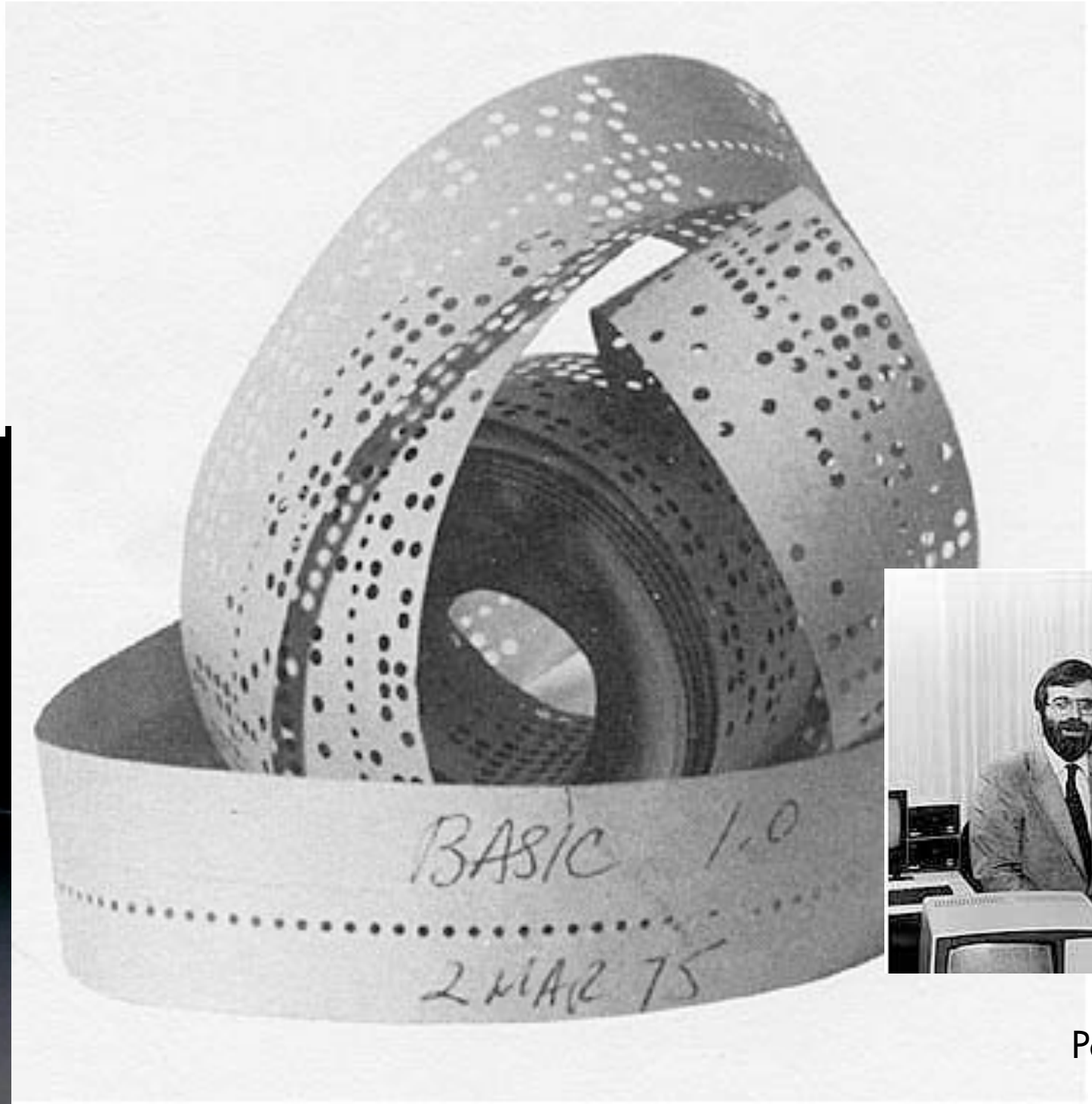
Gary Starkweather

1971 SLOT – Scannes Laser Output Terminal
1972 EARS – Ethernet, Alto, Research character generator, Scanned laser output terminal

1978 Xerox 9700

Altair

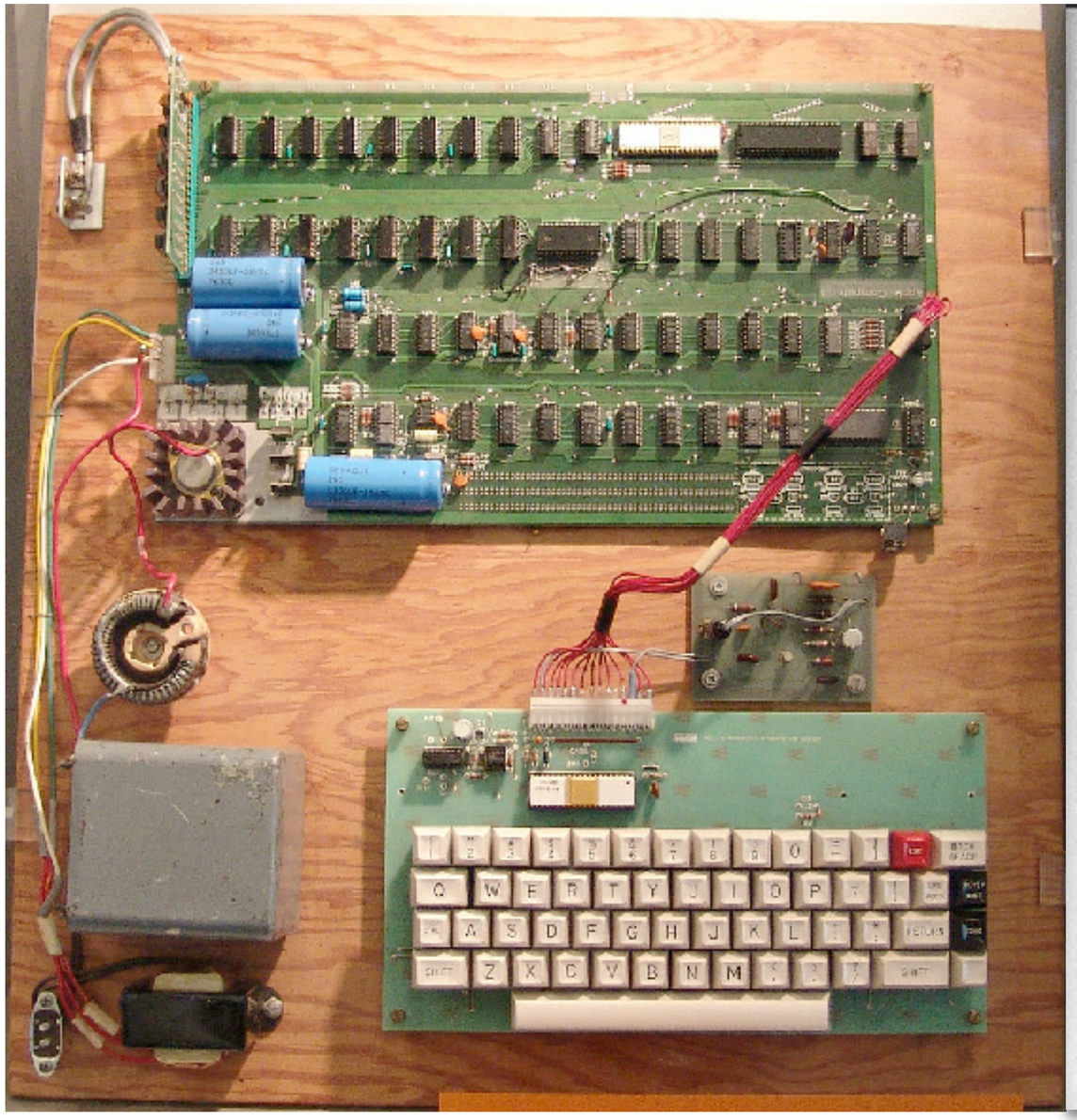
1974-1975



Ed Roberts, MITS

Paul Allan, Bill Gates

Apple I - der erste **Homecomputer** (1976)



Apple Introduces the First Low Cost Microcomputer System with a Video Terminal and 8K Bytes of RAM on a Single PC Card.

The Apple Computer. A truly complete microcomputer system on a single PC board. Based on the MOS Technology 6502 microprocessor, the Apple also has a built-in video terminal and sockets for 8K bytes of on-board RAM memory. With the addition of a keyboard and video monitor, you'll have an extremely powerful computer system that can be used for anything from developing programs to playing games or running BASIC.

Combining the computer, video terminal and dynamic memory on a single board has resulted in a large reduction in chip-count, which means more reliability and lowered cost. Since the Apple comes fully assembled, tested & burned-in and has a complete power supply on-board, initial set-up is essentially "hassle free" and you can be running within minutes. At $666.66 (including 4K bytes RAM!) it opens many new possibilities for users and systems manufacturers.

You Don't Need an Expensive Teletype.

Using the built-in video terminal and keyboard interface, you avoid all the expense, noise and maintenance associated with a teletype. And the Apple video terminal is six times faster than a teletype, which means more throughput and less waiting. The Apple connects directly to a video monitor (or home TV with an inexpensive RF modulator) and displays 960 easy to read characters in 24 rows of 40 characters per line with automatic scrolling. The video display section contains its own 1K bytes of memory, so all the RAM memory is available for user programs. And the Keyboard interface lets you use almost any ASCII-encoded keyboard.

The Apple Computer makes it possible for many people with limited budgets to ship up to a video terminal as an IO device for their computer.

No More Switches, No More Lights.

Compared to switches and LED's, a video terminal can display vast amounts of information simultaneously. The Apple video terminal can display the contents of 192 memory locations at once on the screen. And the firmware in PROMS enables you to enter, display and debug programs (all in hex) from the keyboard, rendering a front panel unnecessary. The firmware also allows your programs to print characters on the display, and since you'll be looking at letters and numbers instead of just LED's, the door is open to all kinds of alphanumeric software (i.e., Games and BASIC).

8K Bytes RAM in 16 Chips!

The Apple Computer uses the new 16-pin 4K dynamic memory chips. They are faster and take ¼ the space and power of even the low power 2102's (the memory chip that everyone else uses). That means 8K bytes in sixteen chips. It also means no more 28 amp power supplies.

The system is fully expandable to 65K via an edge connector which carries both the address and data busses, power supplies and all timing signals. All dynamic memory refreshing for both on and off-board memory is done automatically. Also, the Apple Computer can be upgraded to use the 16K chips when they become available. That's 32K bytes on-board RAM in 16 IC's—the equivalent of 256 2102's!

A Little Cassette Board That Works!

Unlike many other cassette boards on the marketplace, ours works every time. It plugs directly into the upright connector on the main board and stands only 2½" tall. And since it is very fast (1500 bits per second), you can read or write 4K bytes in about 20 seconds. All timing is done in software, which results in crystal-controlled accuracy and uniformity from unit to unit.

Unlike some other cassette interfaces which require an expensive tape recorder, the Apple Cassette interface works reliably with almost any audio-grade cassette recorder.

Software:

A type of APPLE BASIC is included free with the Cassette Interface. Apple Basic features immediate error messages and fast execution, and lets you program in a higher level language immediately and without added cost. Also available **now** are a dis-assembler and many games, with many software packages, (including a macro assembler) in the works. And since our philosophy is to provide software for our machines free or at minimal cost, you won't be continually paying for access to this growing software library.

