do calculating machines like drawing?
and if so, why?

considerations from some past

frieder nake
university & university of the arts
bremen, germany


exploring
alternative tech (!?)

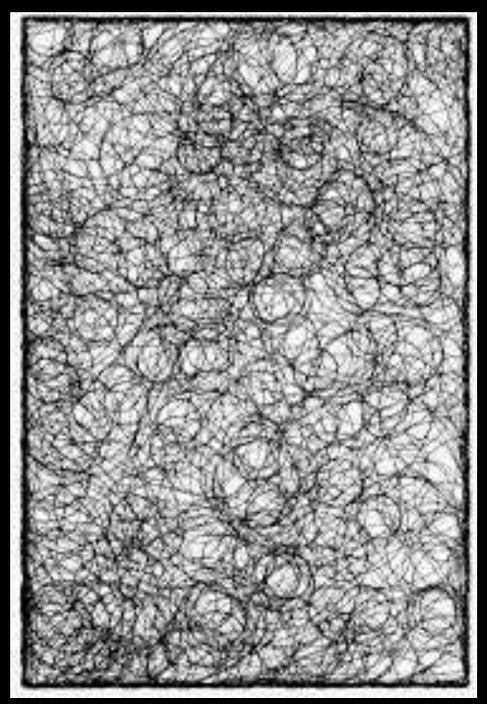
goto

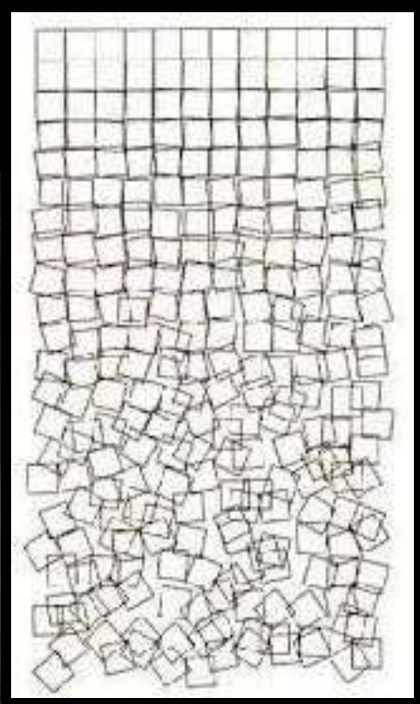
statement considered harmful

Edsger Dijkstra, CACM March 1968

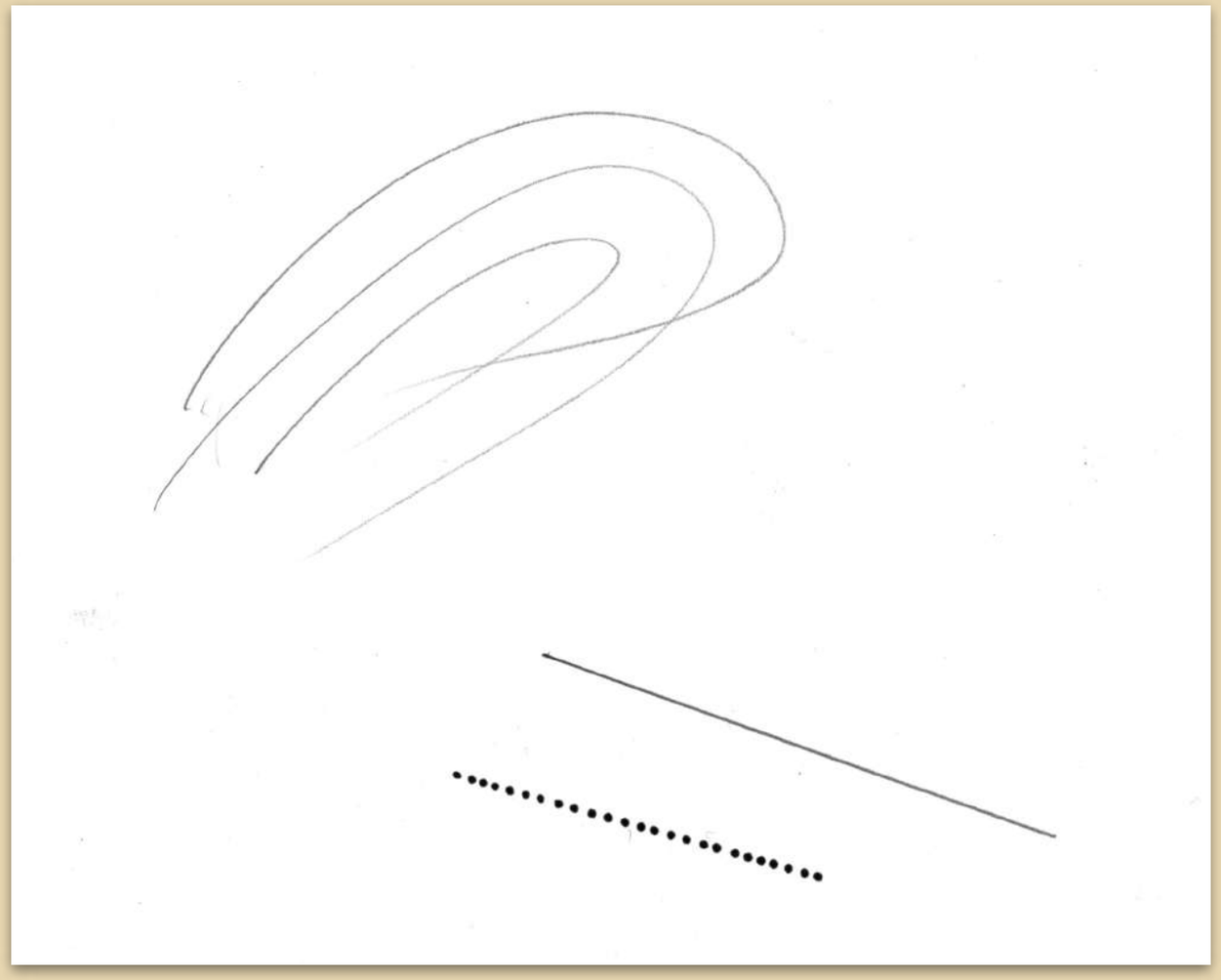
georg nees

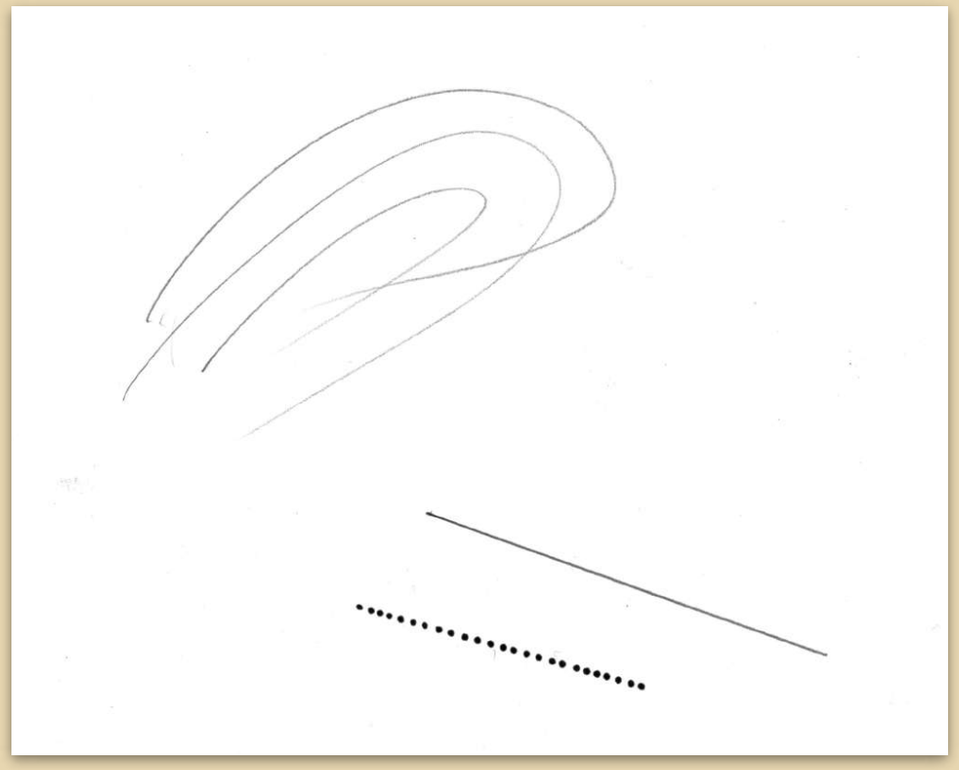
5 feb 1965 exhibition »computergrafik«
georg nees l studiengalerie university of stuttgart



