The Great Ideas Of Biology

1. The Cell
2. The Gene
3. Evolution by Natural Selection
4. Life as Chemistry

And an Emerging Idea……

5. Biological Organisation

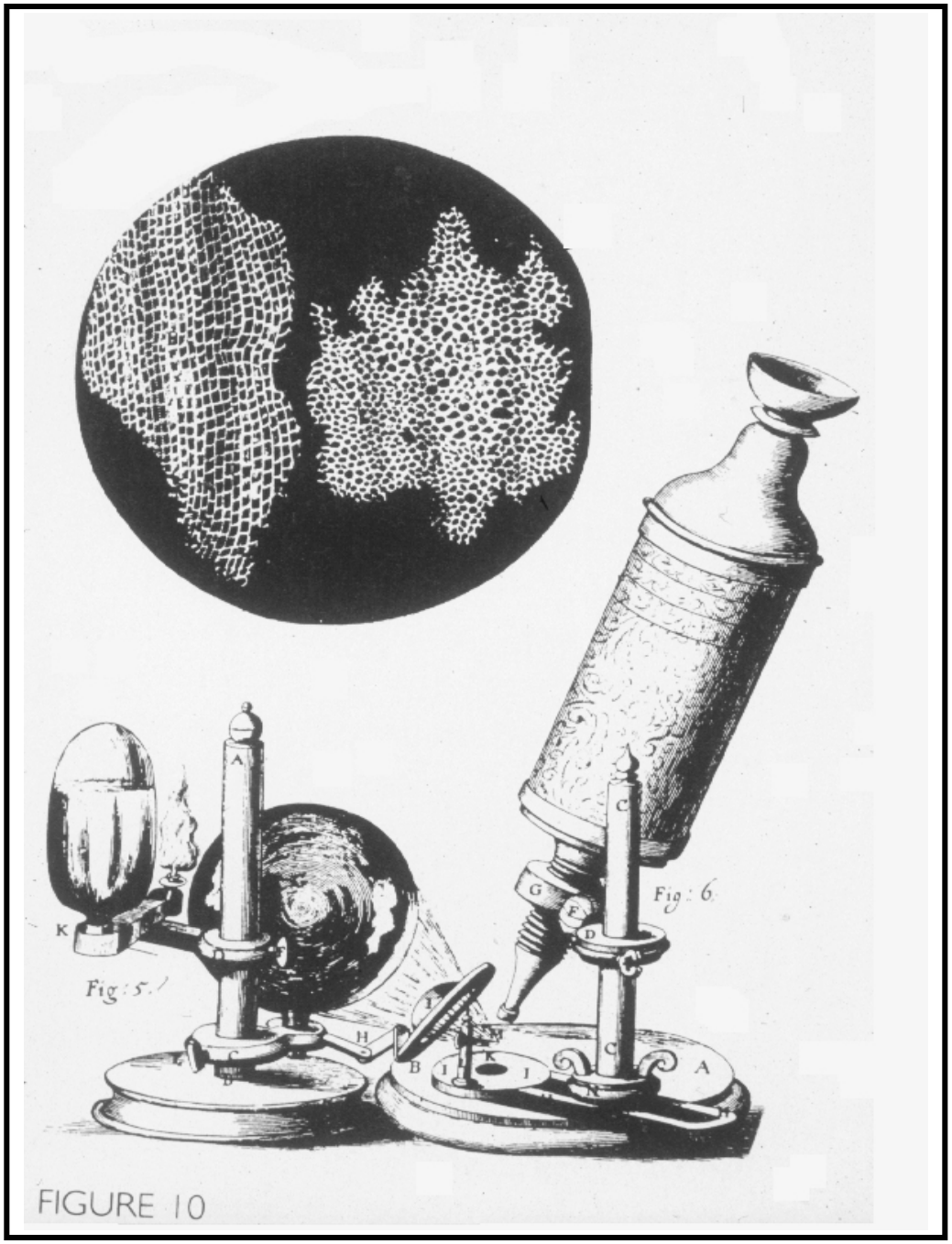
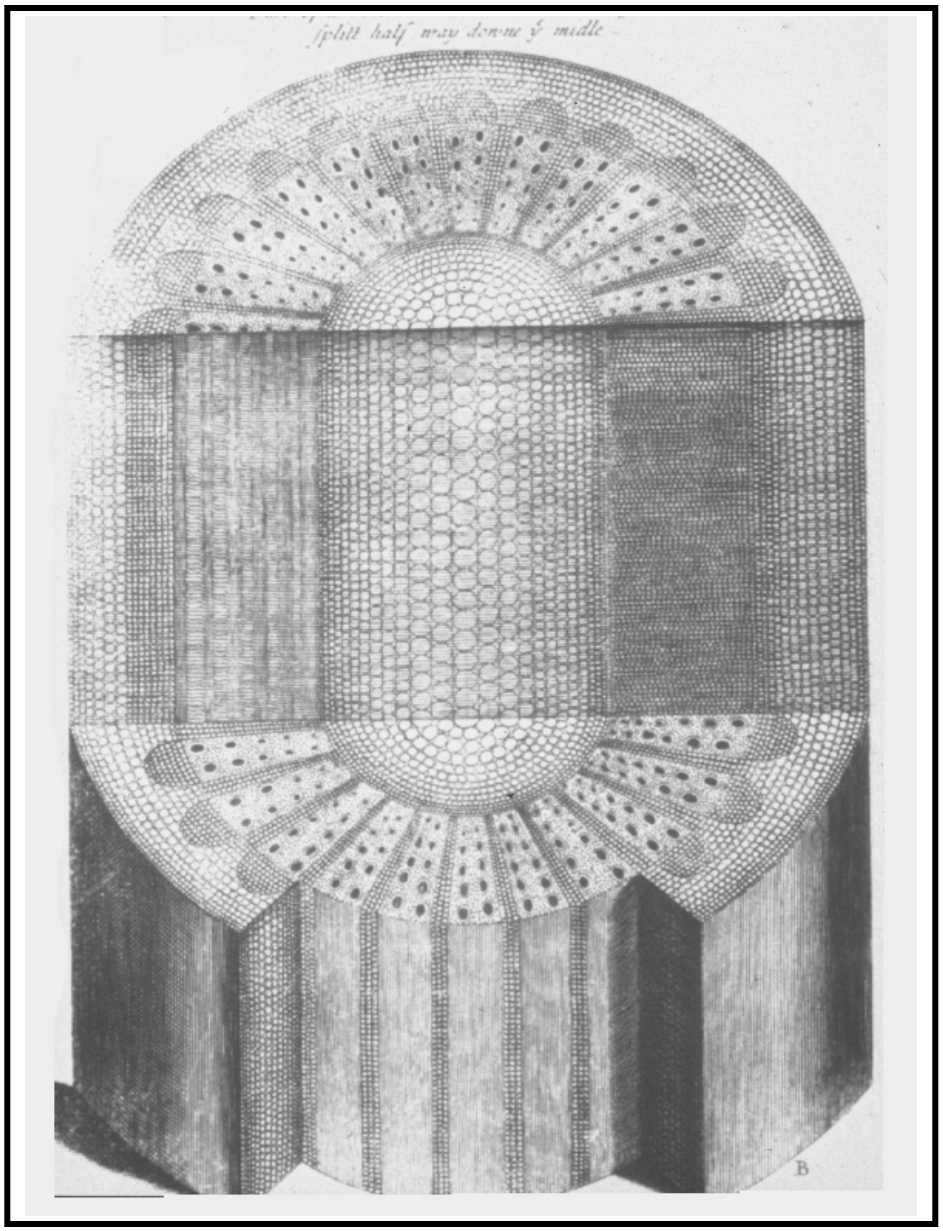
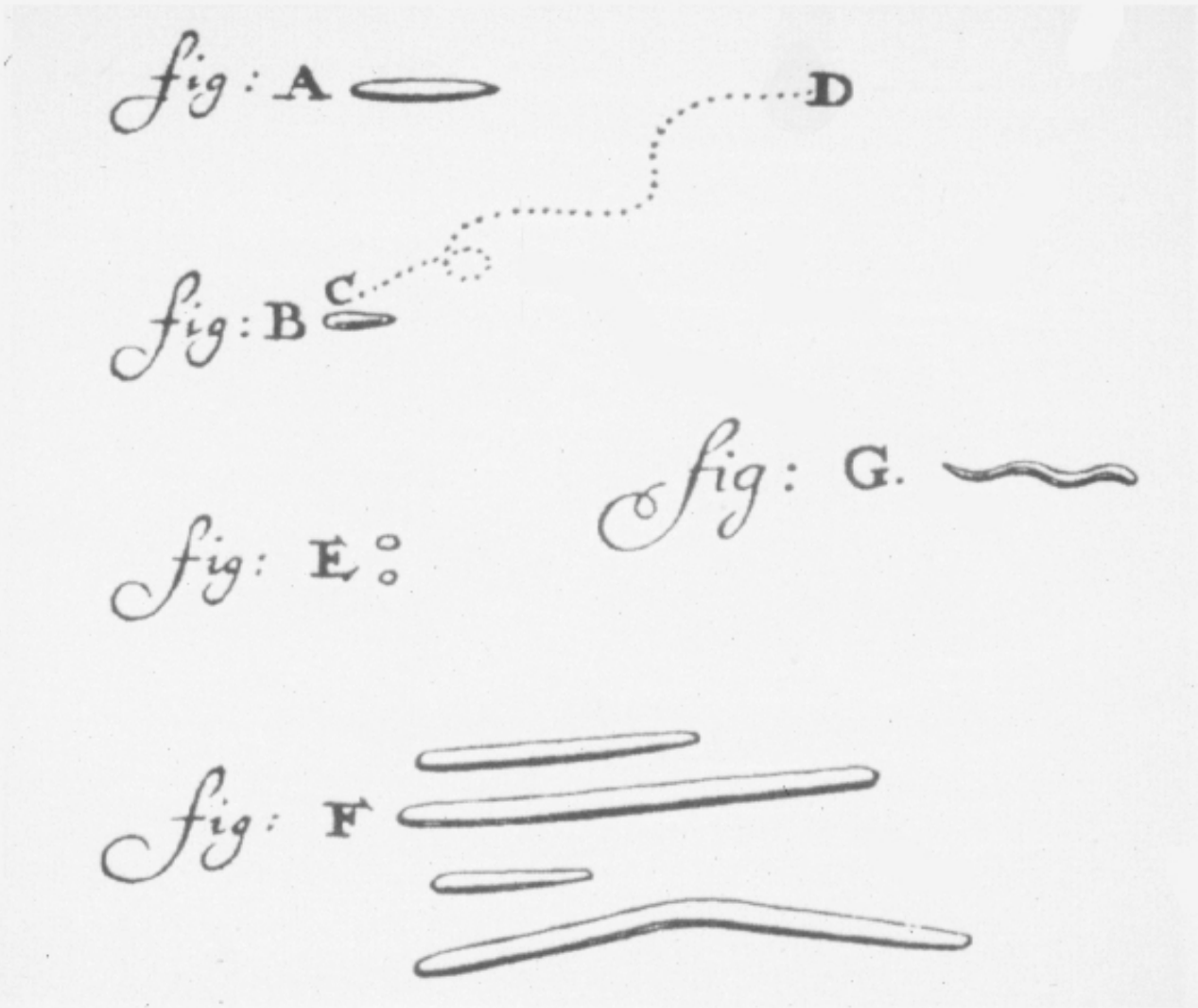
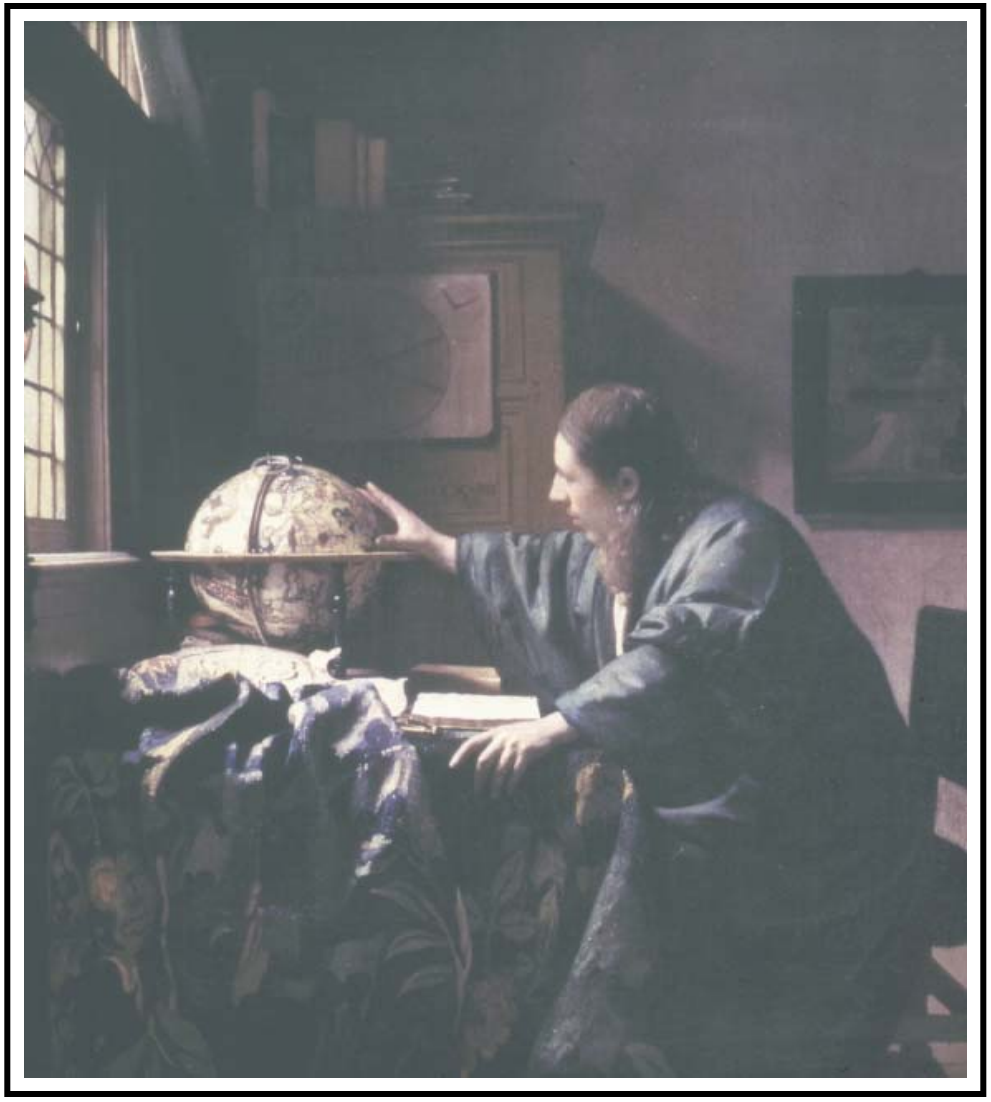