The Apple Computer is in stock at almost all major computer stores. (If your local computer store doesn't carry our products, encourage them or write us direct). **Dealer inquiries invited.**

Byte into an Apple $666.66*

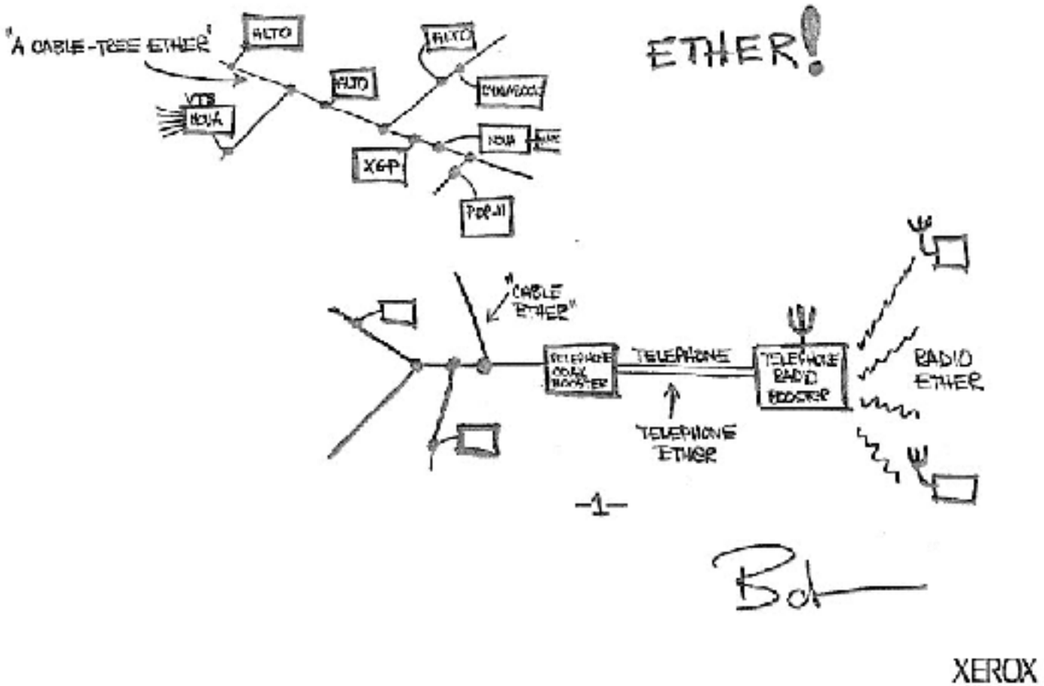
*Includes 4K bytes RAM

APPLE Computer Company • 770 Welch Rd., Palo Alto, CA 94304 • (415) 326-4248

Apple II
1977

Intranetworking: Ethernet

Robert Metcalfe
PARC, 1973



XEROX

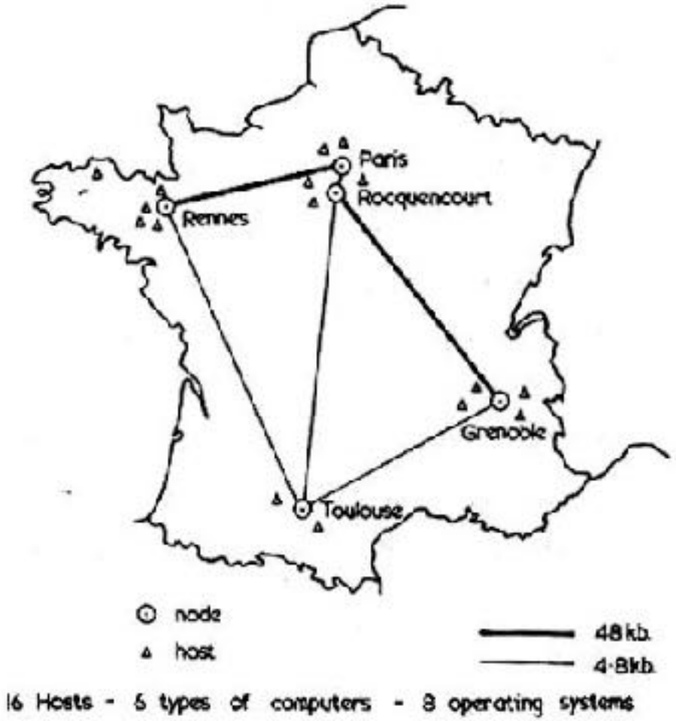
MAY 22, 1973

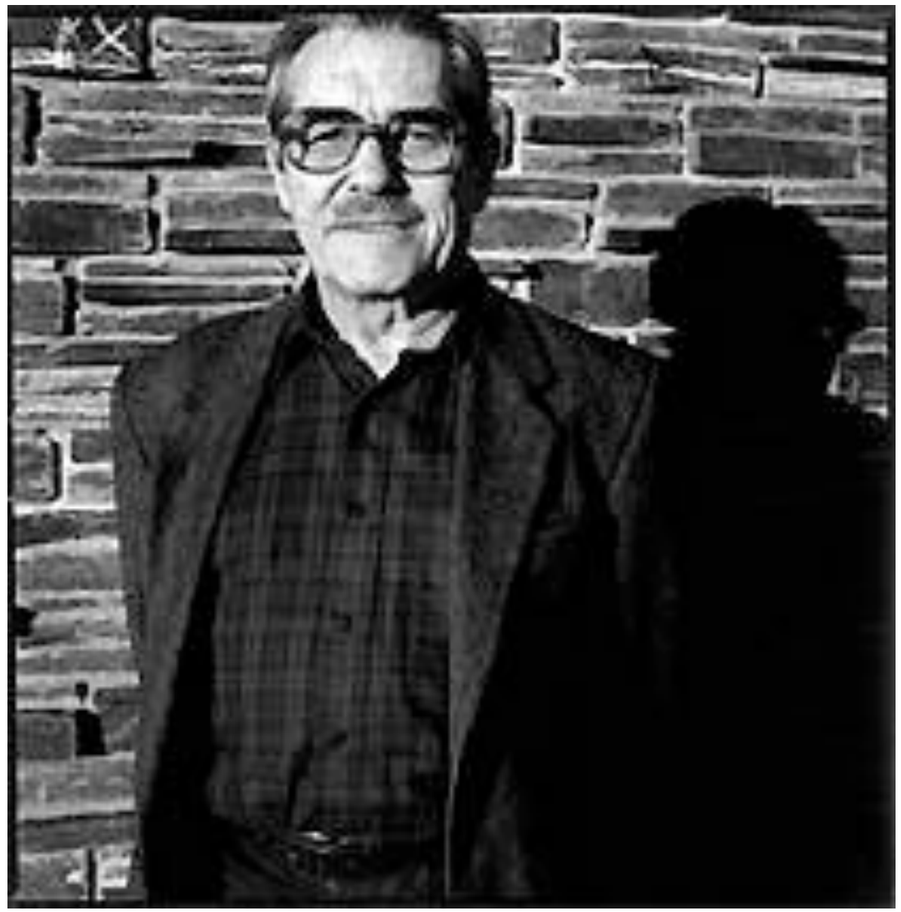
TO: ALTO ALOHA DISTRIUBTION
FROM: BOB METCALFE
SUBJECT: ETHER ACQUISITION

HERE IS SOME ROUGH STUFF ON THE ALTO ALOHA NETWORK.