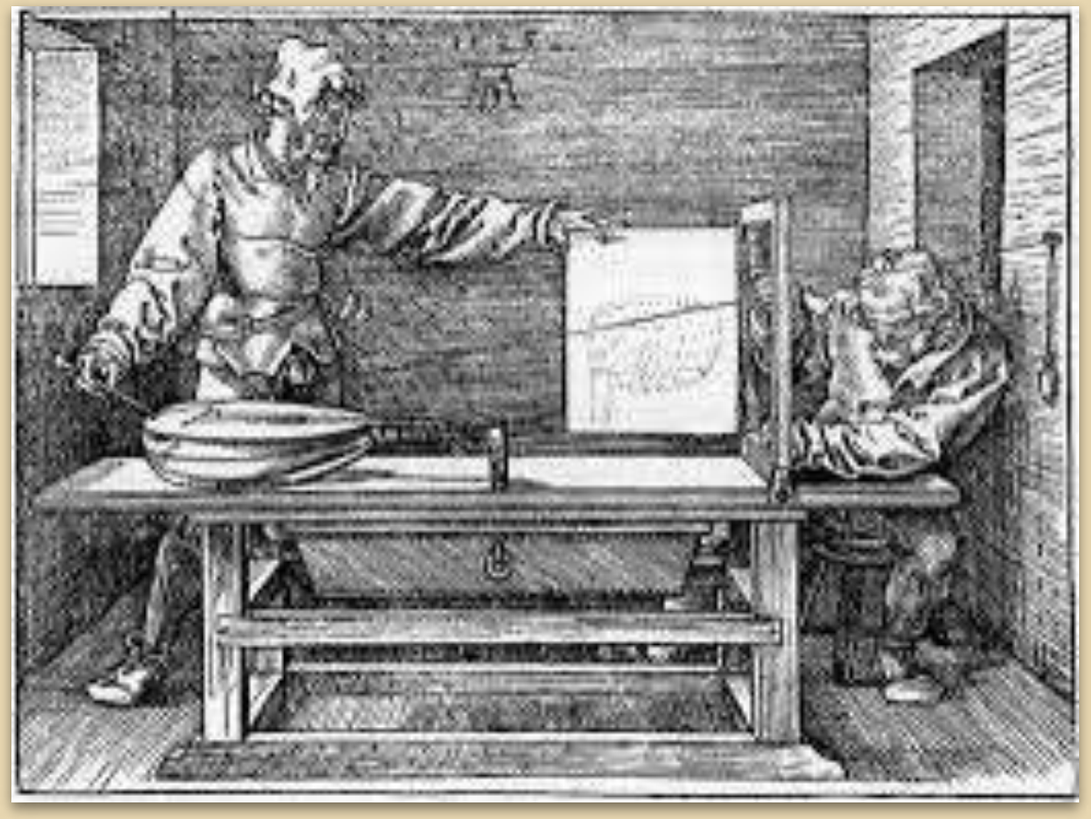


DIGITAL | ANALOGUE
DISCRETE | CONTINUOUS
COUNTING | DRAWING



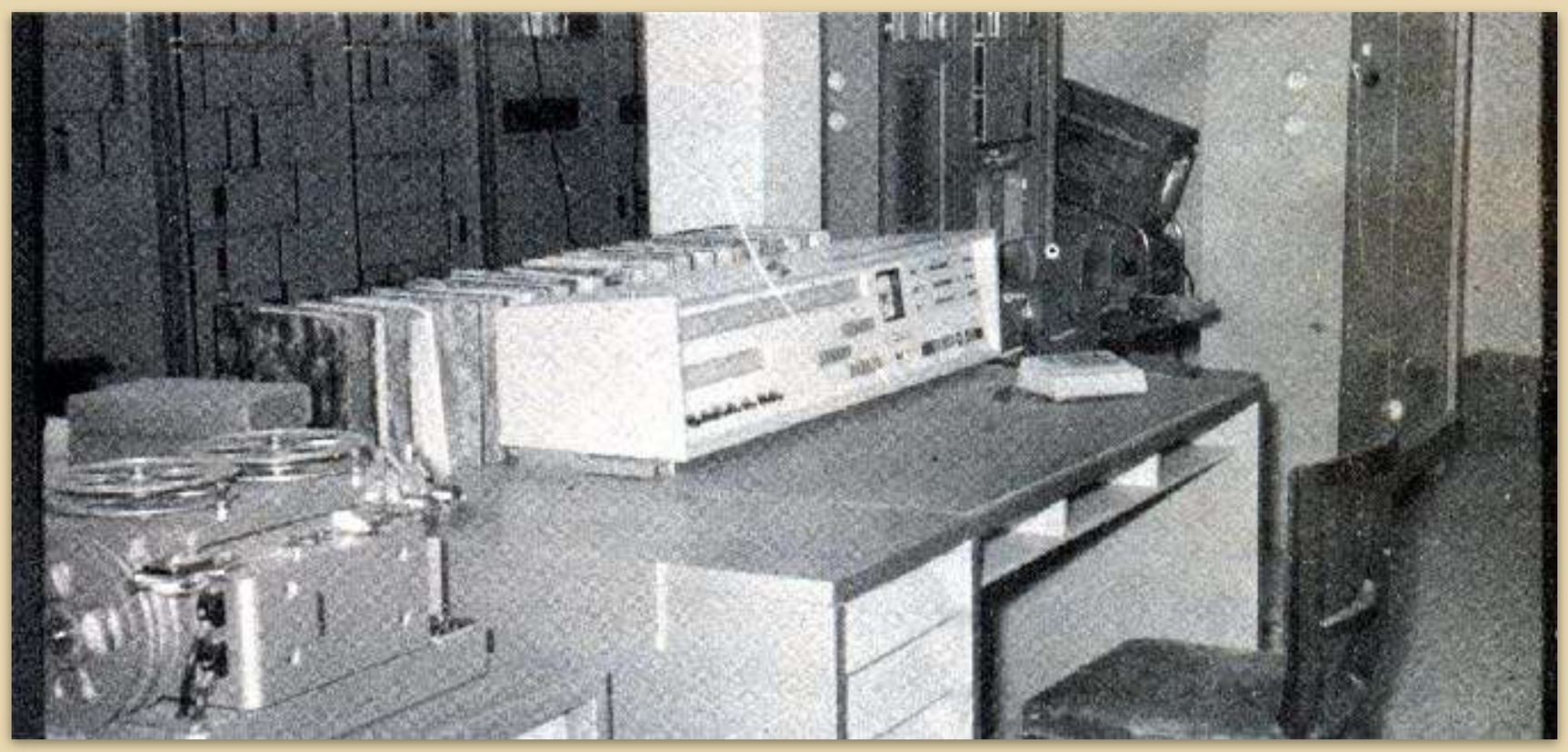


if the computer *could* draw,
it would do it with *utmost* precision



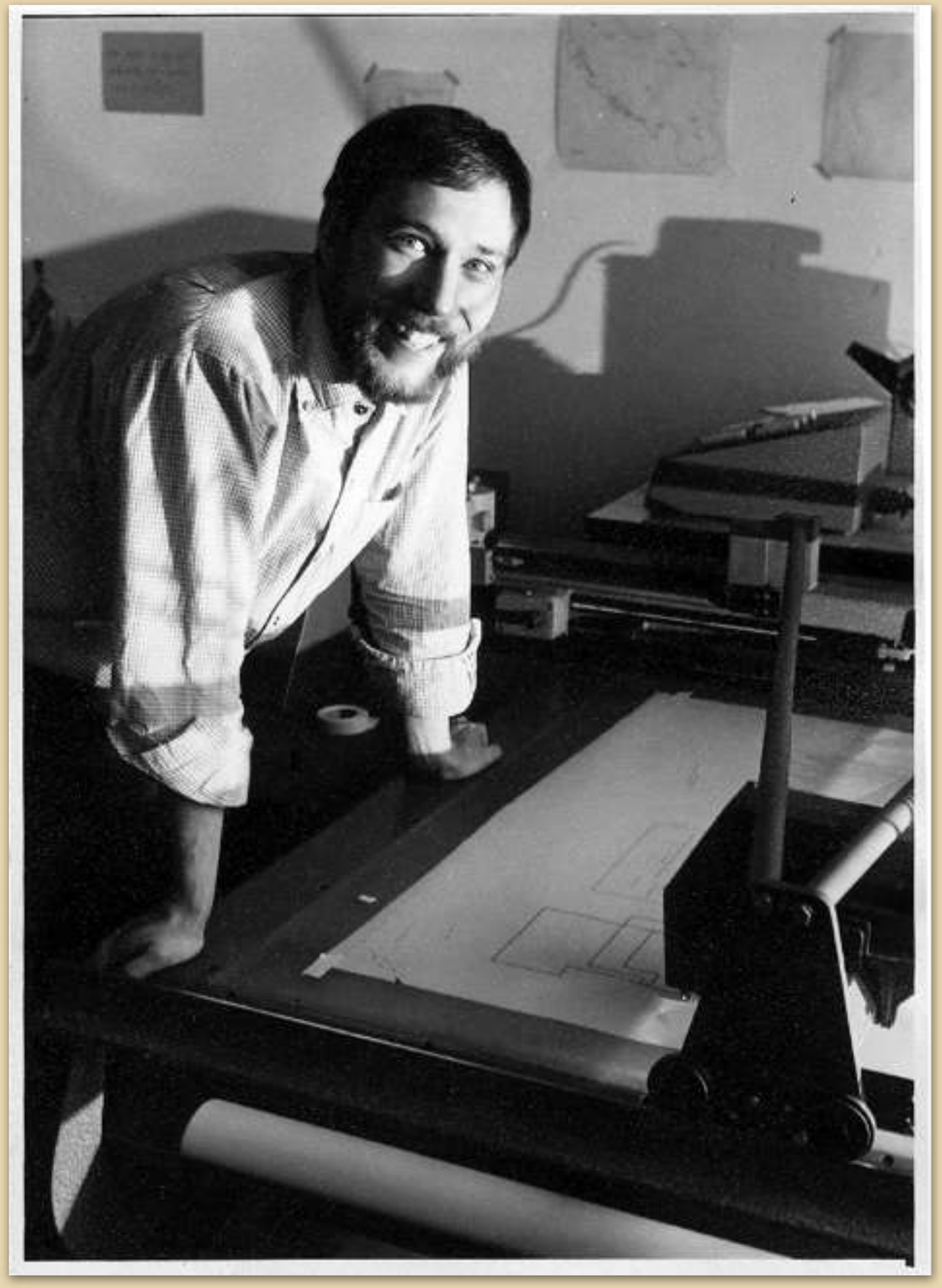
Dürer's
mechanization of perspective

computer SEL ER 56

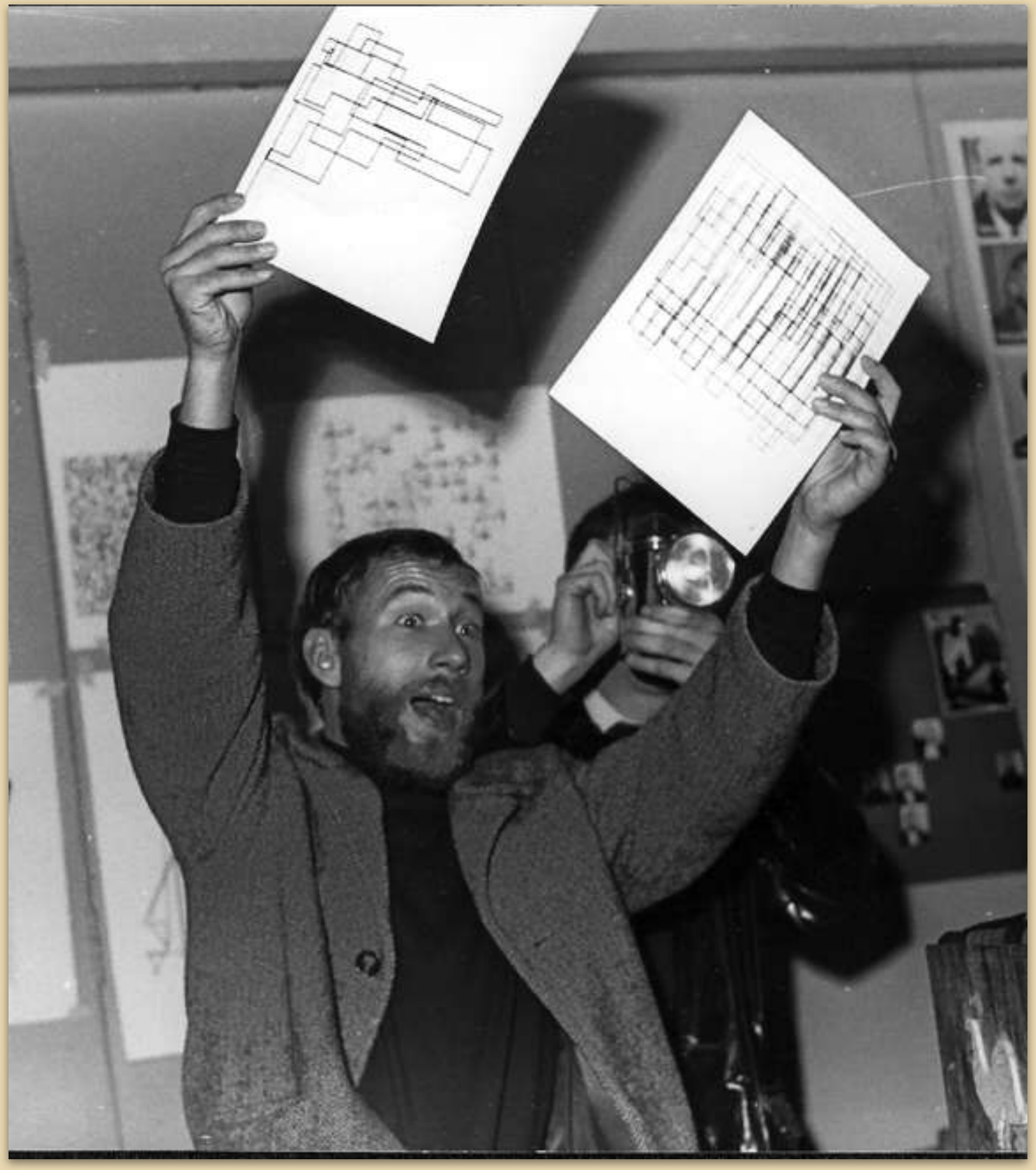


drawing machine