FIGURE 10


split half way downe ye middle
B



21. Leeuwenhoek's illustration of animalcules (bacteria) from the



41. Theodor Schwann (1810–82)

"WE HAVE SEEN THAT ALL ORGANISMS ARE COMPOSED OF ESSENTIALLY LIKE PARTS, NAMELY, OF CELLS; THAT THESE CELLS ARE FORMED AND GROW IN ACCORDANCE WITH ESSENTIALLY THE SAME LAWS; HENCE, THAT THESE PROCESSES MUST EVERYWHERE RESULT FROM THE OPERATION OF THE SAME FORCES."

SCHWANN 1839

"IN BOTH THE REJUVENATED INFUSORIAN AND THE FERTILIZED EGG-CELL WE SEE THE ONSET OF AN ENERGETIC MULTIPLICATION BY CELL-DIVISION WHICH LEADS IN THE ONE CASE TO THE FORMATION OF MULTICELLULAR ORGANISM AND IN THE OTHER TO A SERIES OF CELL GENERATIONS."

BUTSCHLI 1876

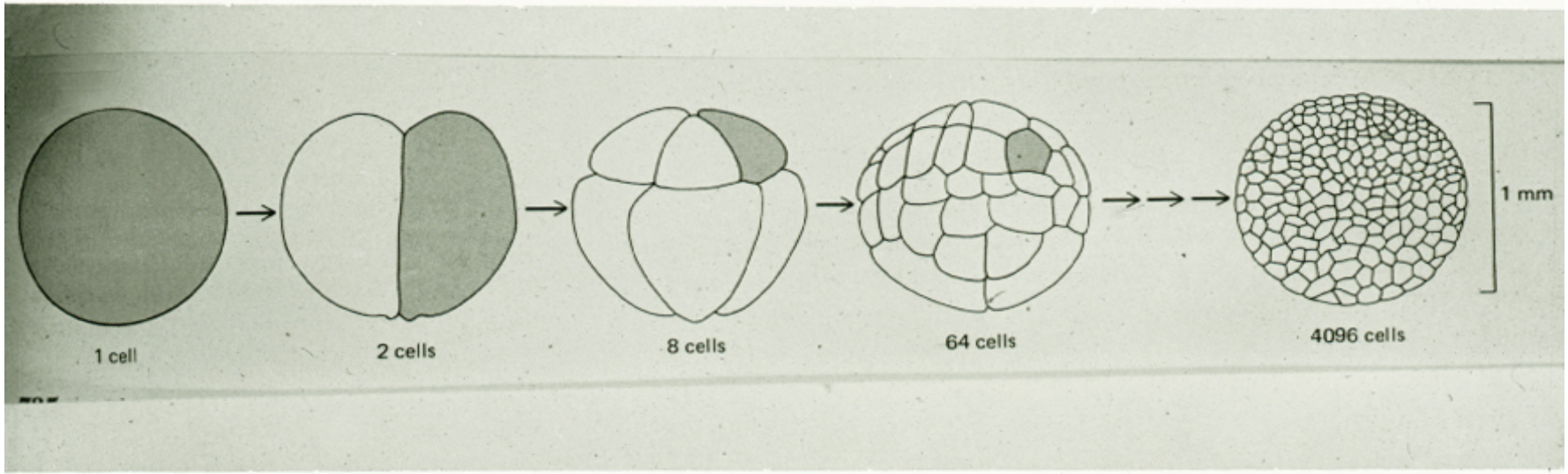
51. Rudolf Virchow (1821–1902)