Cyclades/Cigale

1972-1978





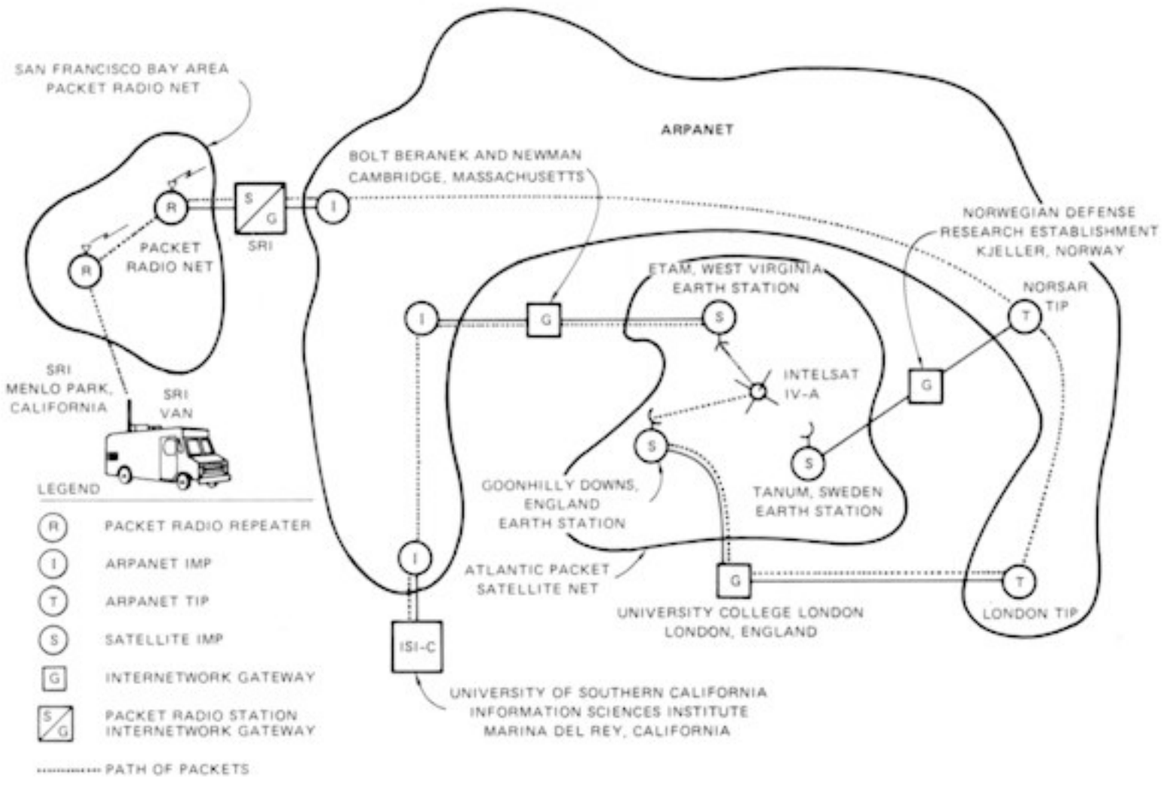
Datagramme

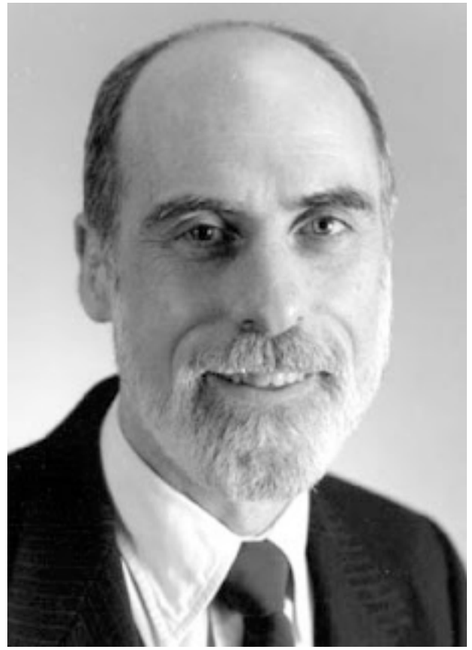
Logische Adressierung

Louis Pouzin

TCP/IP

A Protocol For Packet Network Intercommunication, 1974

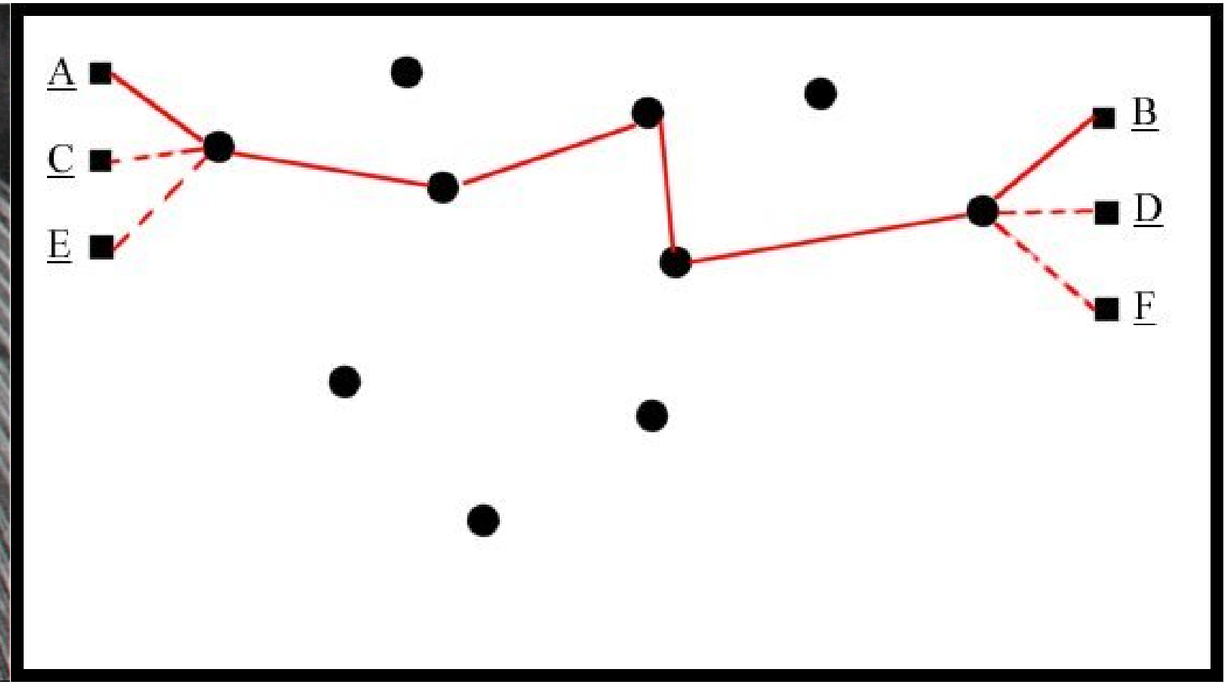




Vinton Cerf

Bob Kahn

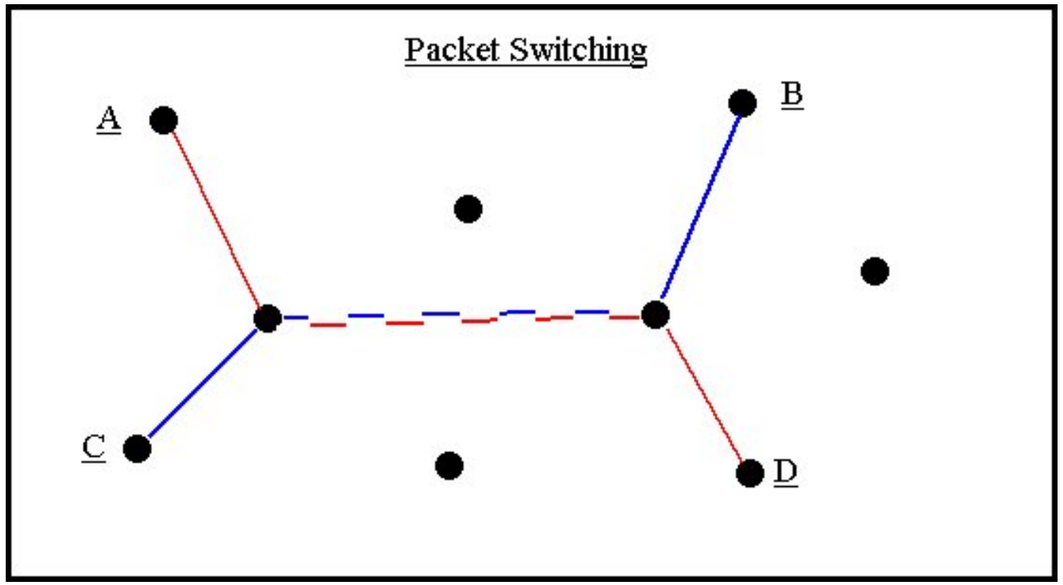
Leitungsvermittlung



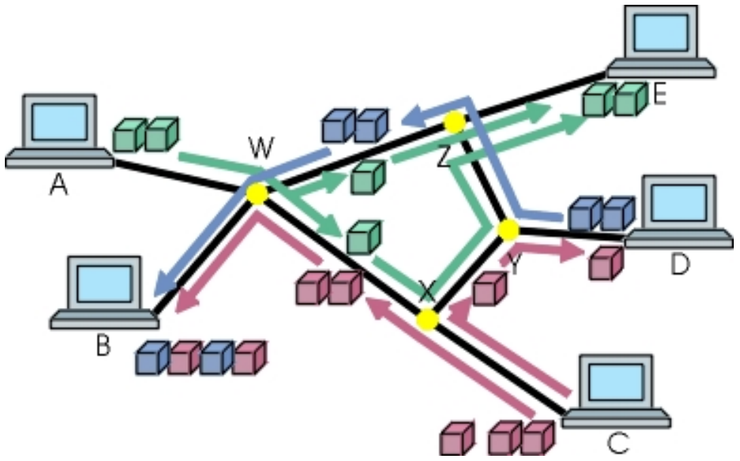
Bis 1969 waren zivile Kommunikationsnetze zentralisiert, analog und leitungsvermittelt – aus historischen, kommerziellen, politischen, militärischen und technischen Gründen.

Welche Gründe führten also zur Errichtung eines dezentralen, digitalen, paketvermittelnden Netzes?