ZUSE GRAPHOMAT Z64
1964 | 0.06 mm

plotting machine
Calcomp 565
1959 | 0.25 mm



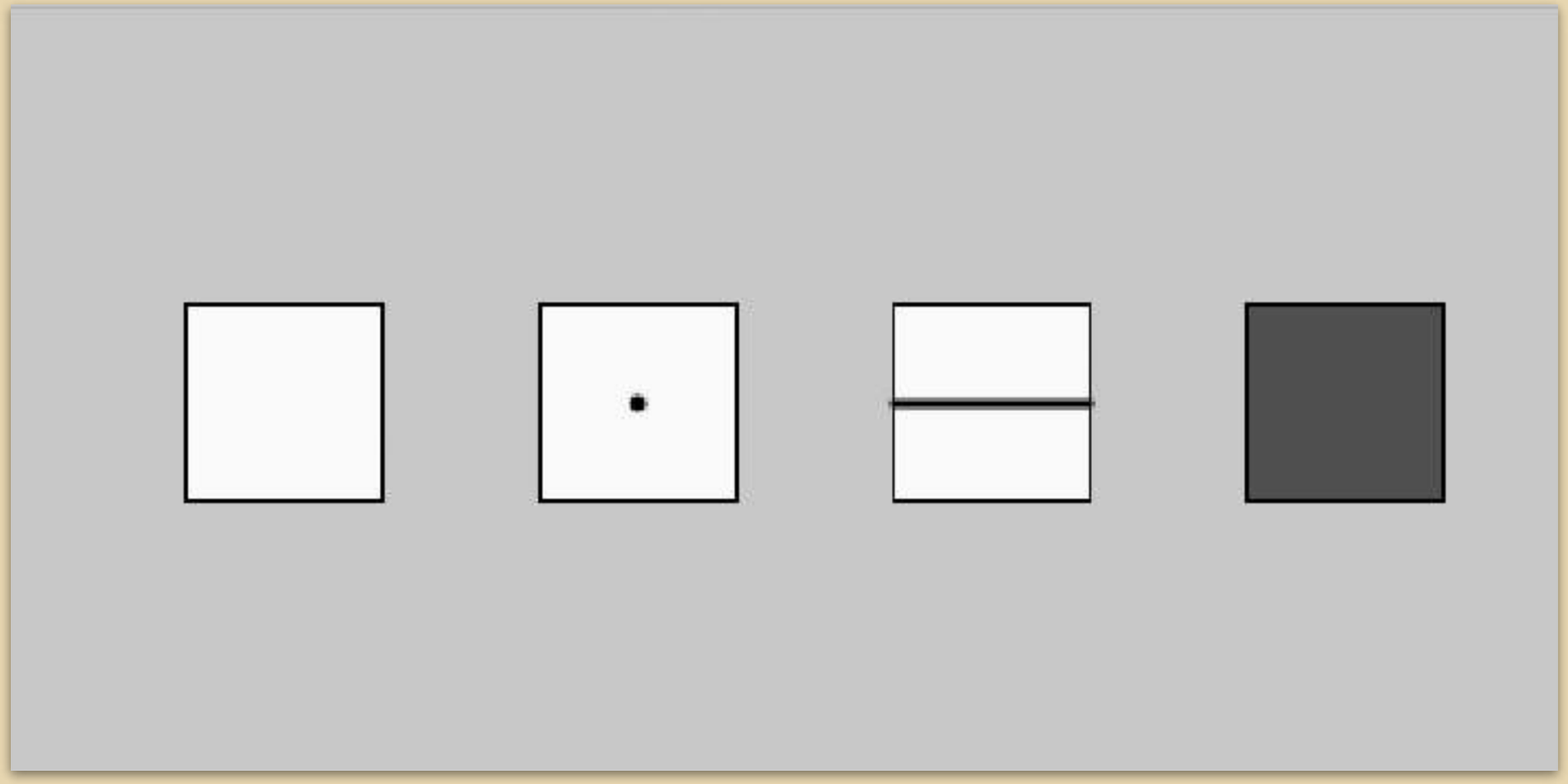
1965



1967

“A Proposed Language for the Definition of Arbitrary Two-dimensional Signs”

Frieder Nake 1968-1971



the primitive elements:
blank, dot, stroke, field (valuated semantics)
empty, point, line, area (abstract syntactics)

TX2 computer
hardware interface