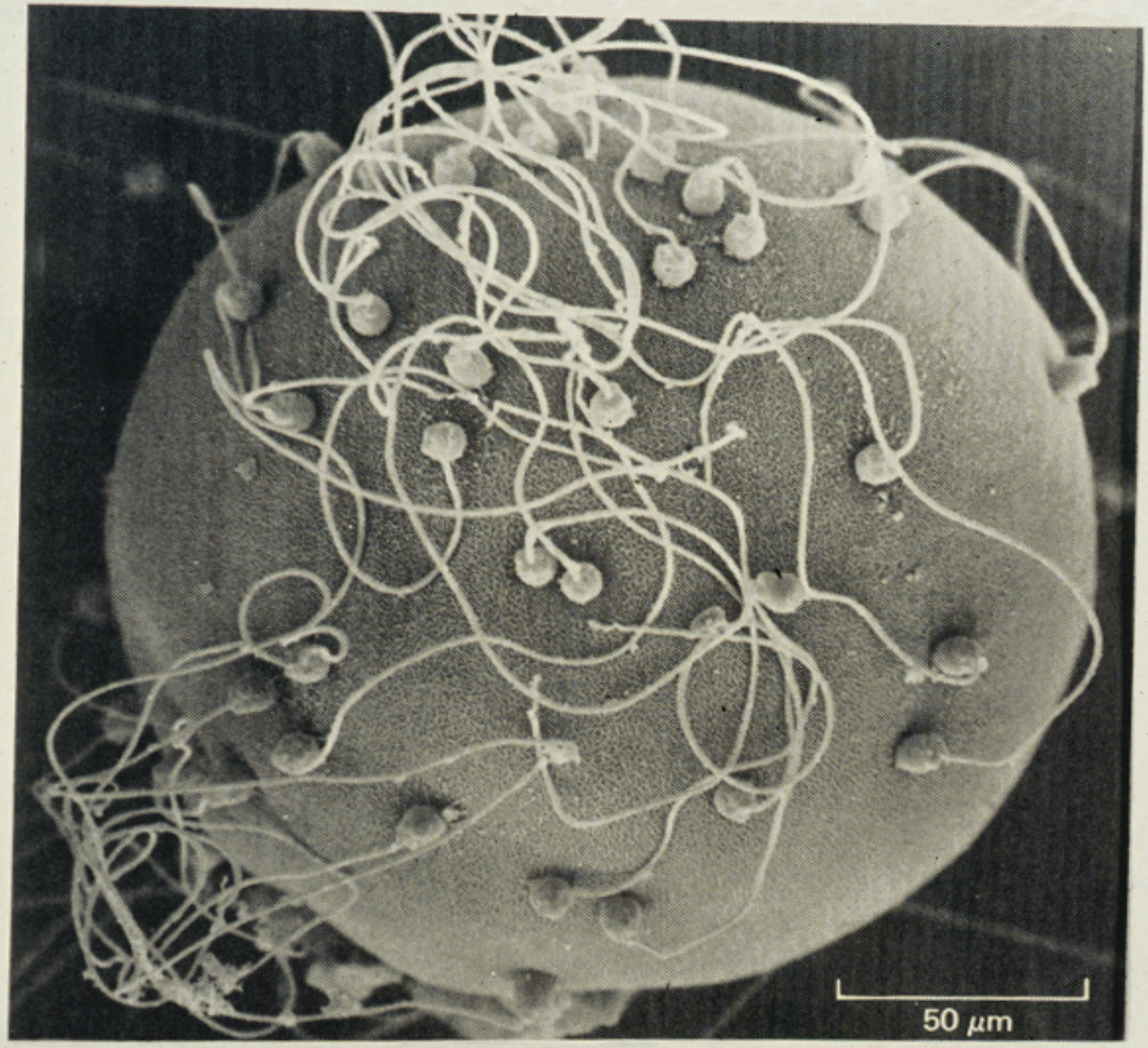
"EVERY ANIMAL APPEARS AS A SUM OF VITAL UNITS, EACH OF WHICH BEARS IN ITSELF THE COMPLETE CHARACTERISTICS OF LIFE."

VIRCHOW 1858

"WHERE A CELL EXISTS THERE MUST HAVE BEEN A PRE-EXISTING CELL ..... THE PRINCIPLE IS THUS ESTABLISHED ..... THAT THROUGHOUT THE WHOLE SERIES OF LIVING FORMS ..... THERE RULES AN ETERNAL LAW OF CONTINUOUS DEVELOPMENT."

VIRCHOW 1858


1 cell
2 cells
8 cells
64 cells
4096 cells
1 mm


50 μm

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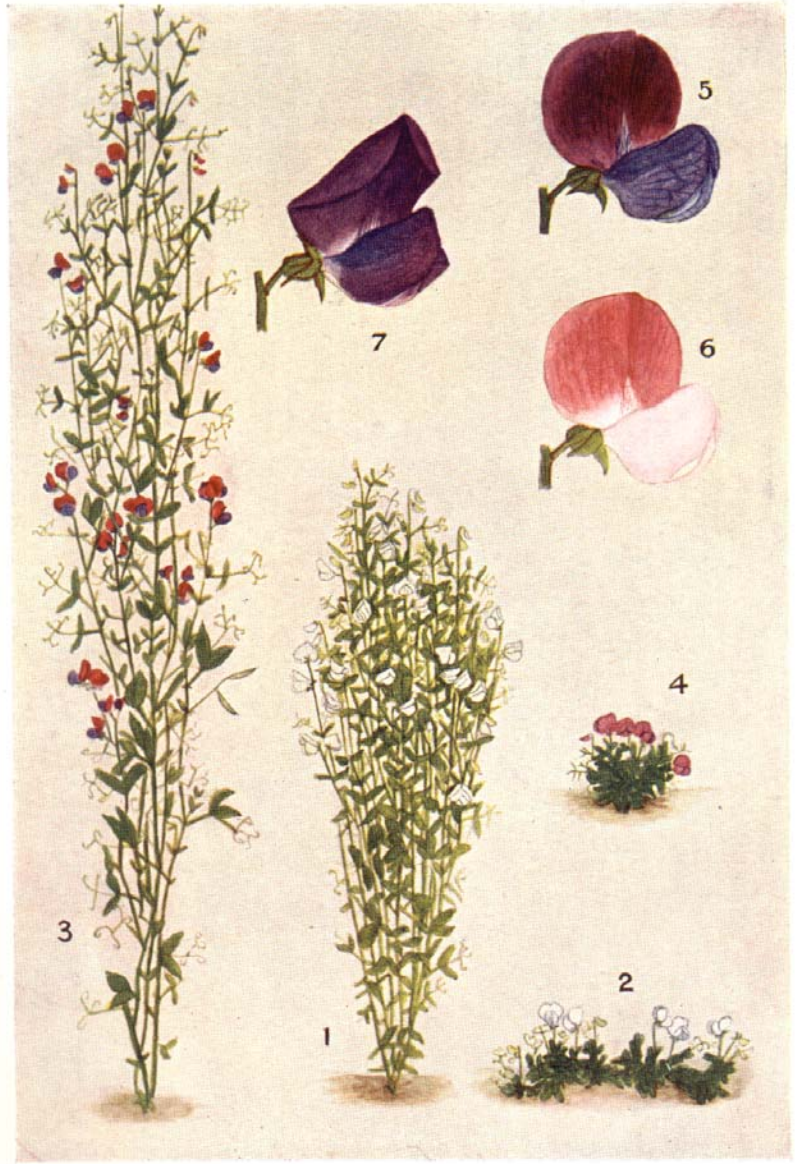
GREGOR MENDEL

ABBOT OF BRÜNN

Frontispiece



1, Bush Sweet Pea; 2, Cupid Sweet Pea; 3, F_1 reversionary Tall; 4, Erect Cupid Sweet Pea; 5, Purple Invincible; 6, Painted Lady; 7, Duke of Westminster (hooded standard).