Paketvermittlung

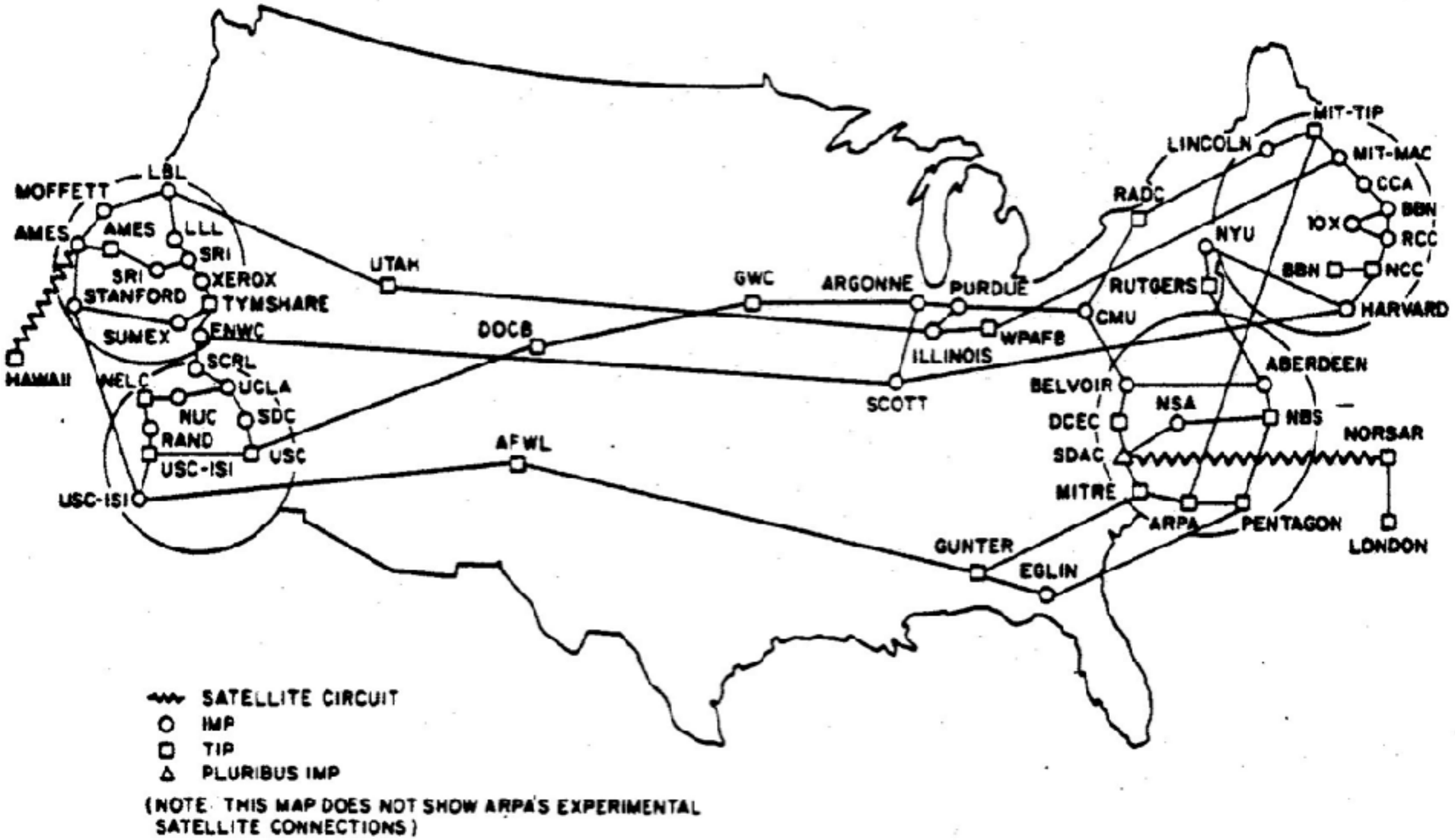


Virtuelle Leitungen

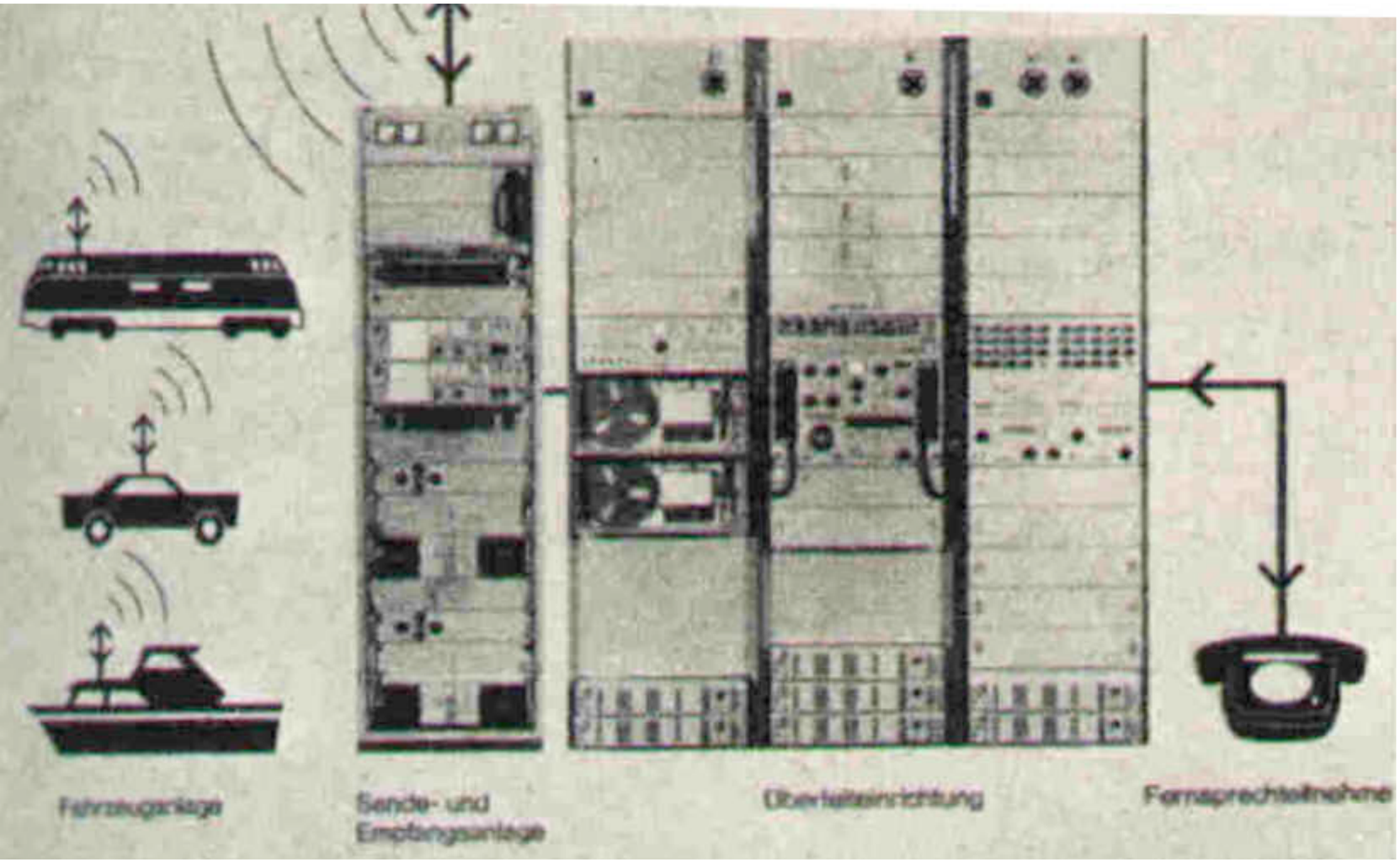


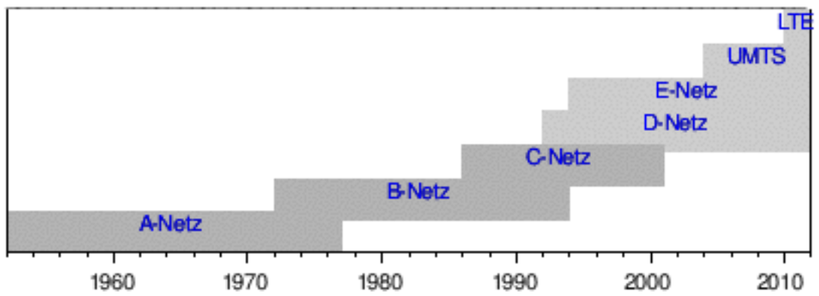
Datagramme

ARPANET 1975

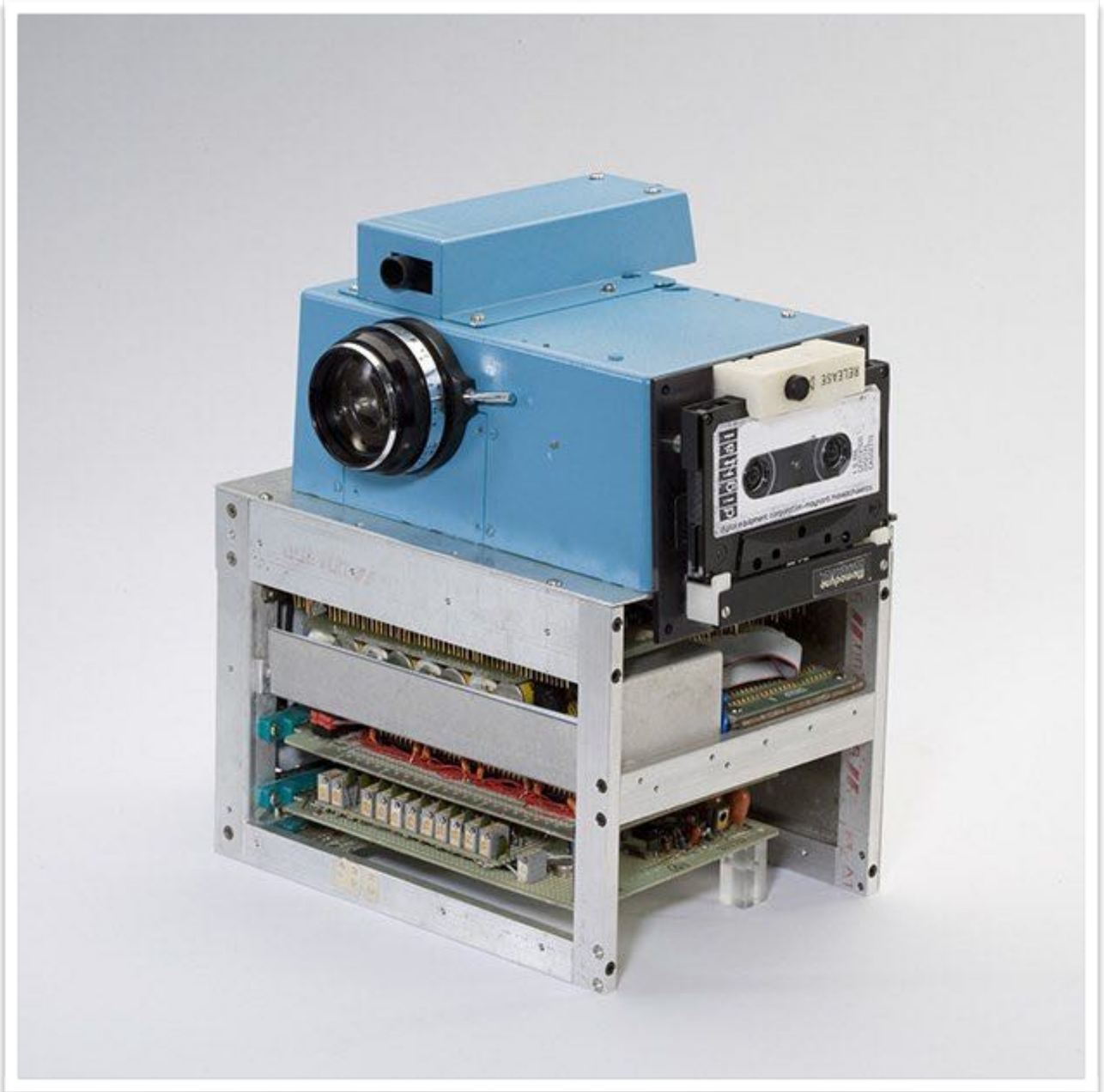


Mobiltelefon





B-Netz, 1972-1994



Digitalkamera

1975 Steve Sasson

Kulturgeschichte

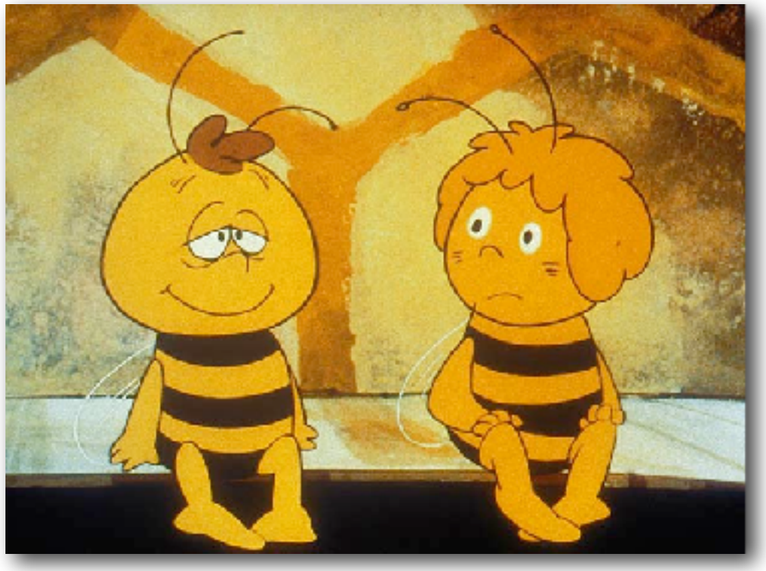
Kawaii

»niedlich, süß«

Sanrio: Hello Kitty (ハローキティ),
ab 1974

Deutsch-japanische Koproduktionen

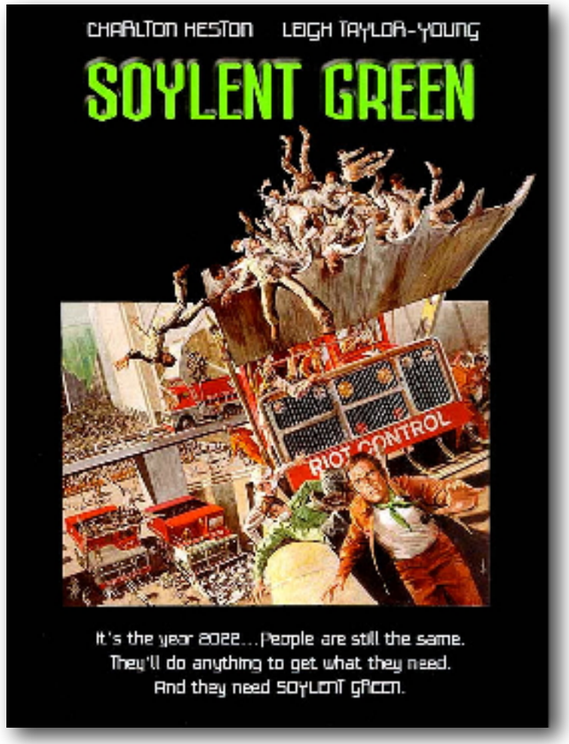
Heidi 1974



Biene Maja 1976

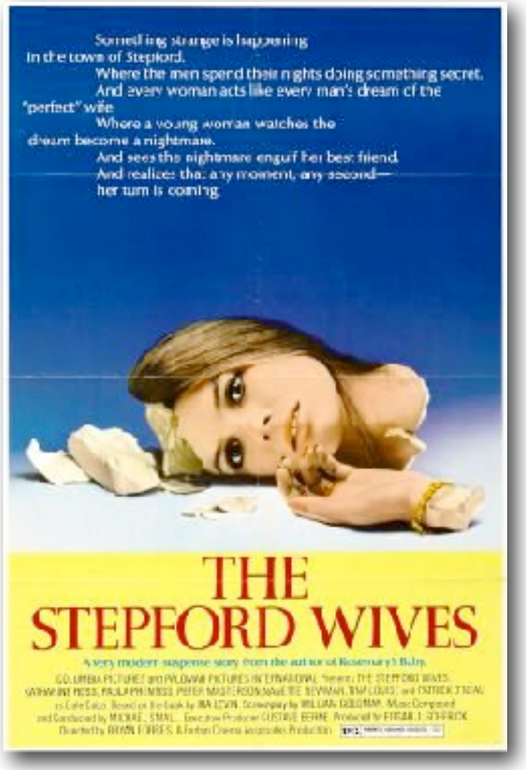
Pinocchio 1976

Science Fiction

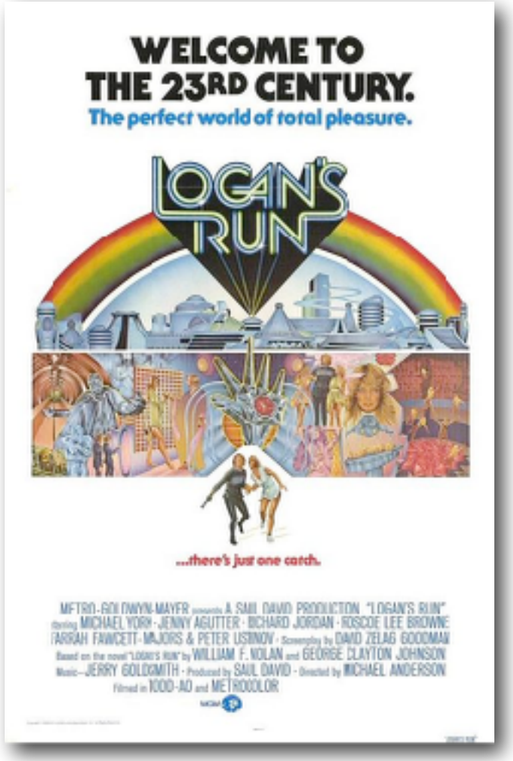