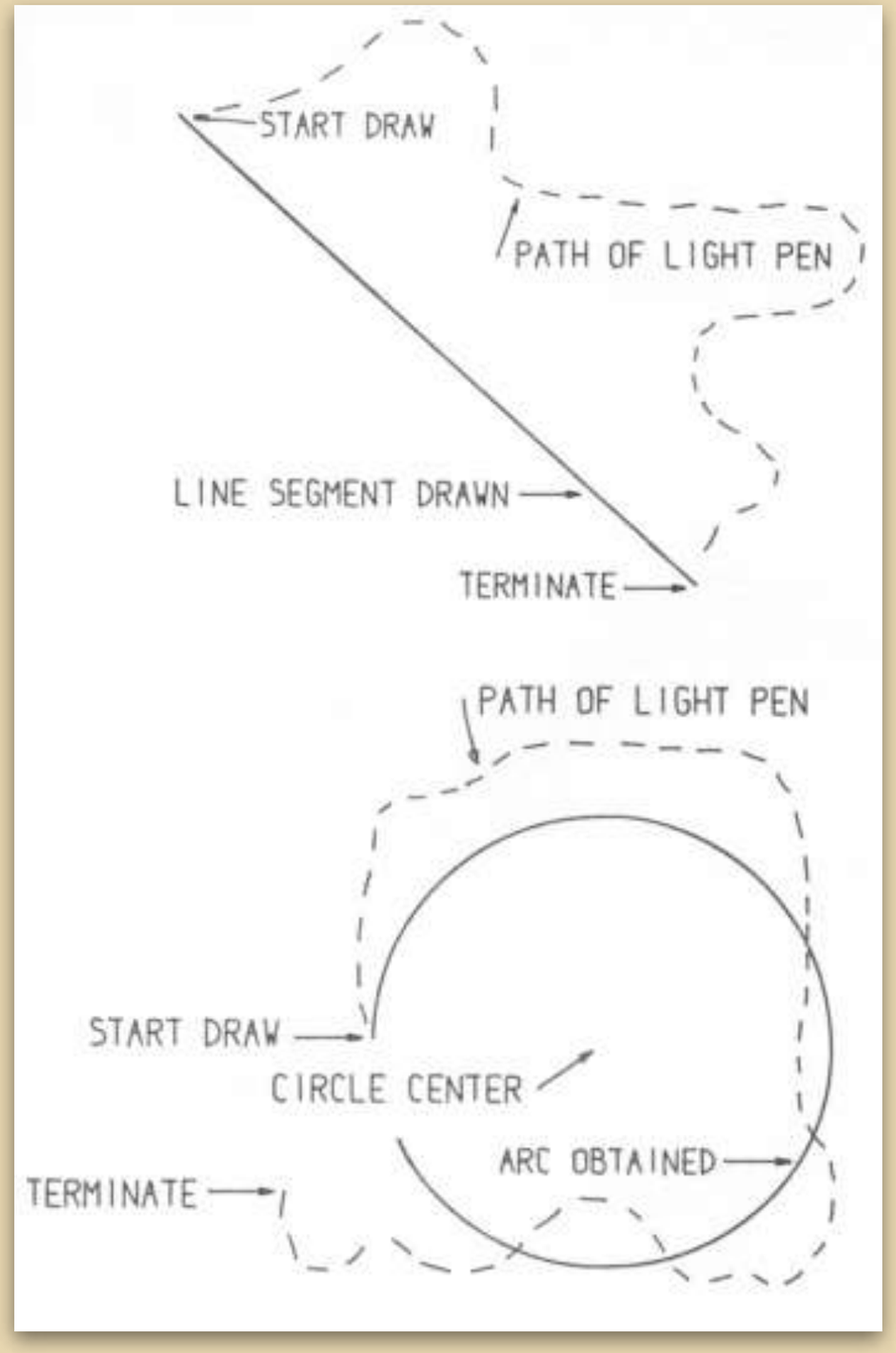
Ivan E. Sutherland: *Sketchpad. A man-machine graphical communication system*. 1963

“inking up” – isn’t it nice?

Heretofore
most interaction between men and computers
has been slowed down
by the need to reduce all communication to
written statements
that can be typed;

in the past,
we have been *writing letters to*
rather than *conferring with* our computers.

Ivan E. Sutherland, *Sketchpad* 1963



Sutherland's way of
drawing a straight line or a circle:

don't even ***try*** to draw straight (or circular),
let the machine do it.

surface & subface

»if the computer could draw,
it would do it with utmost precision.«

what does this mean?

»if the computer could draw,
it would do it with utmost precision.«

what does this mean?