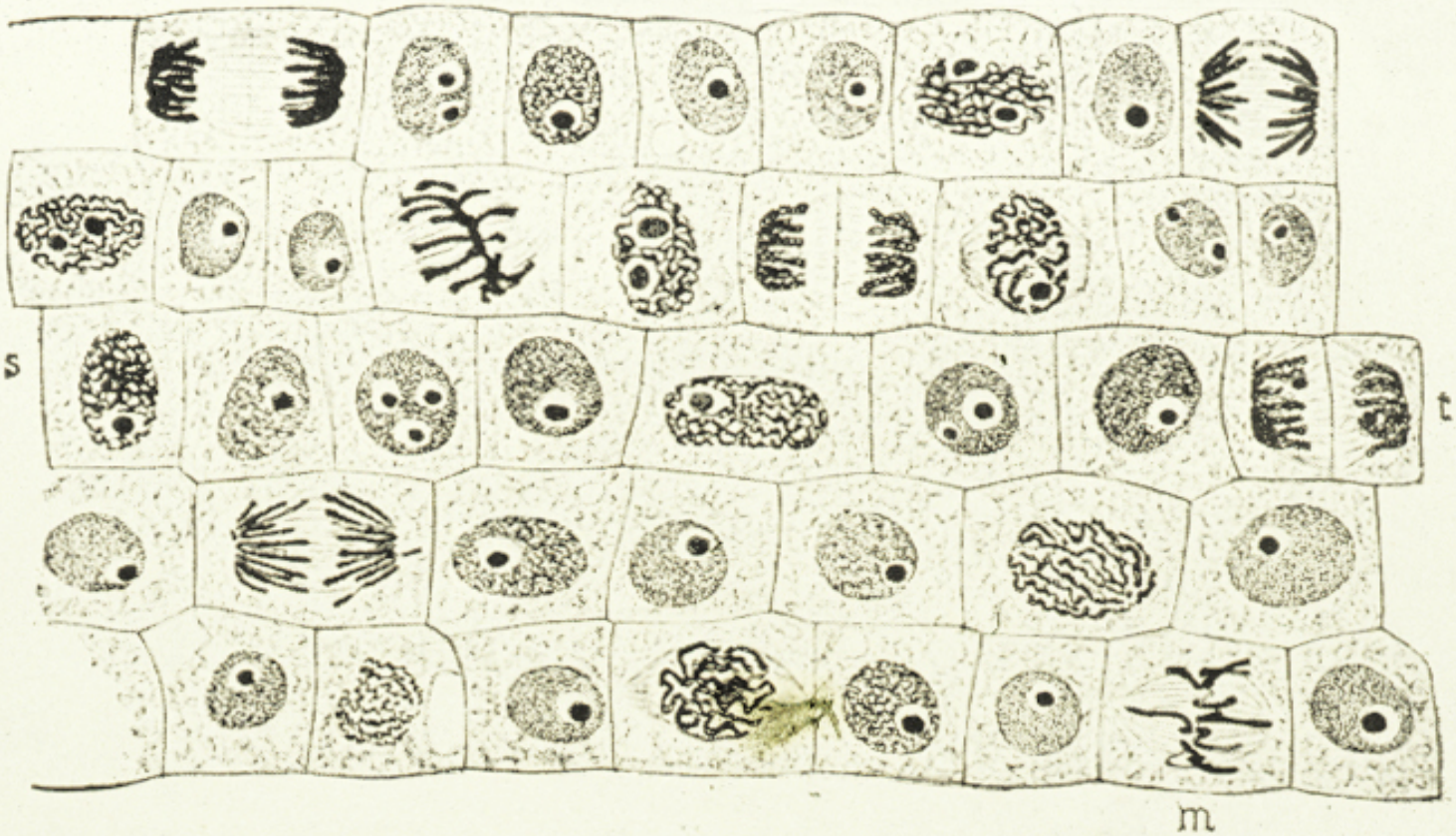
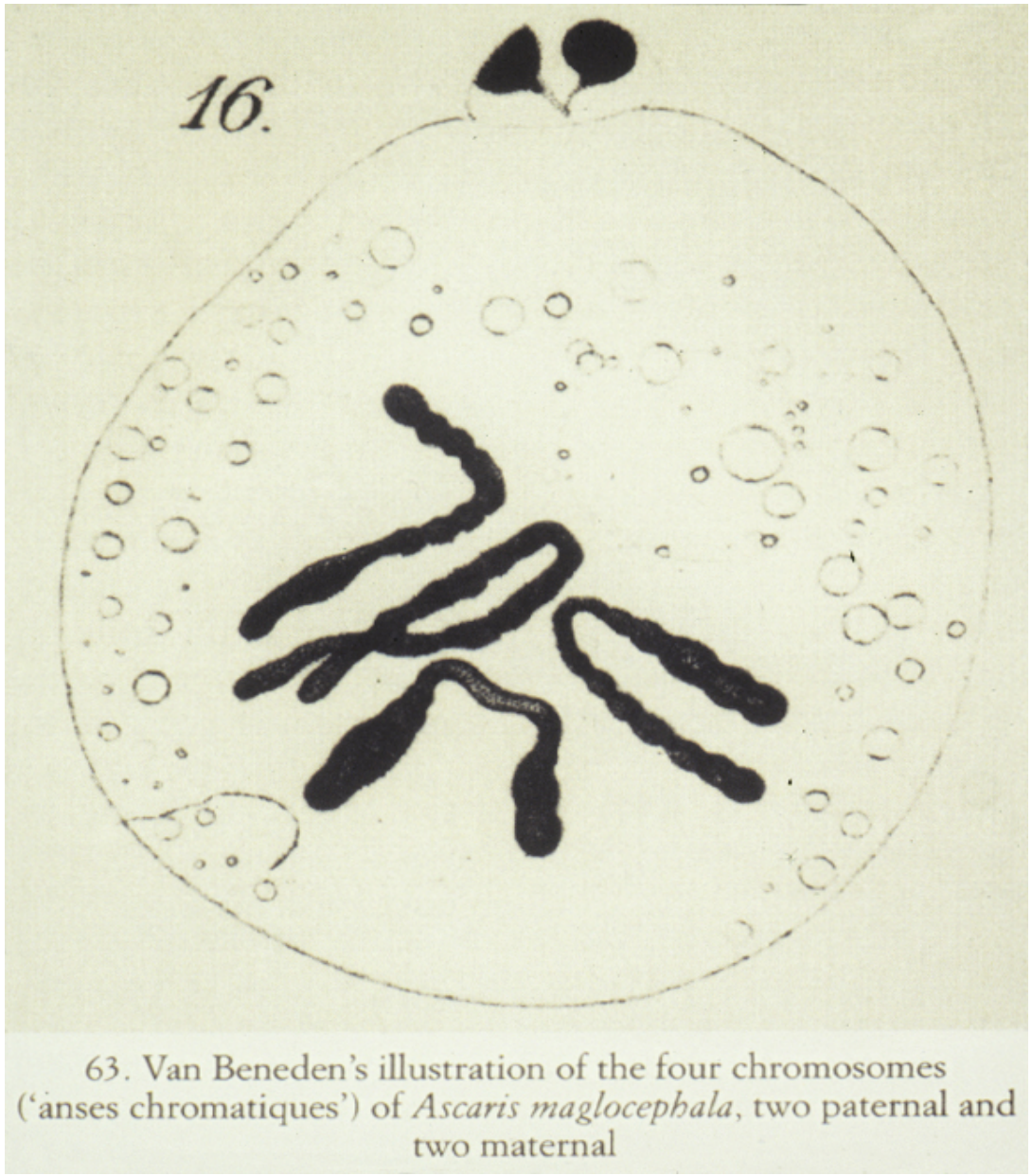
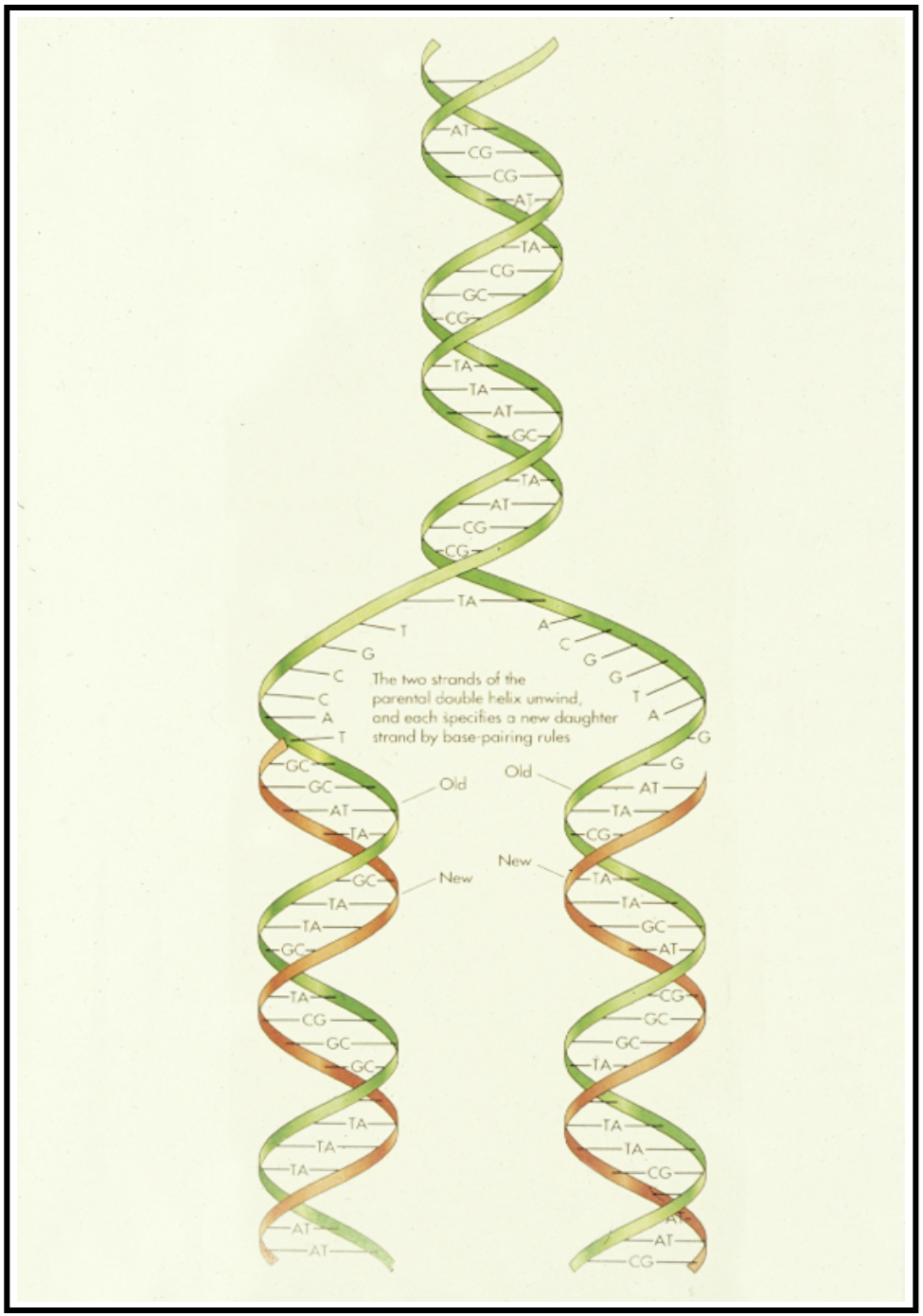
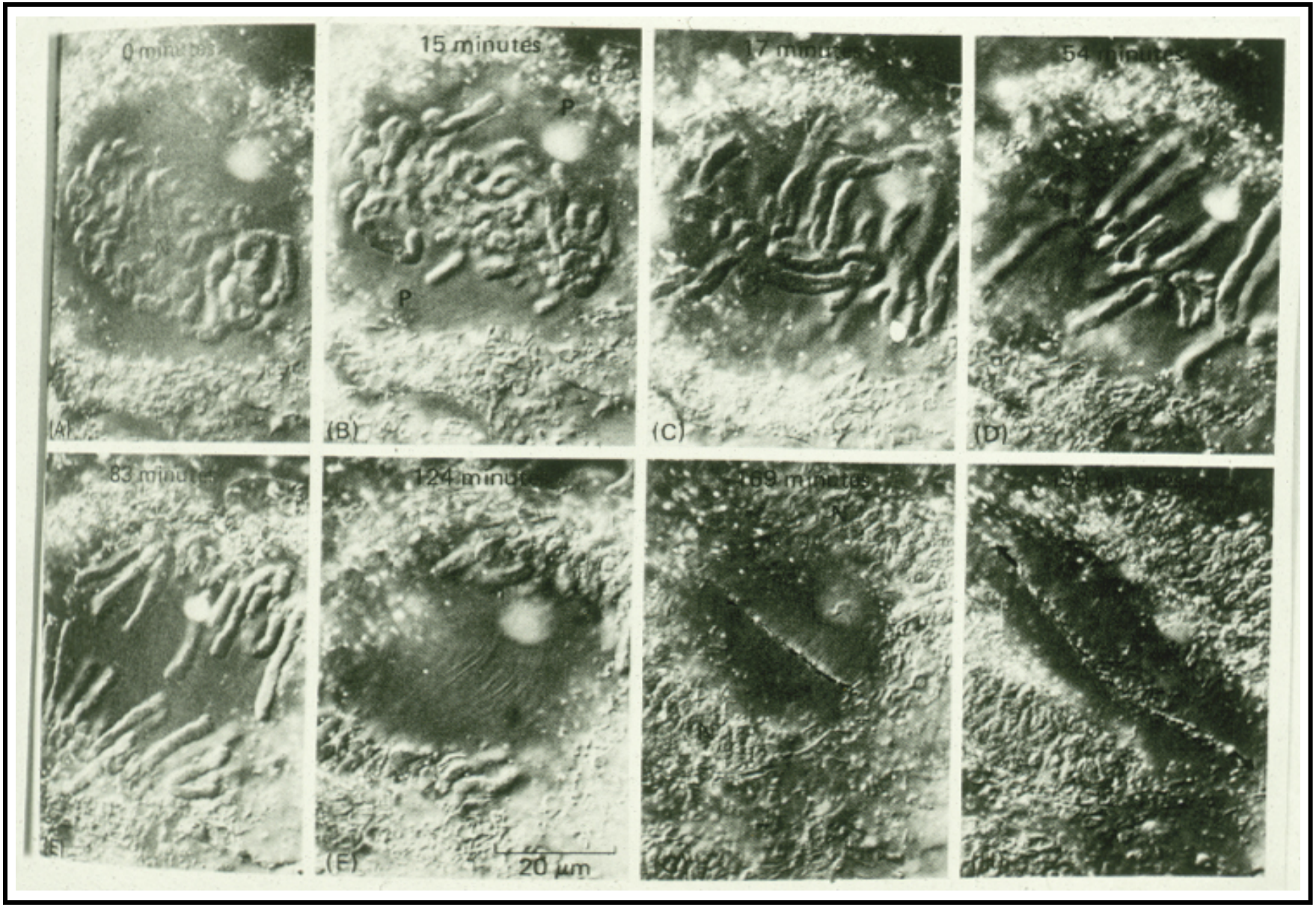