1973

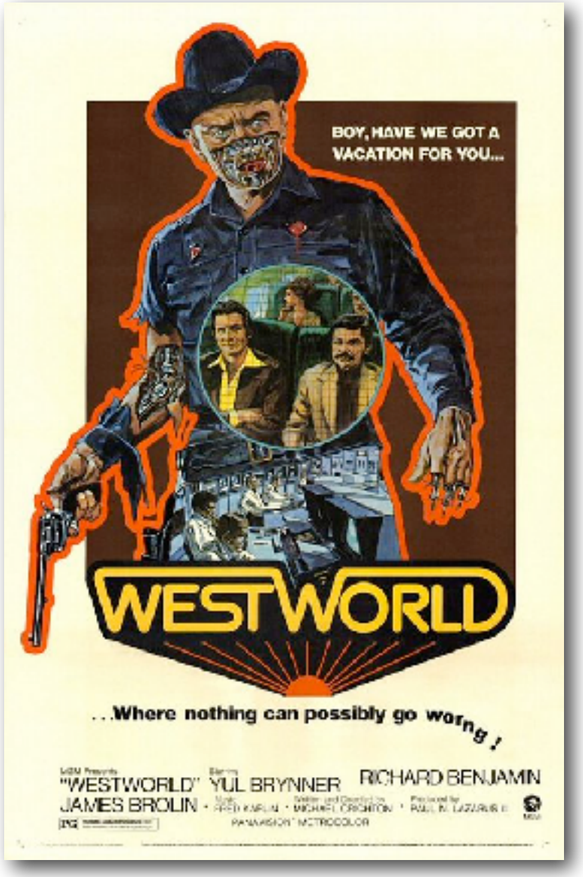
1975

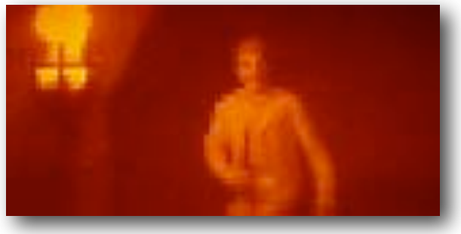


1975



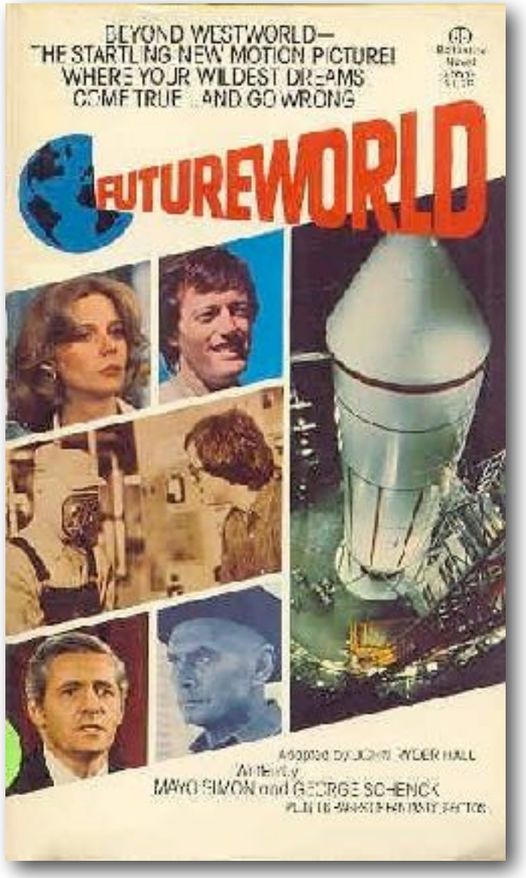
1976





Westworld (1973)

https://www.youtube.com/watch?v=3UPXqL_Vm5M

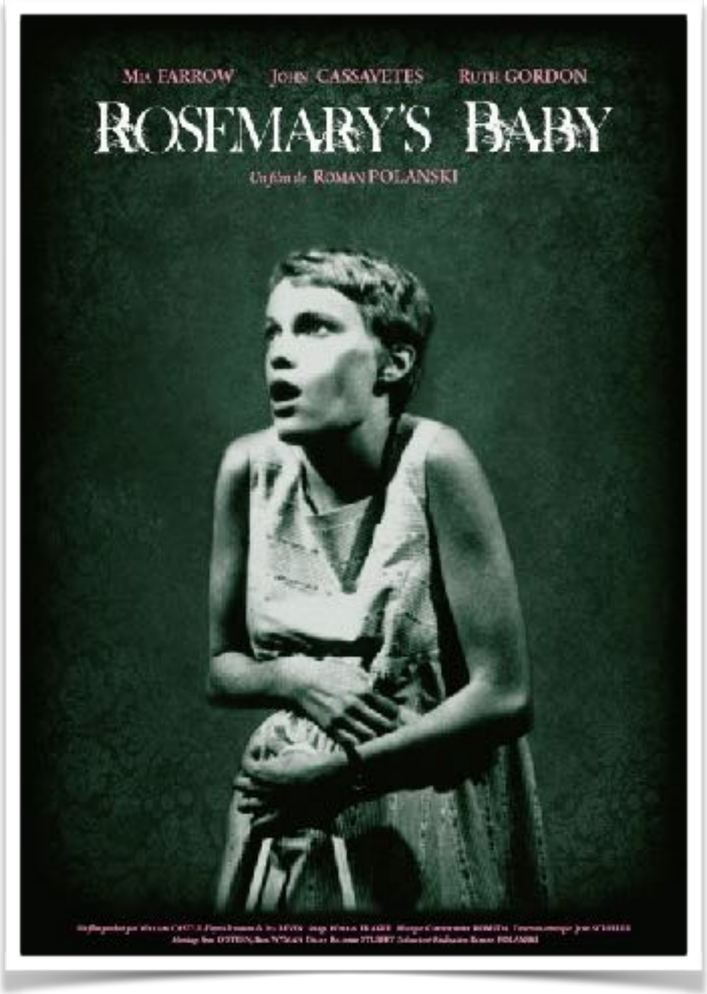


Futureworld (1976)

https://www.youtube.com/watch?v=T5seU-5U0ms

https://www.youtube.com/watch?v=QfRAfsK5cvU

Supernatural Horror

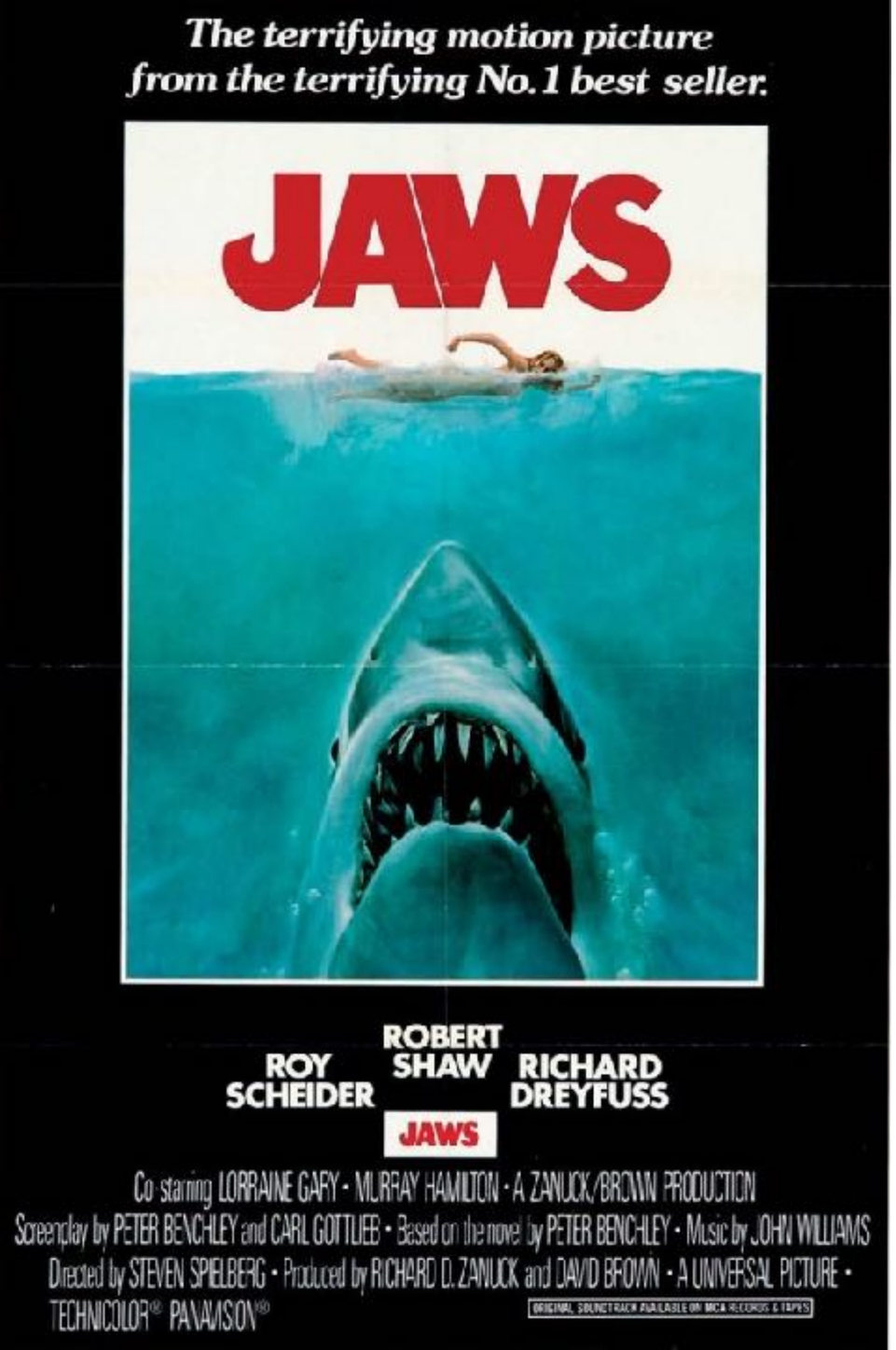


1968

1973

Slasher

The Texas Chain Saw Massacre, 1974



Internationaler Sommer Blockbuster

Der weiße Hai, 1975

Spielegeschichte

Odyssee bringt das vierte Programm auf den Bildschirm.