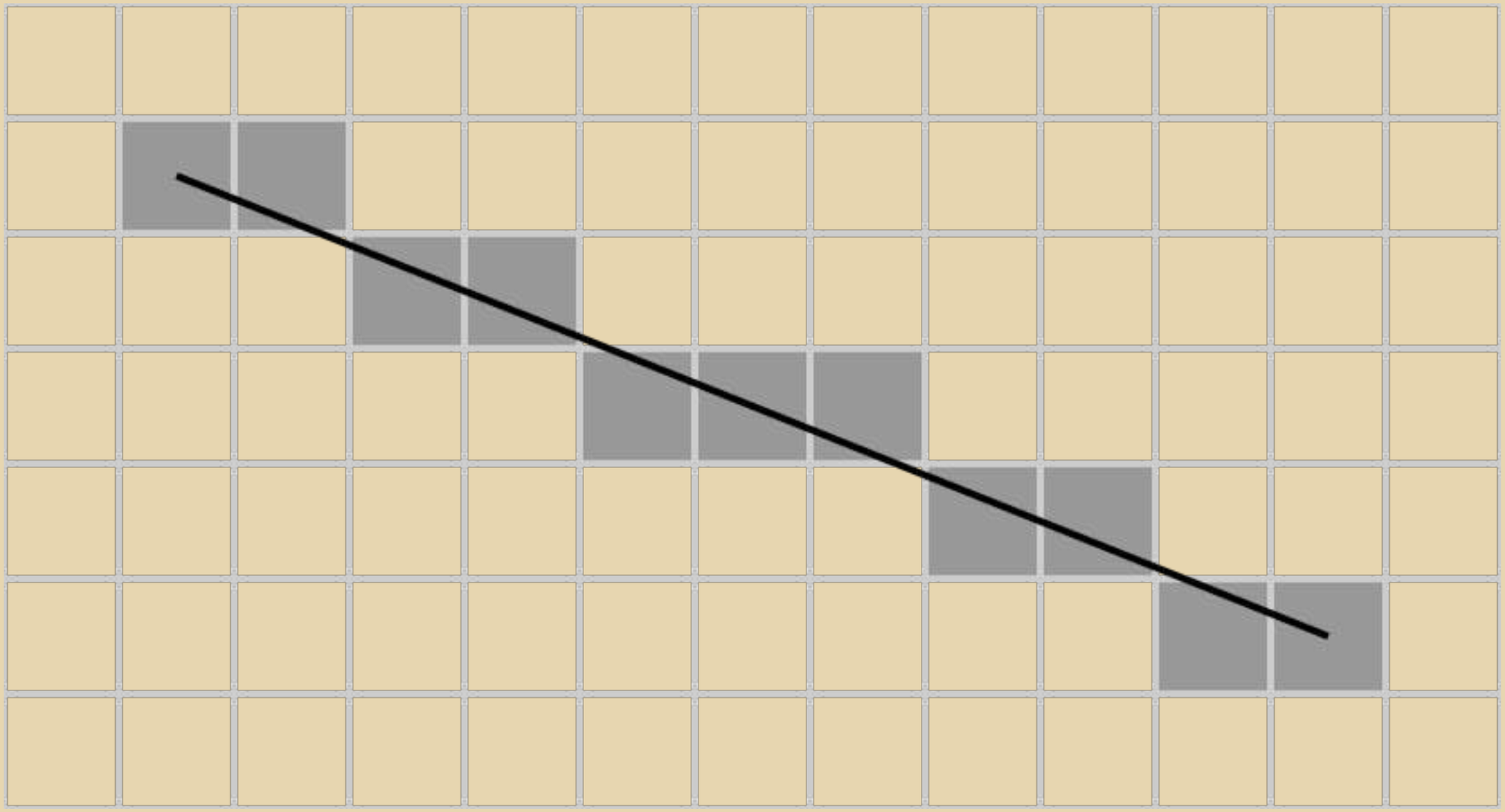
as always in the world of computing:

QUANTITY REPLACES QUALITY!

COMPUTABILITY REPLACES INTUITION.

top performance is replaced by good standard.

a large number of us gain something
they did not know of
top performers move on to new horizons

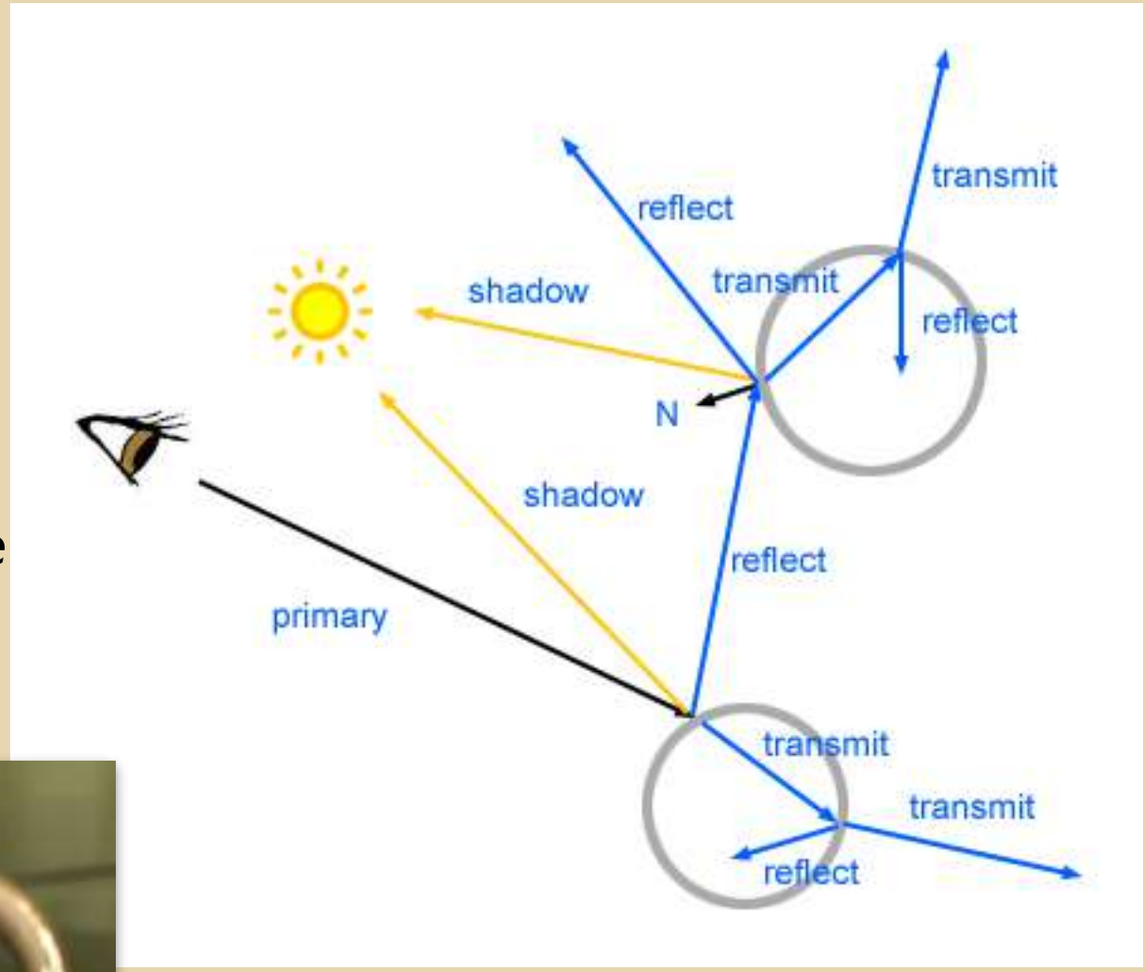


JACK BRESENHAM's
algorithm to draw a straight line segment on a grid
(schema)