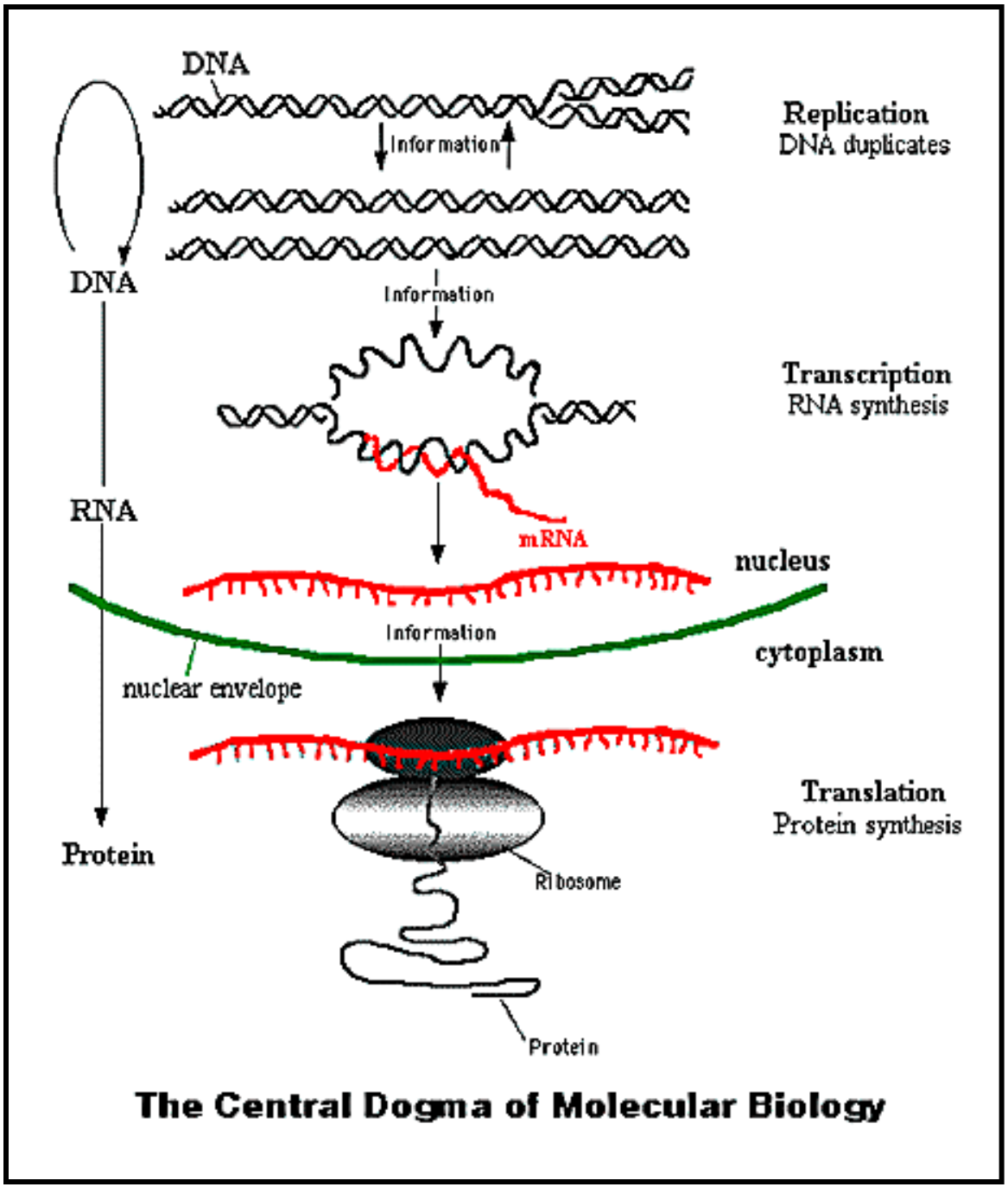
Fig. 2.—Group of cells from the meristem or embryonic tissue of the growing root-tip of the onion, as seen in longitudinal section. Like the preceding figure this is combined from a number of separate camera drawings; several stages of mitosis having been brought together. At *a*, *a* are seen anaphase-figures, at *s*, *s* spiremes, at *m* a metaphase, and at *t* an early telophase.