Sie können dabei aktiv mitmachen.

Durch diese neue Idee wird Ihr Fernsehgerät zum Fußballstadion, zum Tennisplatz, zum Schießstand oder gar zum Weltraum.
Auf Ihrem Bildschirm-Spielfeld agieren elektronische Spielfiguren. Sie schlagen – natürlich elektronisch – Bälle, schießen Torpedos ab, rasen eine Skiabfahrt hinab.

Jetzt durch Großserienfertigung anstatt DM 398.- **298.-**

Das Odyssee-Spielzentrum wird einfach an die Antennenbuchse Ihres Fernsehgerätes angeschlossen.

Und damit können Sie das elektronische Drum und Dran vergessen. Auf dem Bildschirm erscheinen zwei kleine leuchtende Quadrate. Sie stellen die Spielfiguren dar und werden von zwei Spielpulten aus bewegt. Nach allen Richtungen, schnell oder langsam – ganz nach Ihrer individuellen Spielanlage. Nach dem Druck auf die Start-Taste erscheint der Ball. Als leuchtender Punkt fliegt er von einer Spielhälfte zur anderen und kann natürlich auch in Flugrichtung und Geschwindigkeit verändert werden.
Mit den Knöpfen am Spielpult lenken Sie „Ihre" Spielfigur und versuchen, den heranfliegenden Ball zu erreichen.
Er wird dadurch wieder „zurückgeschlagen" und geht nicht ins „Aus".

Konzentration und Geschicklichkeit entscheiden das Spiel

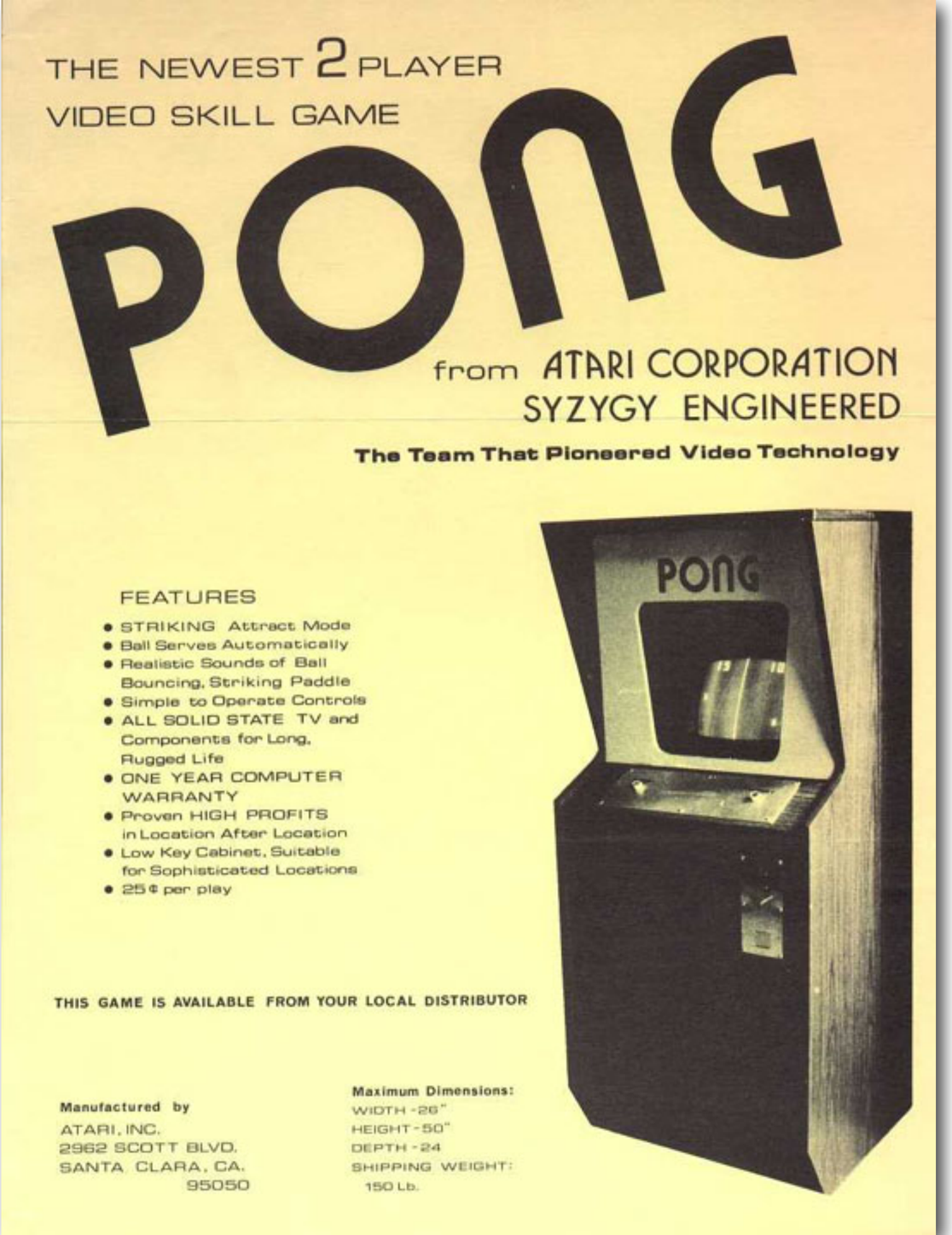
Abb. links: Das „Gehirn" des Odyssee-Spieles befindet sich im Spielzentrum (Mitte), an das die beiden Spielpulte angeschlossen werden.

Abb. rechts: Zum Odyssee-Spiel gehört alles, was für die einzelnen Spiele gebraucht wird: Farbige Bildschirm-Folien für verschiedene Bildröhrengrößen von 43 bis 63 cm (mit den jeweils erforderlichen Spielfeld-Markierungen), Spielkarten, Spielchips, ein 20seitiges Heft mit den genauen Spielregeln, Anschlußkabel und vieles mehr.

pong-picture-page.de

Ralph Baer, 1972 (Prototyp 1967)

https://www.youtube.com/watch?v=0MnRkPvIjKE



Nolan Bushnell, 1972

https://www.youtube.com/watch?v=YmzH4E3x1_g

SS Billiards, south of downtown Hopkins Minnesota, in 1973

Nutting Associates

1973

Pong-Klone

Konsolen-Crash 1977

Universum TV Multi-Spiel 2006, 1978

Telstar 1976

Telstar Arcade 1977

Nintendo Color TV Game 1977

Hunt the Wumpus

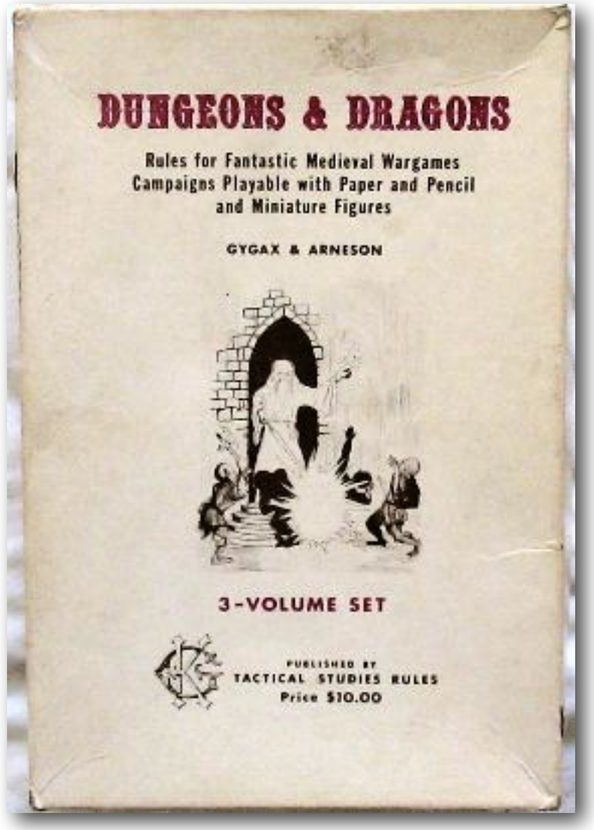
```
You are in room 13 of the cave, and have 5 arrows left.
There are tunnels to rooms 5, 11, and 13.
Move or shoot? (m-s) s14

*thunk* The arrow can't find a way from 13 to 14 and flys randomly
into room 13!

*Thwack!* A sudden piercing feeling informs you that the ricochet of
your wild arrow has resulted in it wedging in your side, causing
extreme agony. The evil Wumpus, with its psychic powers, realizes
this and immediately rushes to your side, not to help, alas, but to
EAT YOU!

(*CHOMP*)

Care to play another game? (y-n)
```

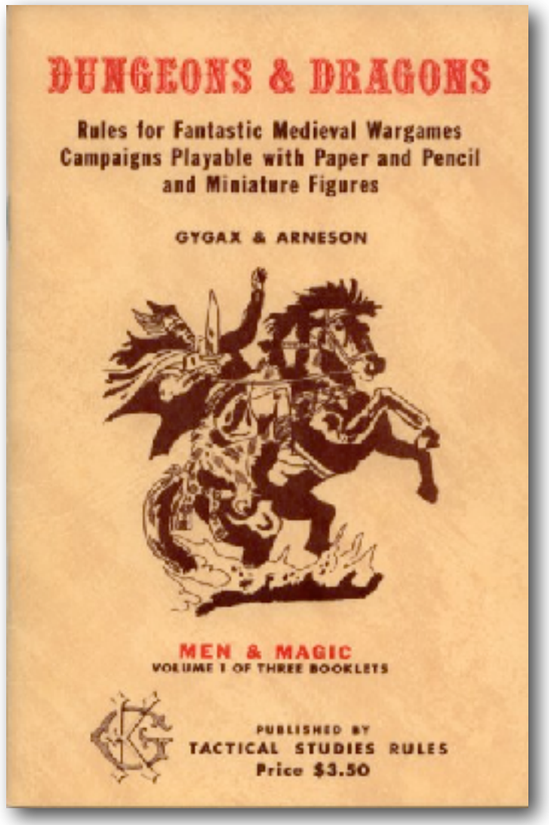
Gregory Yob, 1972

Mazewar, 1974

http://www.digibarn.com/collections/games/xerox-maze-war/movies/maze-on-alto-fastart.mov