recursive – *subface*

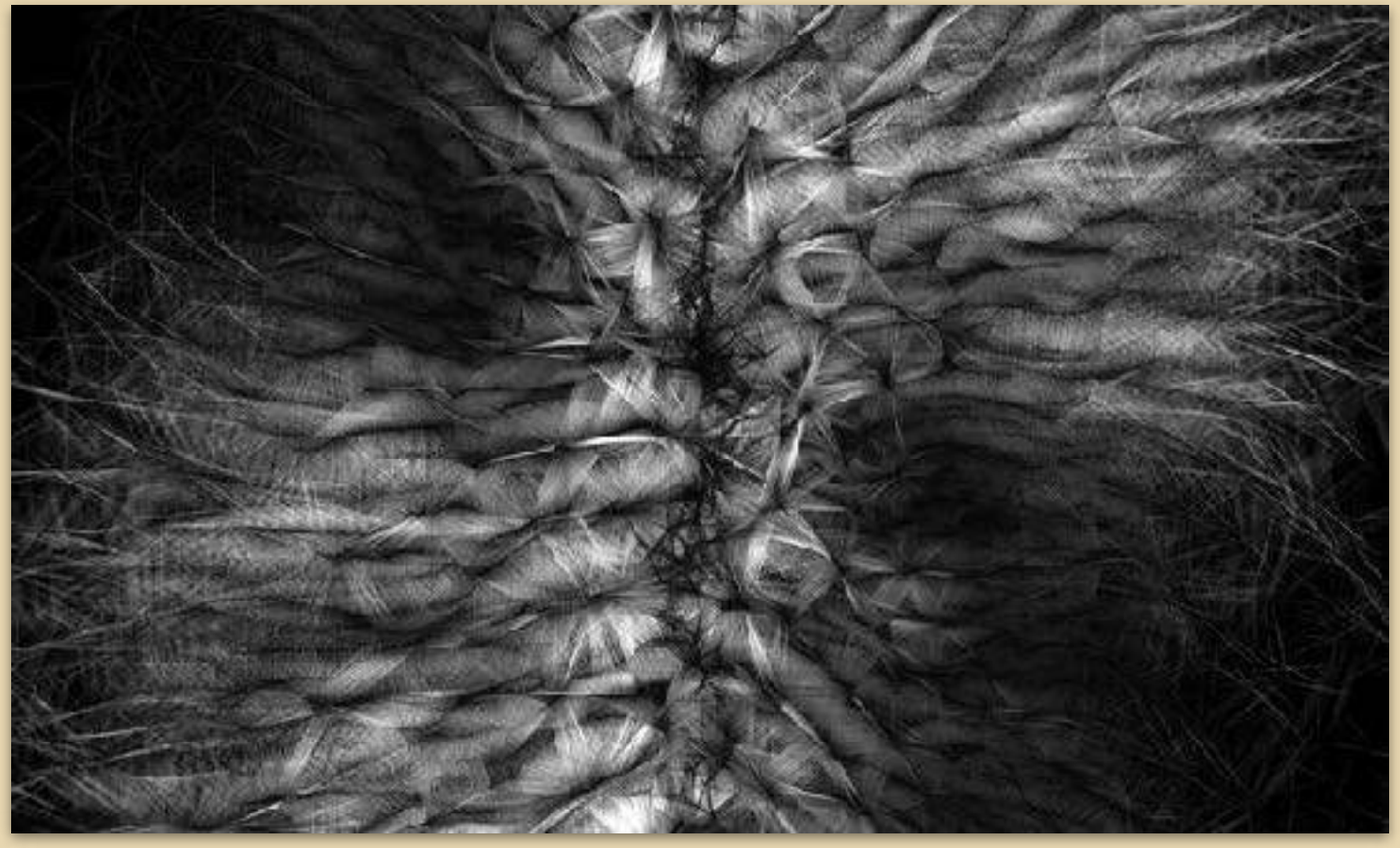
RAYTRACING

fantastic – *surface*



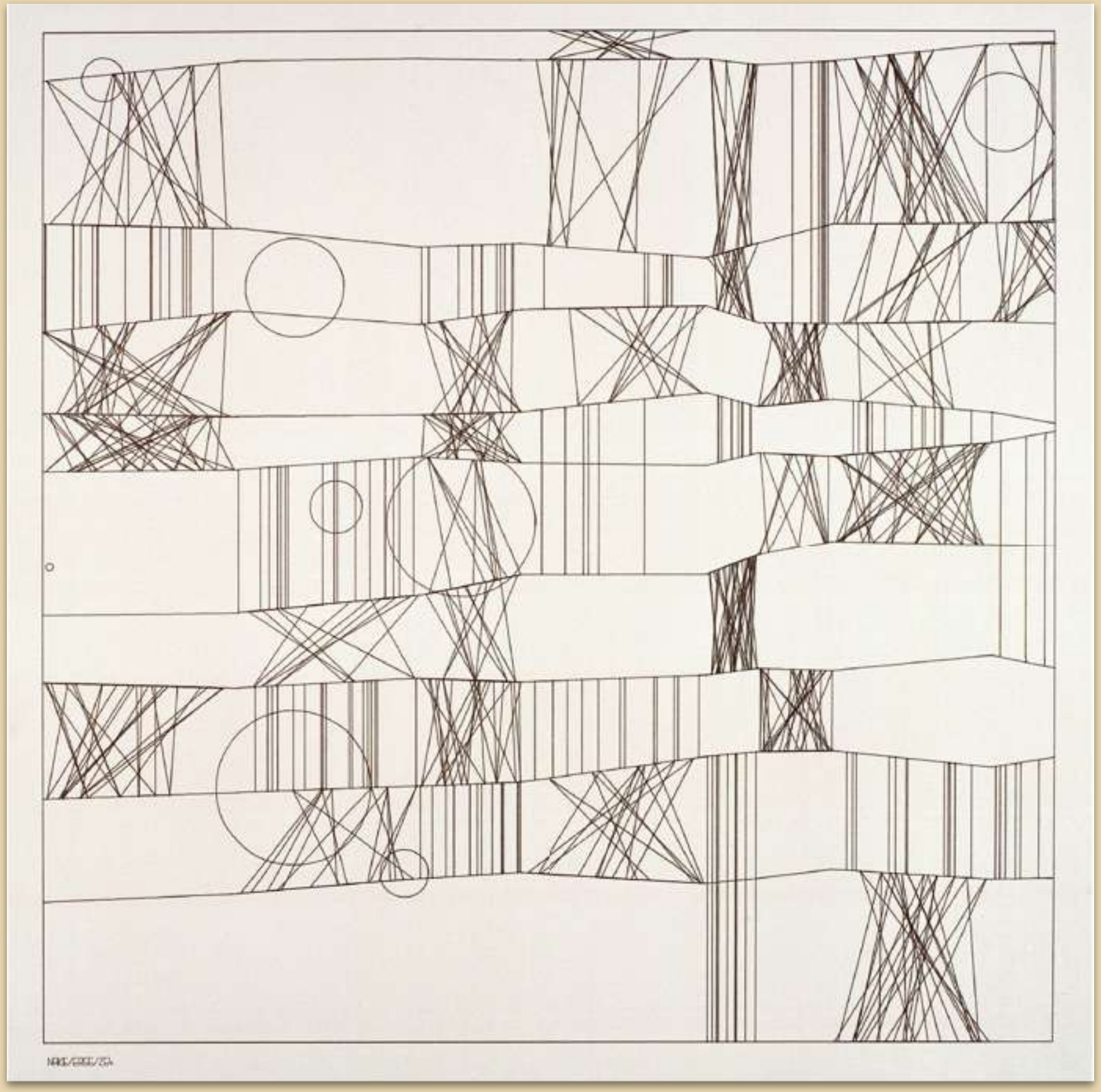
CASEY REAS

2012



2013?

2012



13/9/65 Nr. 2

now, once more: do computers want to draw?

when calculating:	when drawing:
symbols	points
numbers	lines

NO, THEY DON'T REALLY WANT TO DRAW.
THEY'D RATHER STICK TO CALCULATING.