63. Van Beneden's illustration of the four chromosomes ('anses chromatiques') of *Ascaris maglocephala*, two paternal and two maternal


The two strands of the parental double helix unwind, and each specifies a new daughter strand by base-pairing rules
Old
New
Old
New


0 minutes
15 minutes
P
P
17 minutes
54 minutes
(A)
(B)
(C)
(D)
83 minutes
124 minutes
669 minutes
N
(E)
(F)
20 µm



The Central Dogma of Molecular Biology

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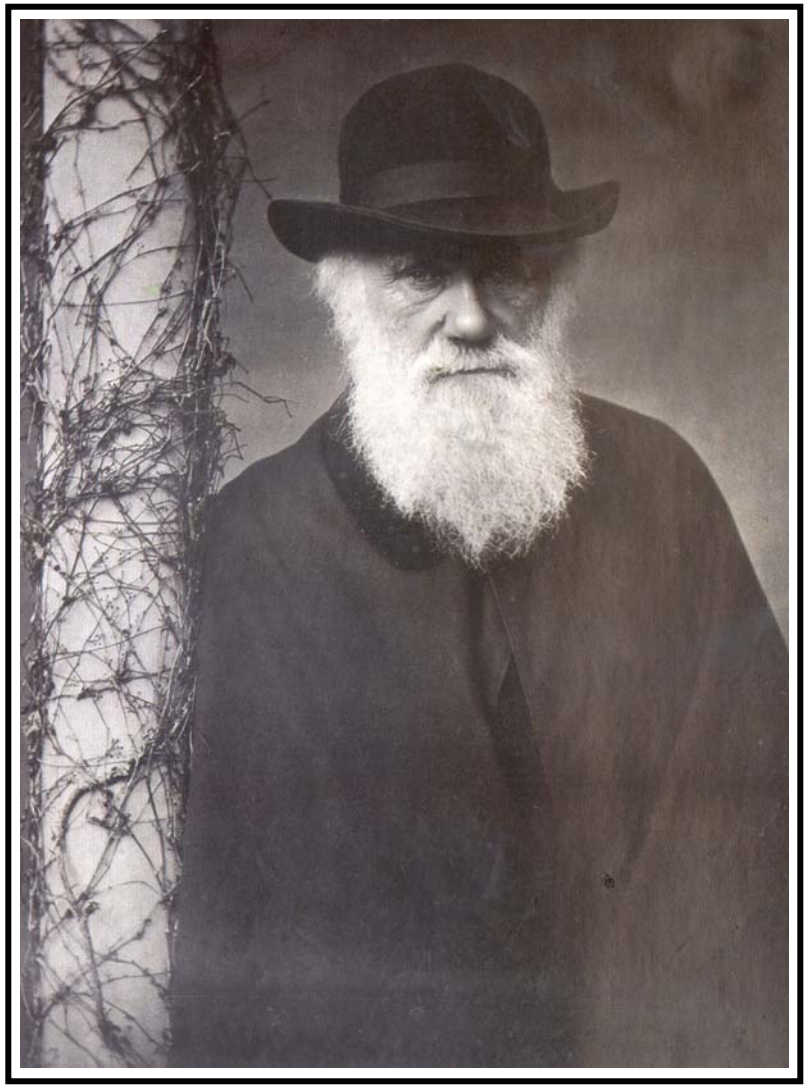

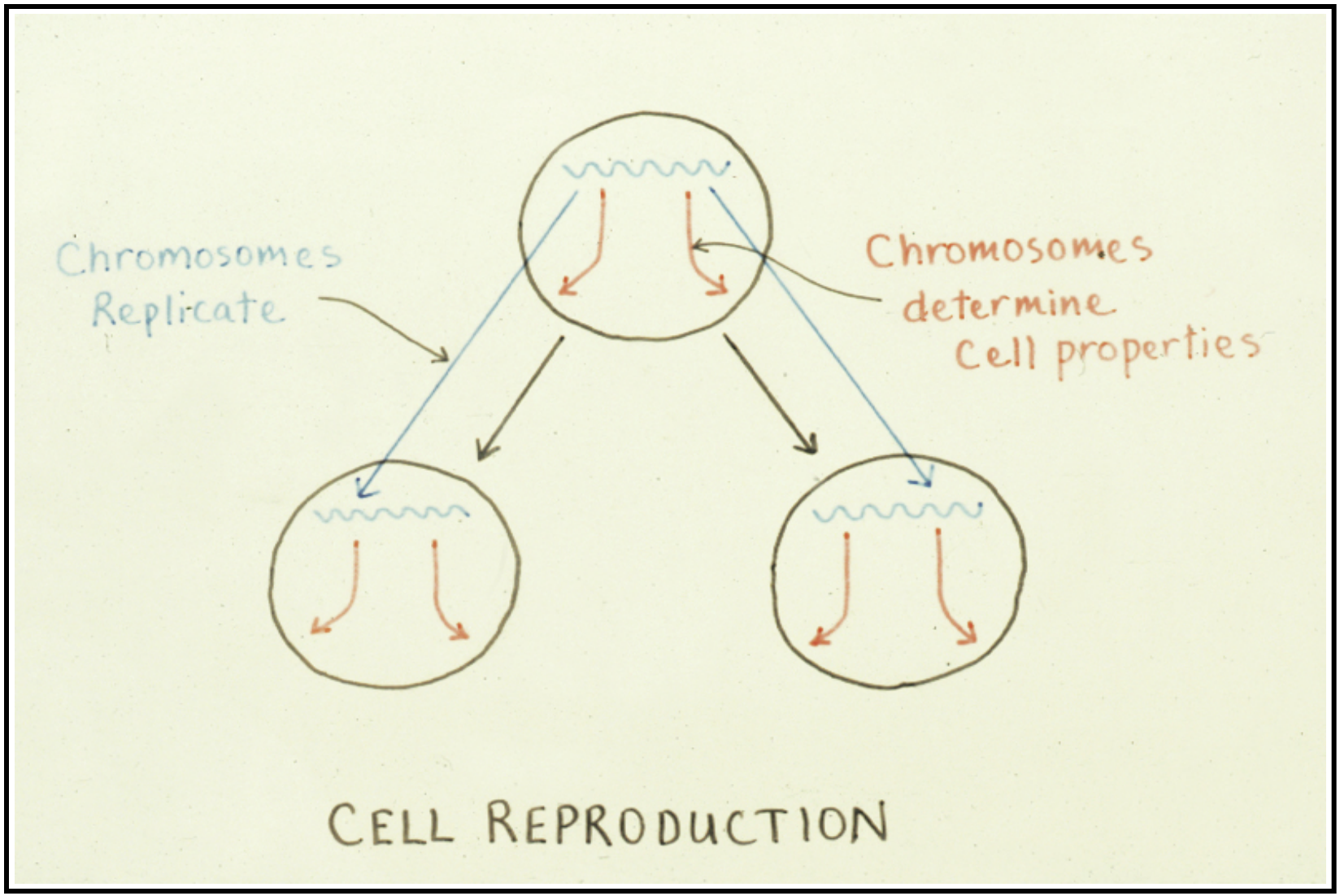
Chromosomes
Replicate
Chromosomes
determine
Cell properties
CELL REPRODUCTION