Dungeons & Dragons

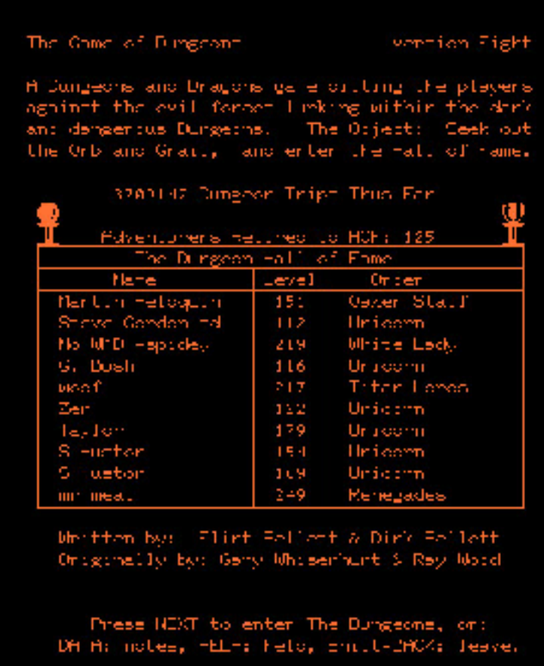




Gary Gygax; Dave Arneson
1974

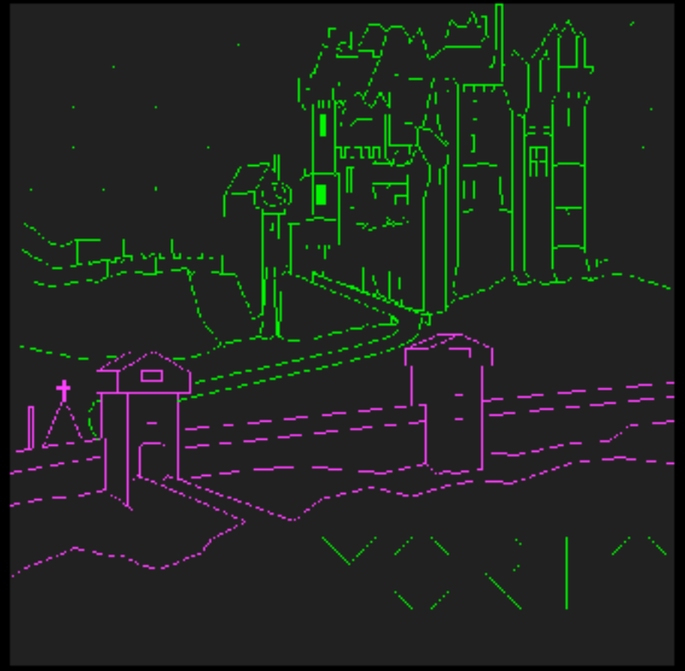
http://www.acaeum.com/ddindexes/setpages/original.html

PLATO

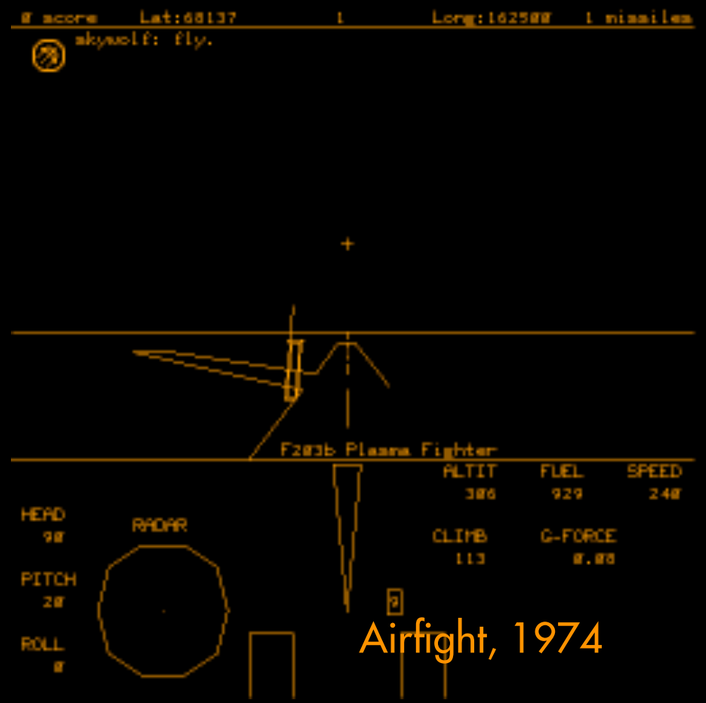


dnd, 1974

Spasim, 1974

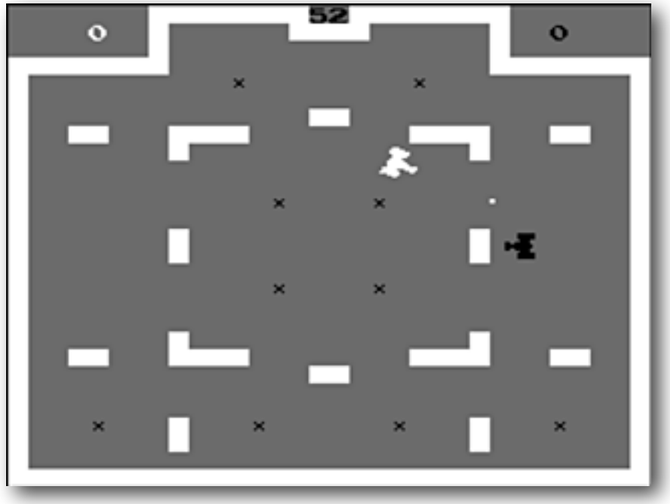


dnd, 1974



Airfight, 1974

Moria, 1975



KEE GAMES

http://www.youtube.com/watch?v=3OsBUzYBJgU

KEE GAMES
a wholly
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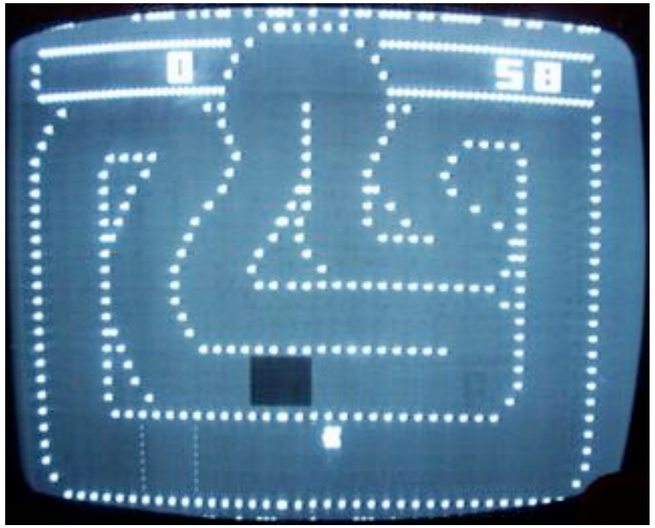
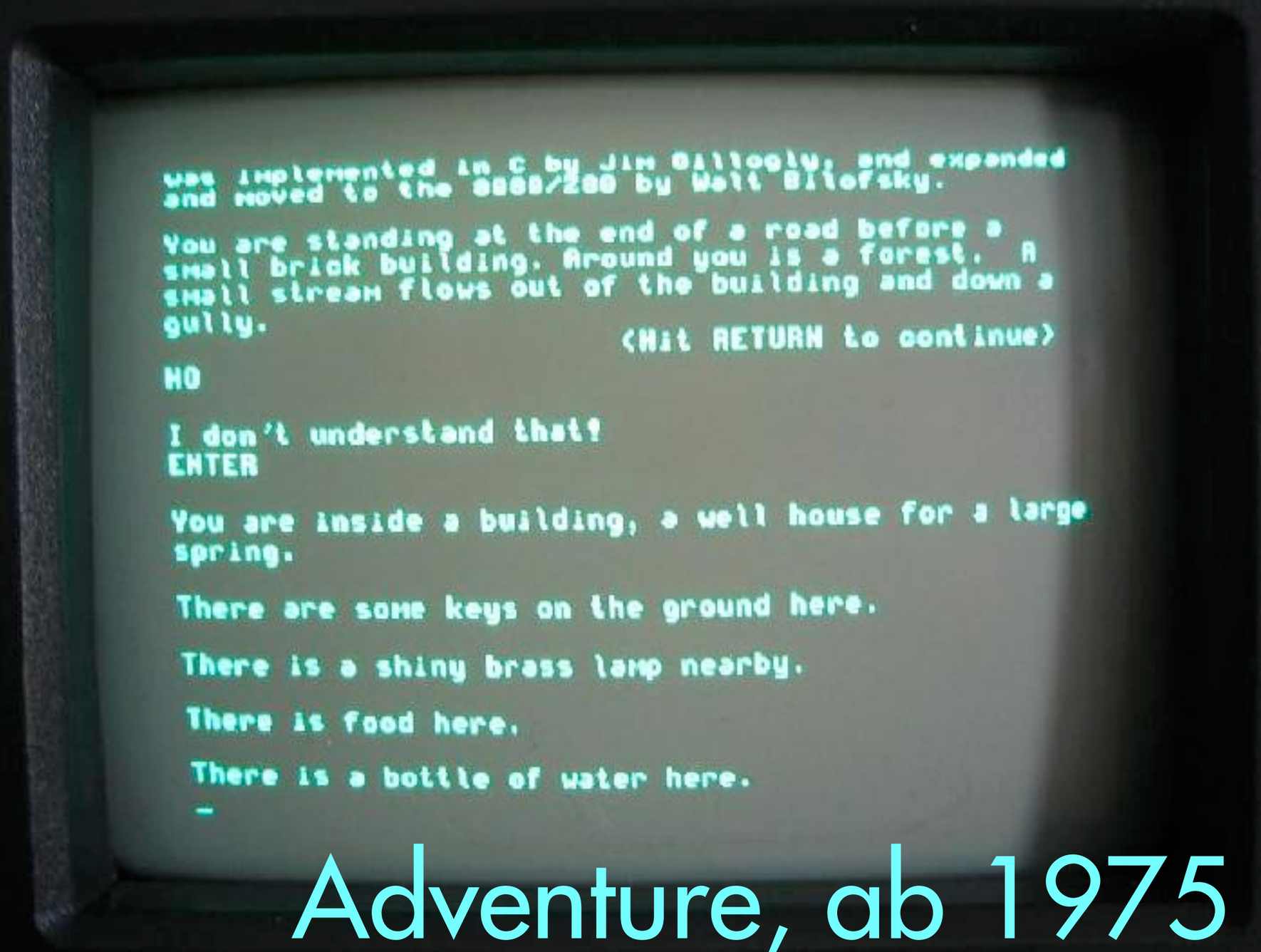
of Atari, Inc.