THEREFORE, THEY DO IT LIKE US –
DRAWING WITH EYES WIDE SHUT!

»COMPUTER«

is

AUTOMATON

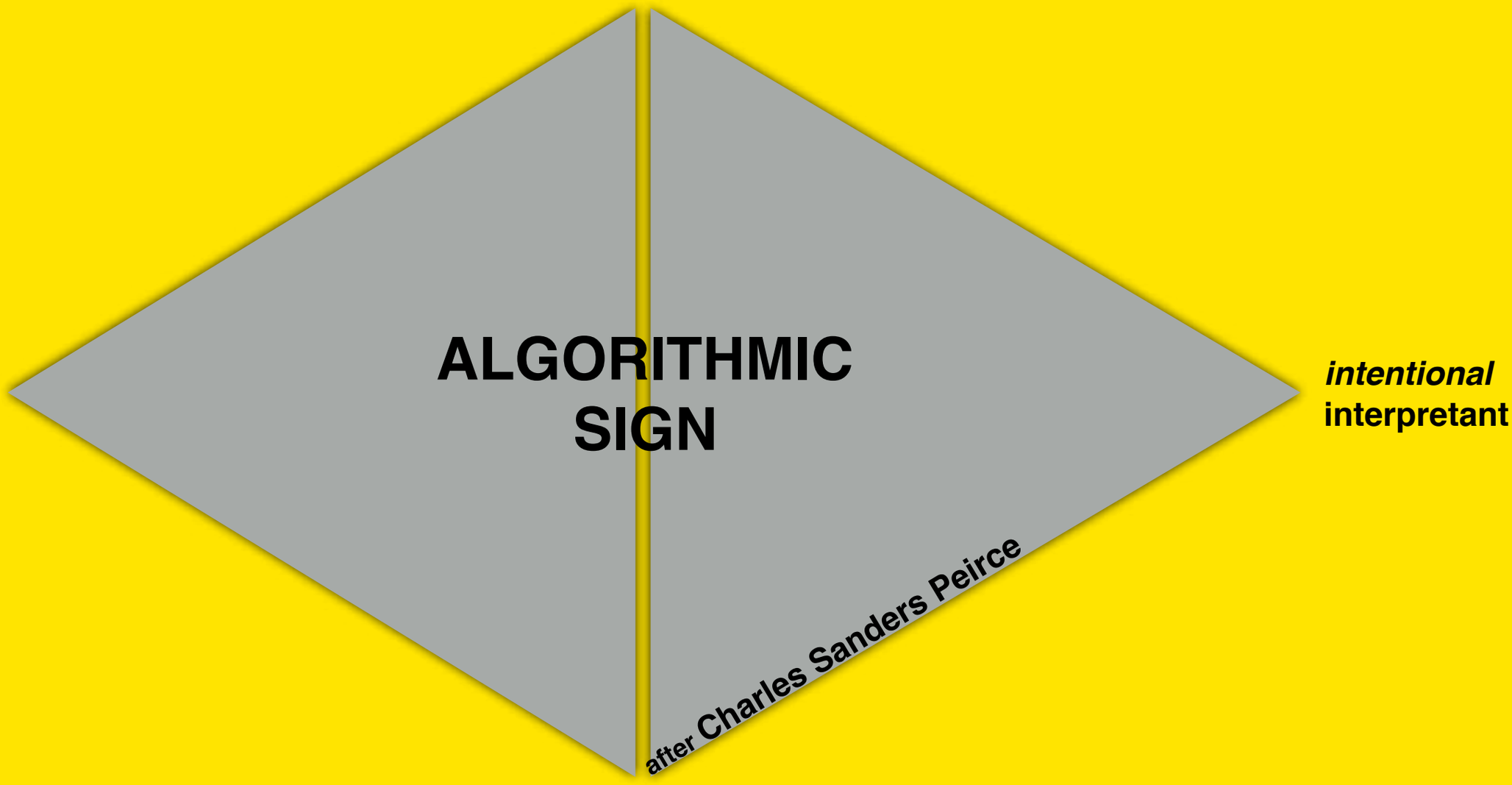
TOOL

MEDIUM

semiotic animal | semiotic engine

us & them meet in the

»ALGORITHMIC SIGN«



– TWOFOLD CHARACTER OF ALL COMPUTER-THINGS –
EVERY THING IS DOUBLE: AESTHETICS & ALGORITHMICS

SURFACE

S U B F A C E