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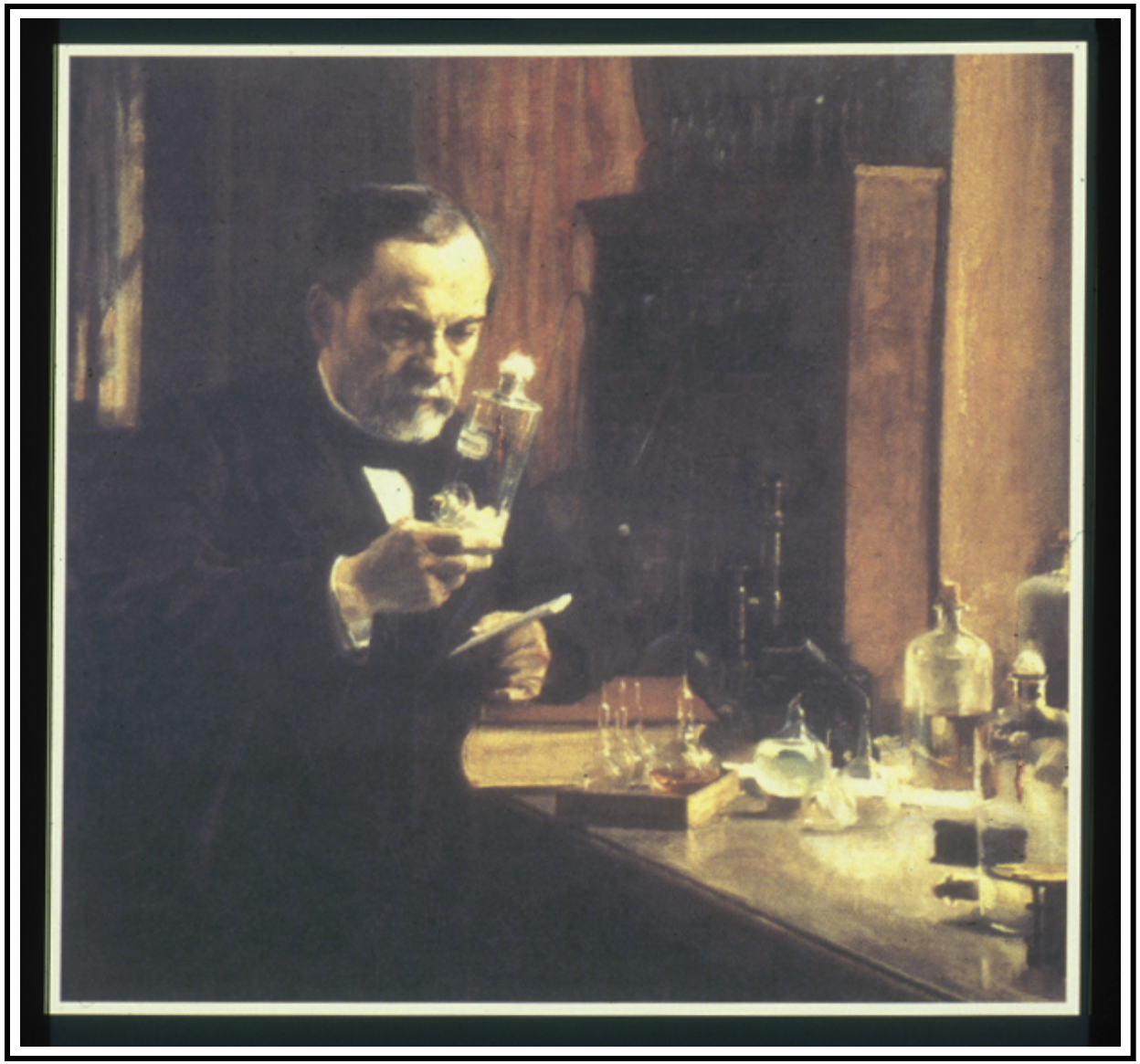
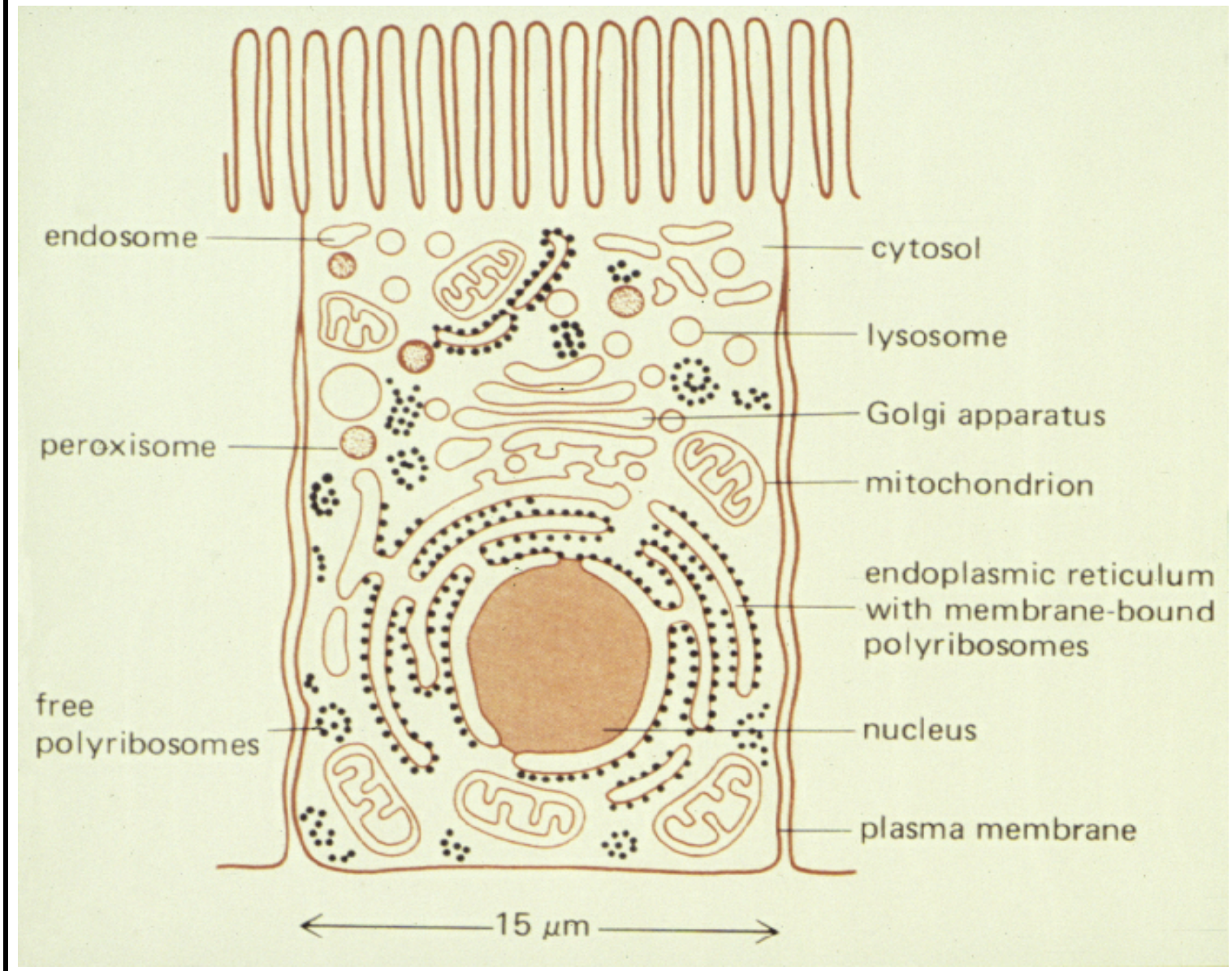
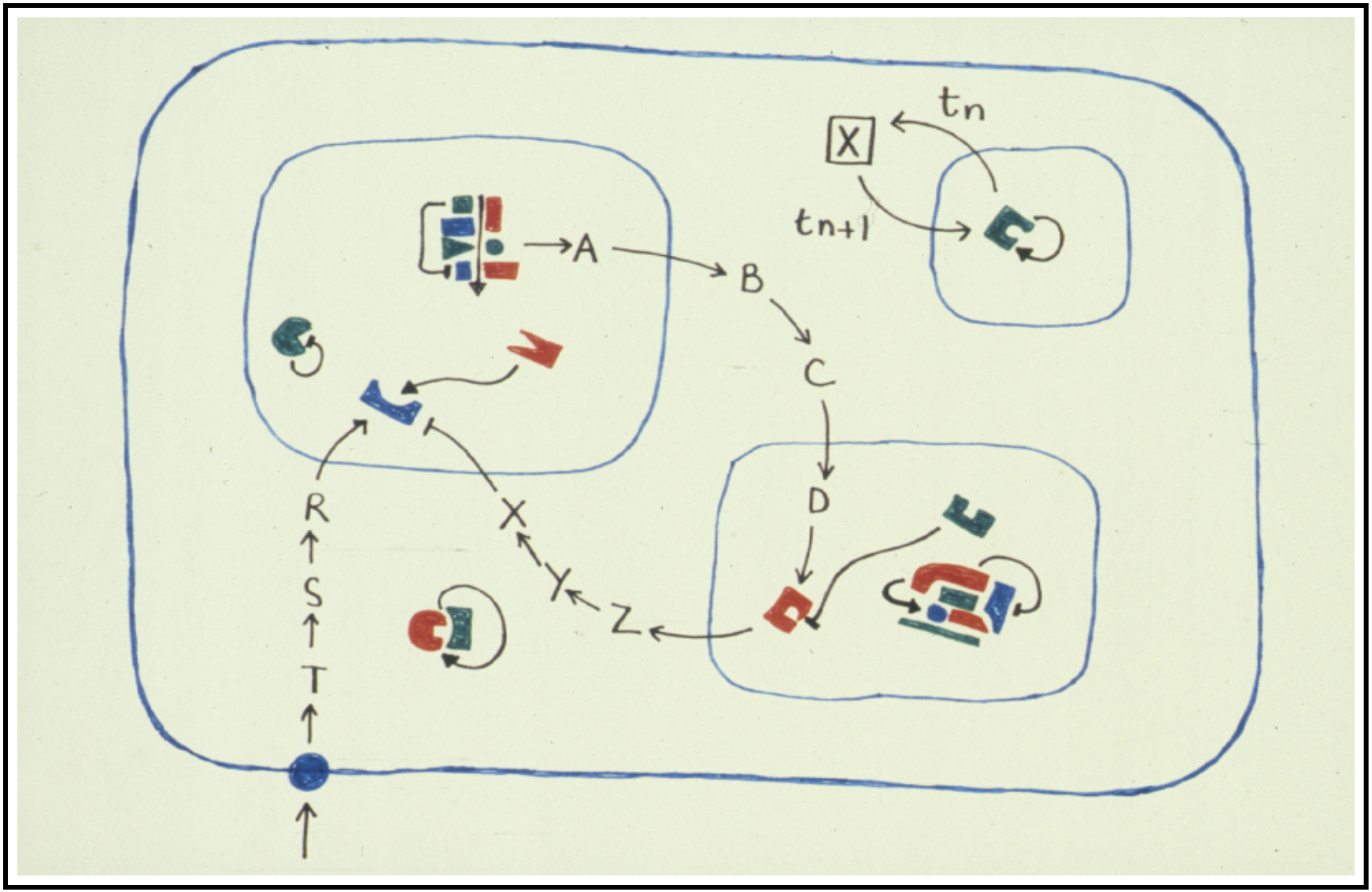



endosome
peroxisome
free
polyribosomes
cytosol
lysosome
Golgi apparatus
mitochondrion
endoplasmic reticulum
with membrane-bound
polyribosomes
nucleus
plasma membrane
15 μm