Kee Games

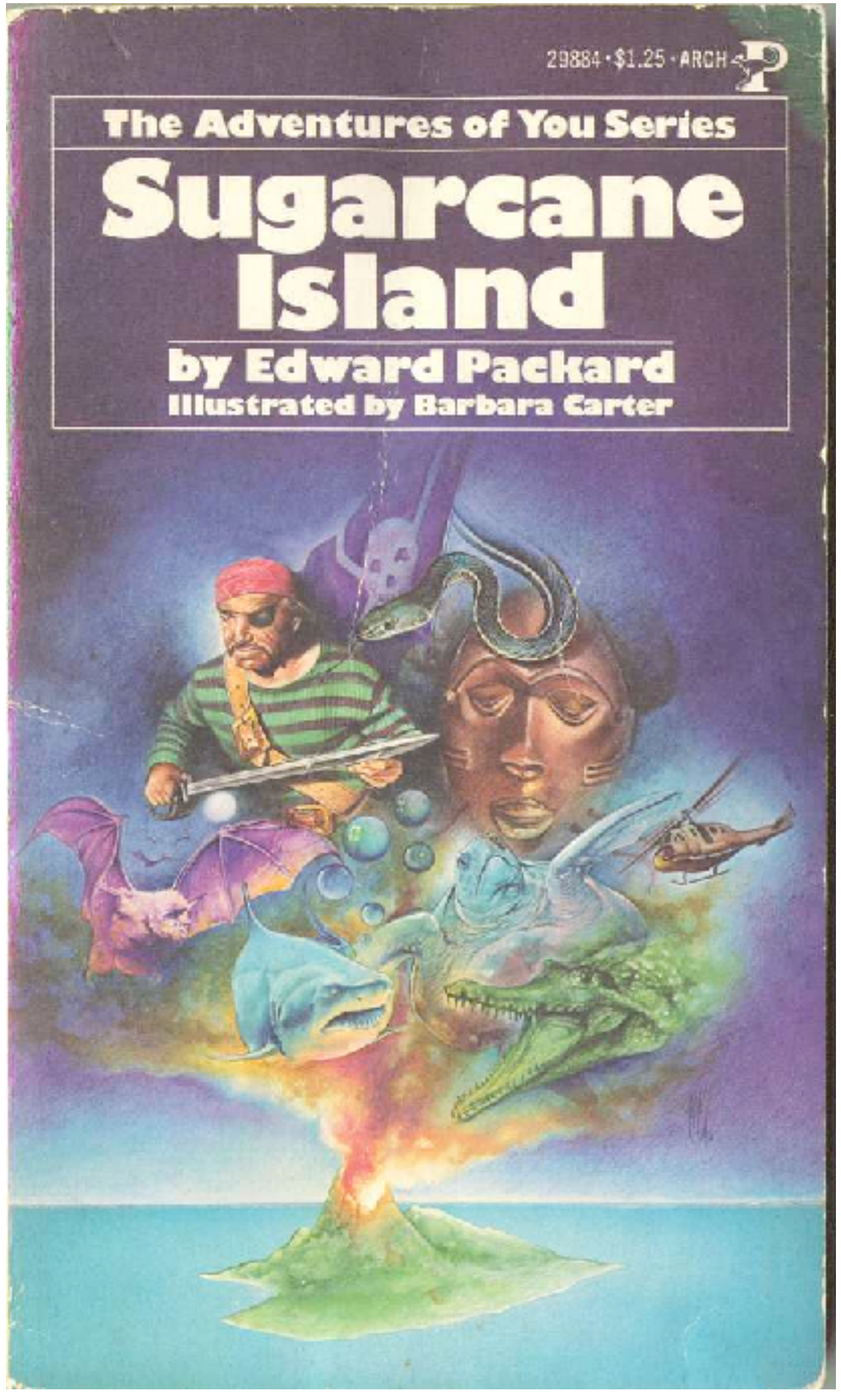
Tank, 1974



Atari: Gran Trak 10, 1974



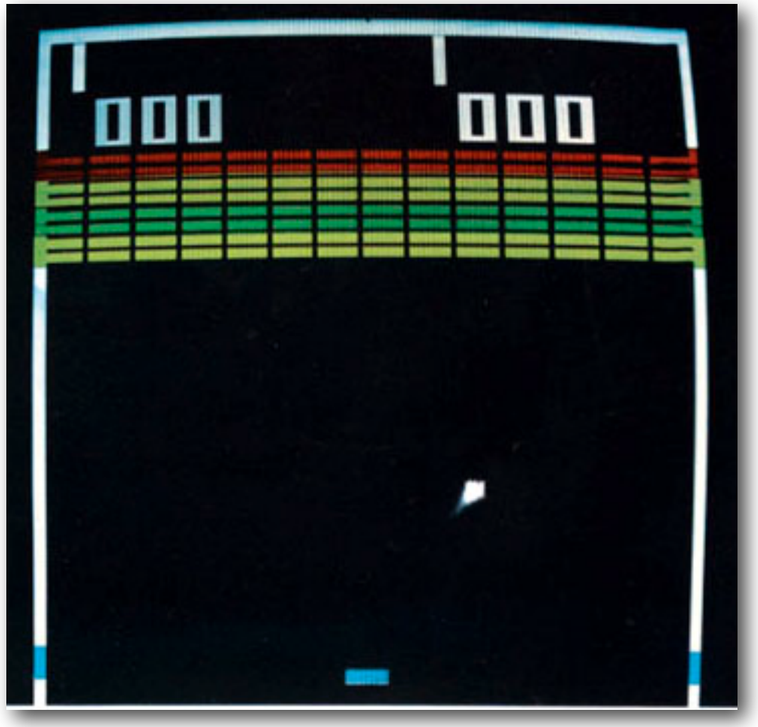
Adventure, ab 1975



Spielbücher

1976 *The Adventures of You*
ab 1978 *Choose Your Own Adventure*

Breakout

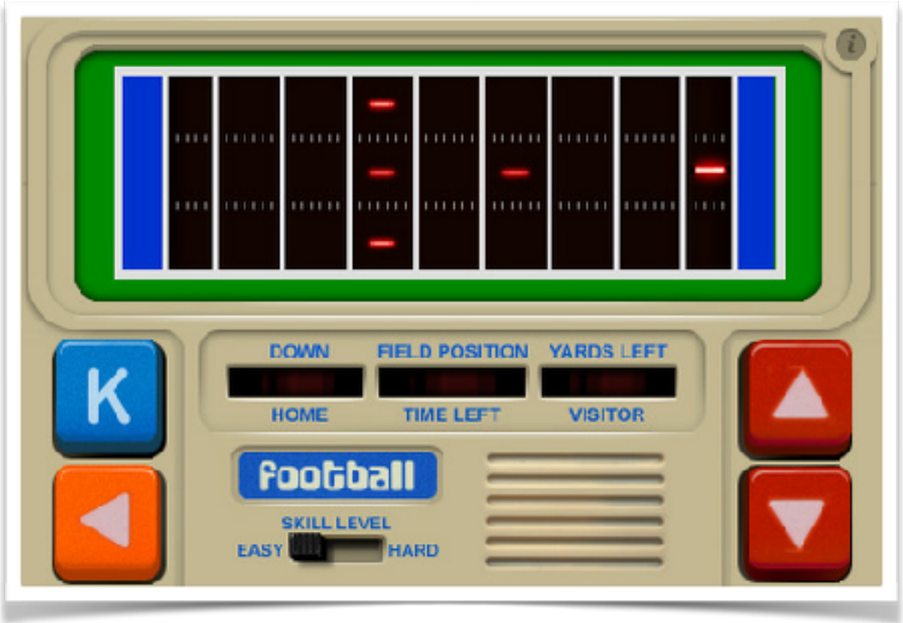


Steve Wozniak, 1976

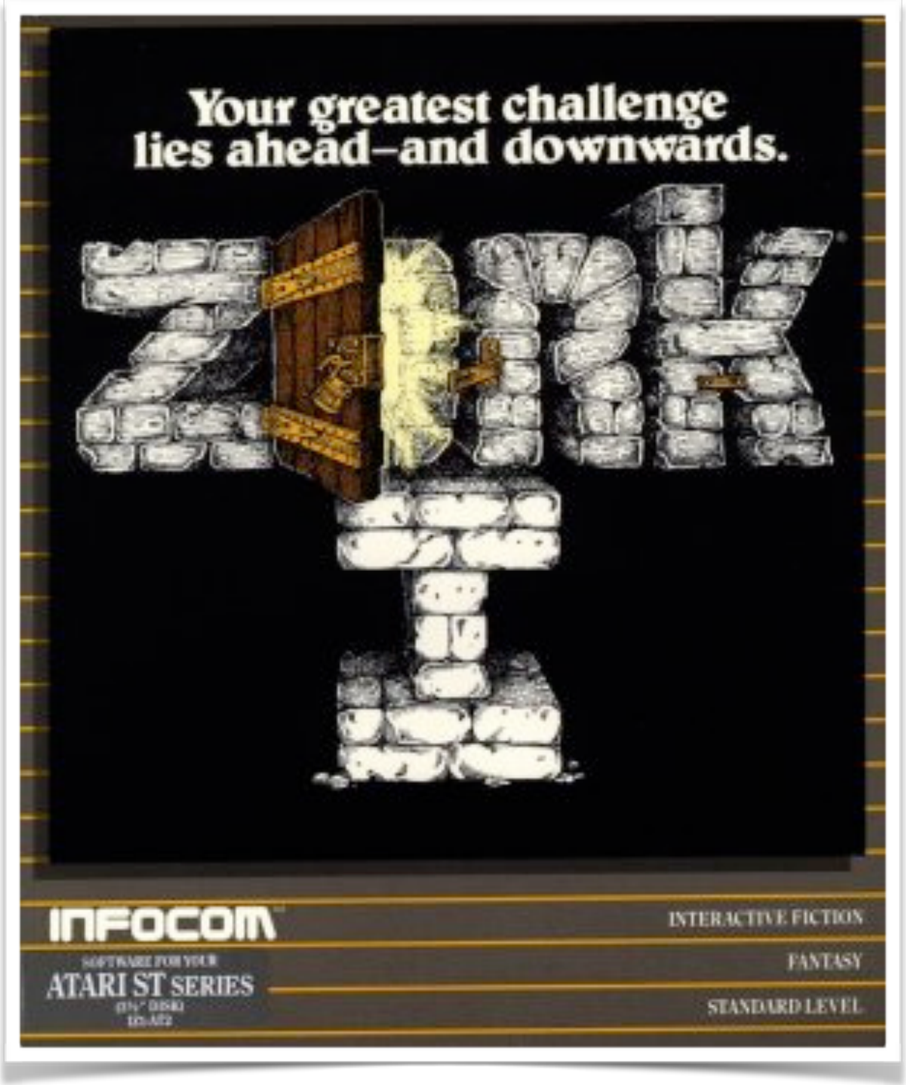
Portable: Mattel Electronics

1976

http://www.youtube.com/watch?v=isejBX1Tyjk



http://www.youtube.com/watch?v=jNKgpAFOsa0



Zork I

Infocom: Tim Anderson, Marc Blank, Bruce Daniels, Dave Lebling, 1977