tn
X
tn+1
A
B
C
D
E
F
R
S
T
X
Y
Z

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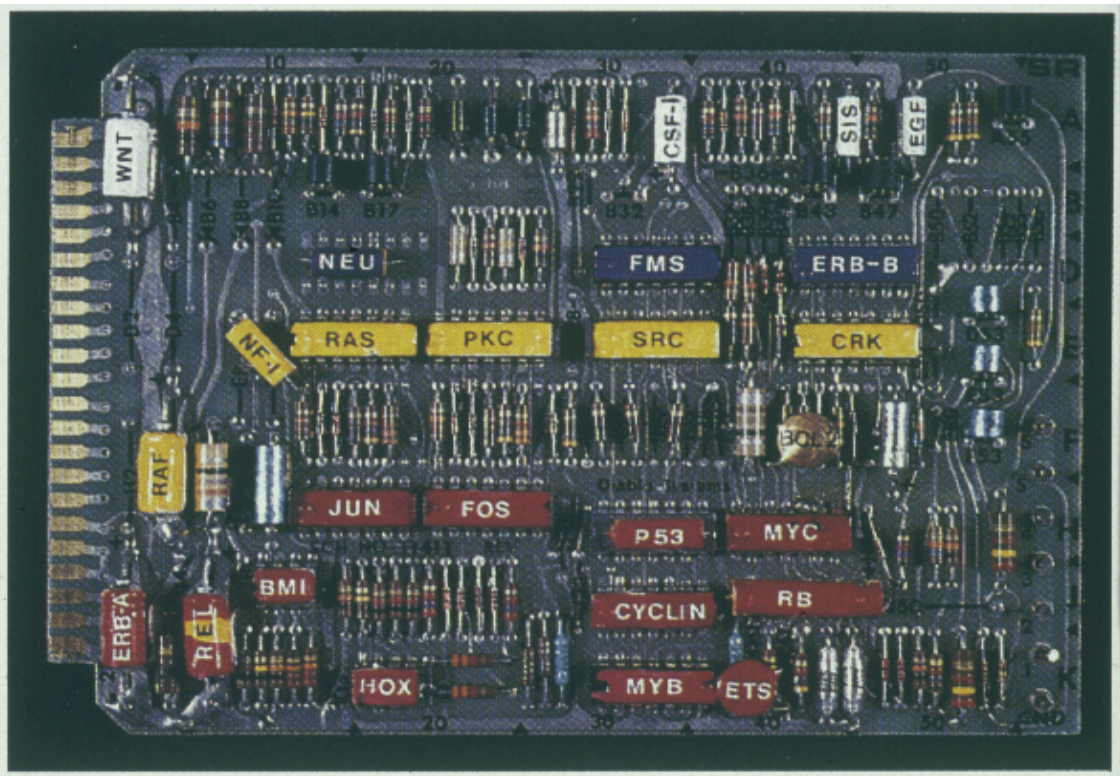
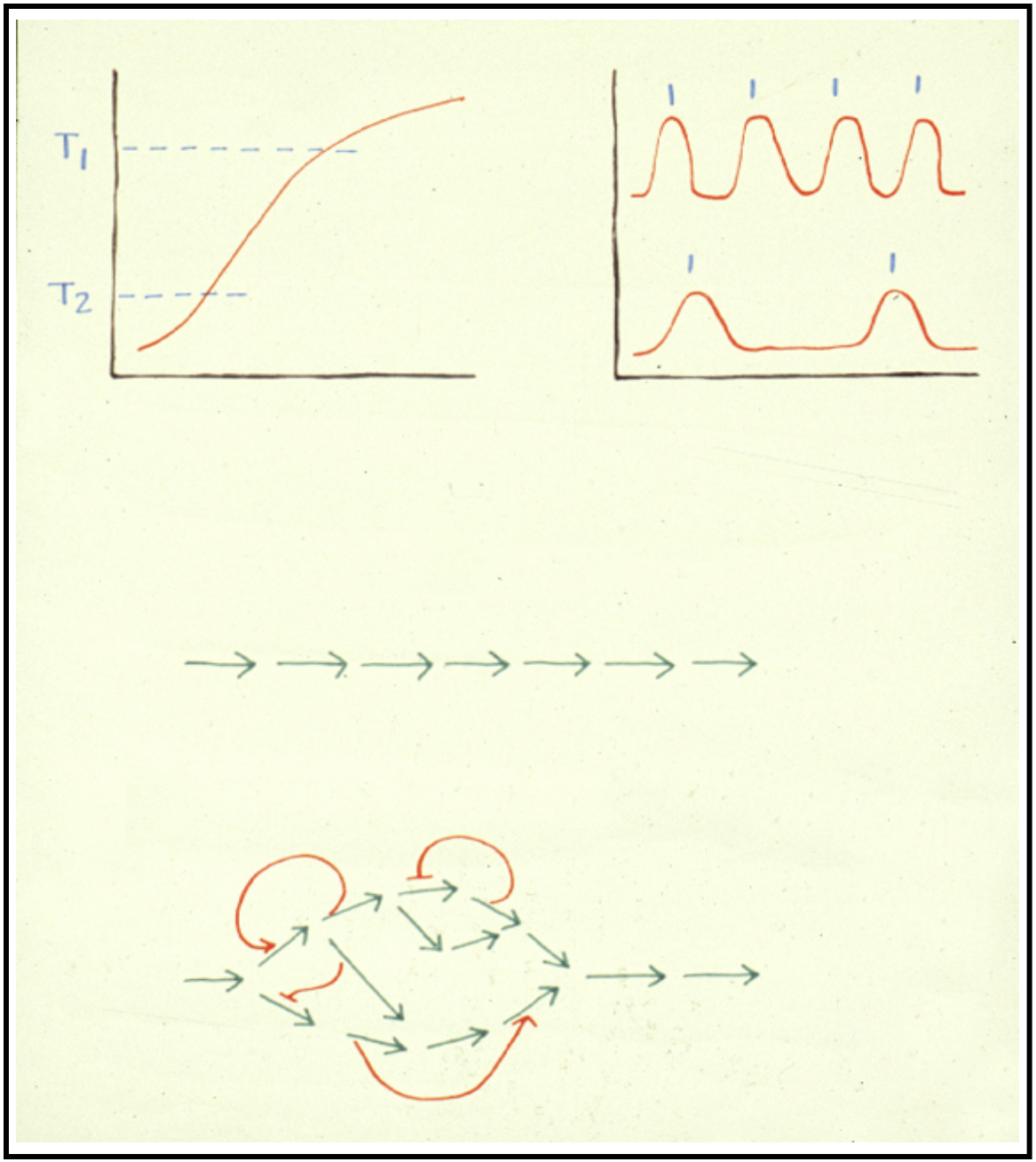
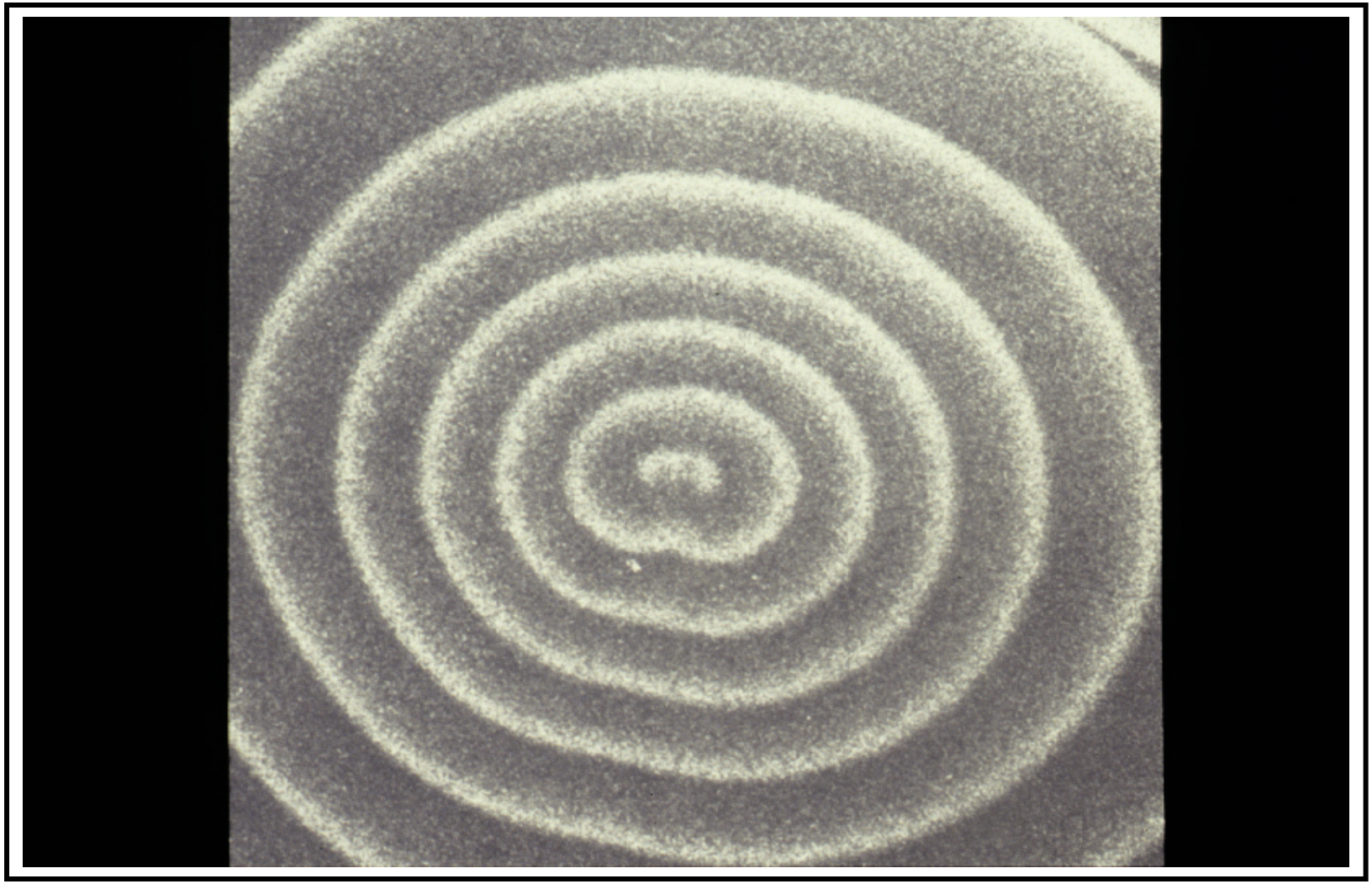


A fanciful model of the circuitry involved in cell signaling, with the extracellular factors on top and the transcription factors at the bottom.


T1
T2



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