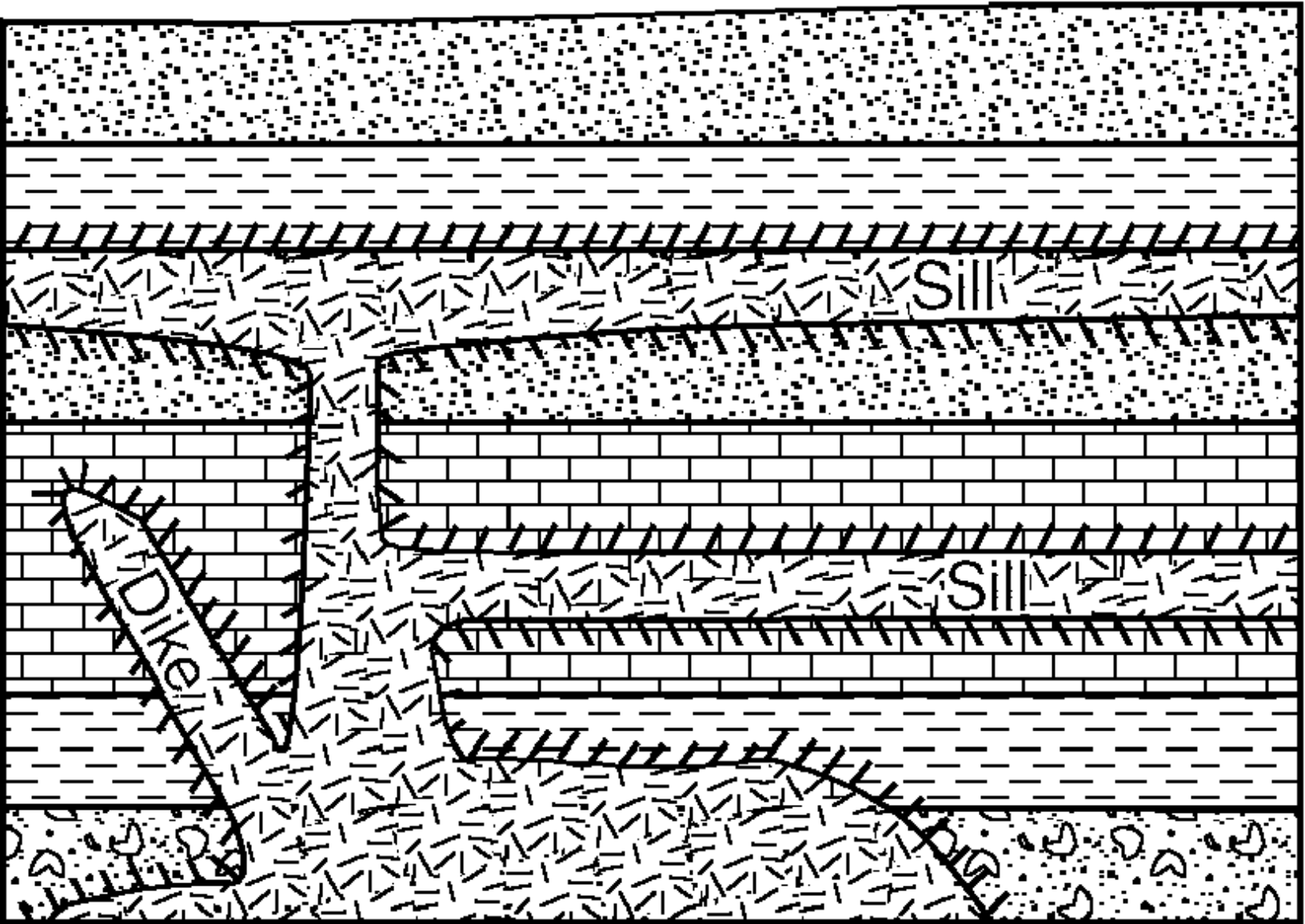
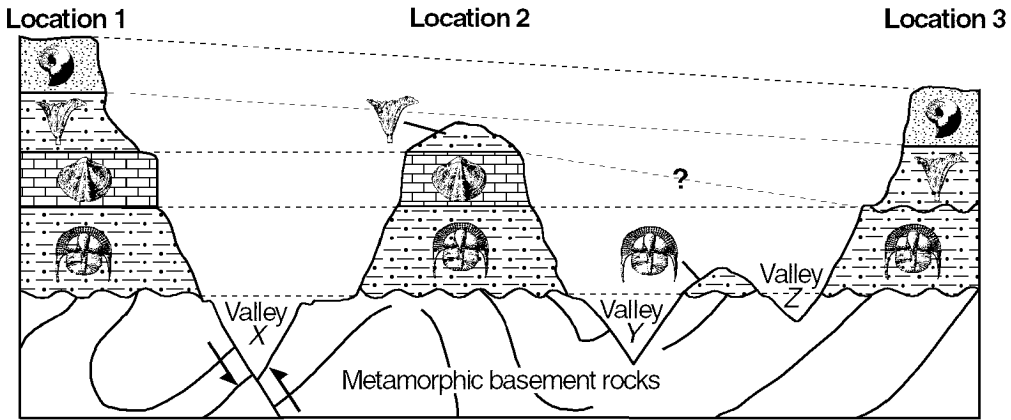
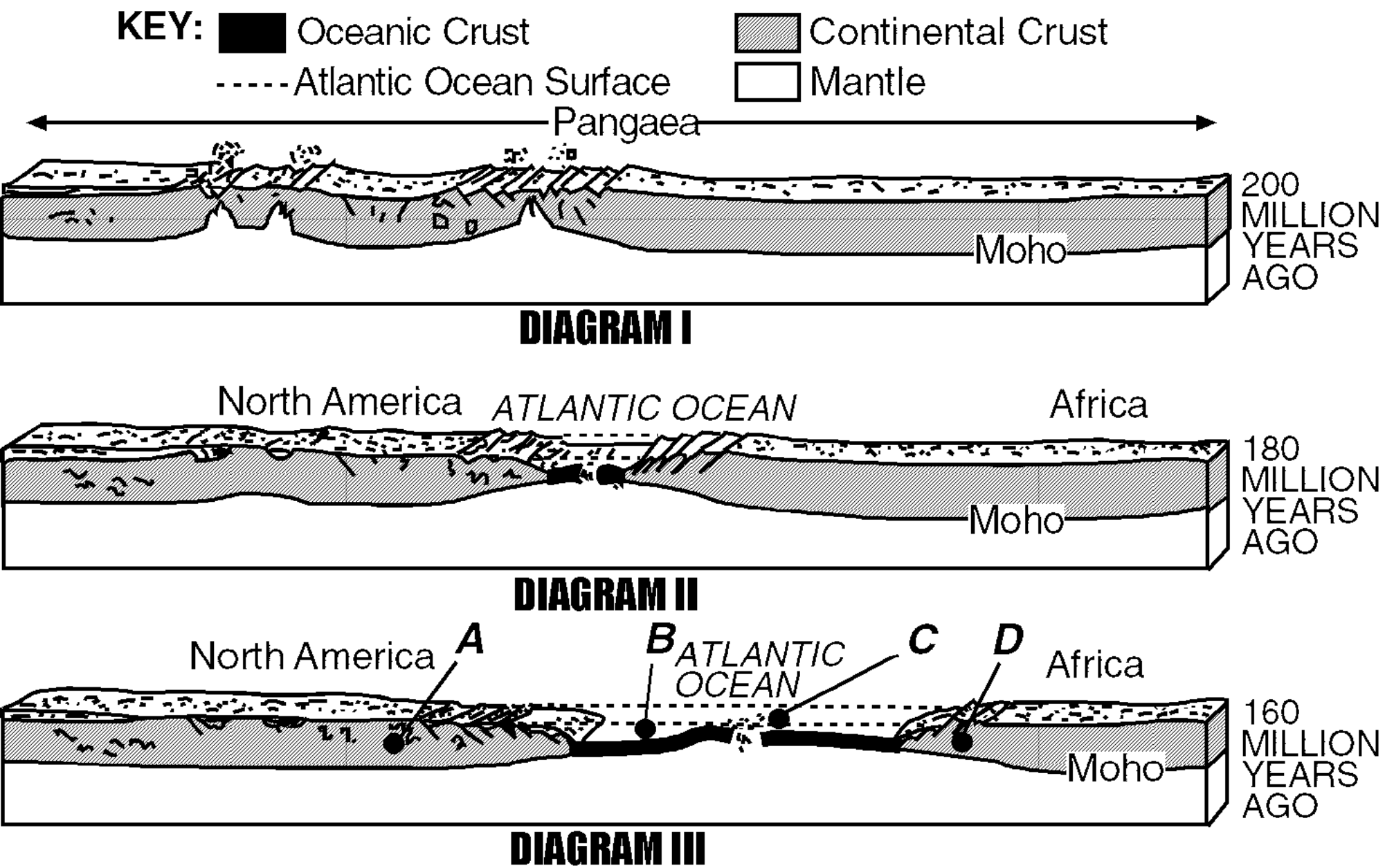
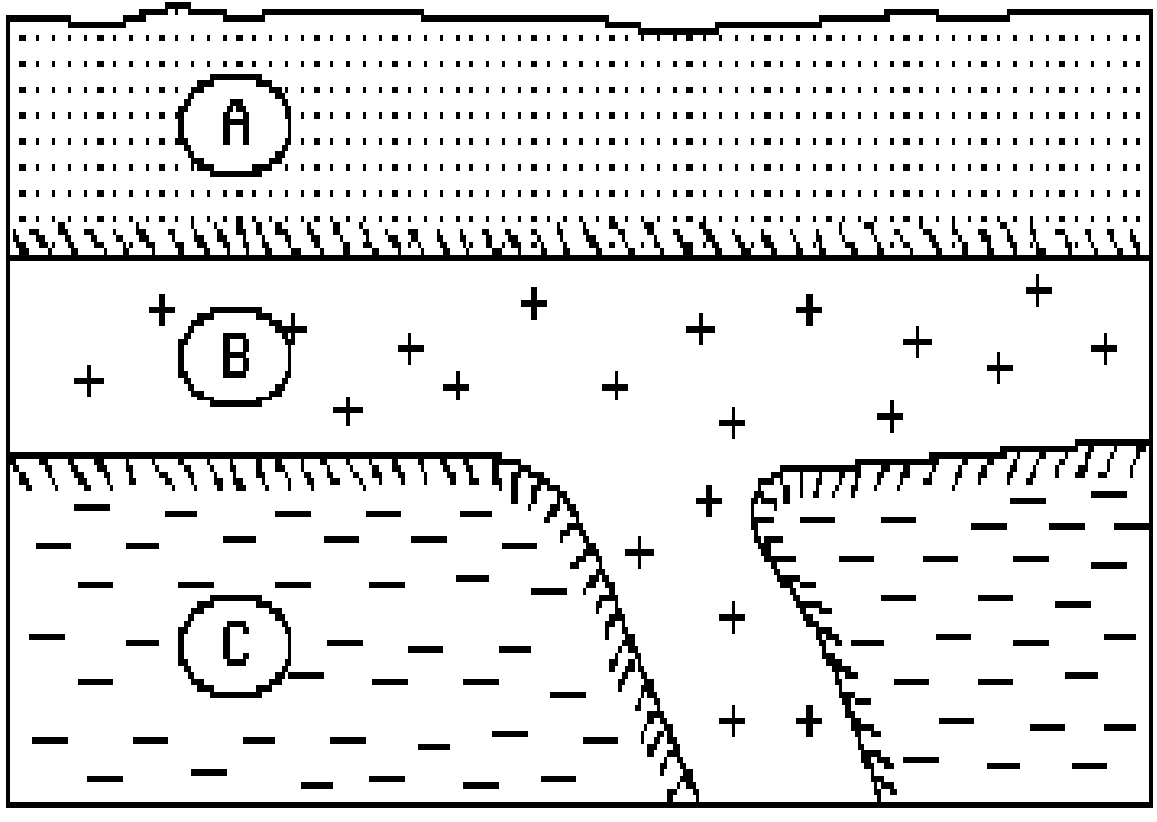

Sill
Sill
Dike


Location 1
Location 2
Location 3
?
Valley X
Valley Y
Valley Z
Metamorphic basement rocks


KEY:
Oceanic Crust
Continental Crust
Atlantic Ocean Surface
Mantle
Pangaea
200 MILLION YEARS AGO
Moho
DIAGRAM I
North America
ATLANTIC OCEAN
Africa
180 MILLION YEARS AGO
Moho
DIAGRAM II
North America
A
B
ATLANTIC OCEAN
C
D
Africa
160 MILLION YEARS AGO
Moho
DIAGRAM III

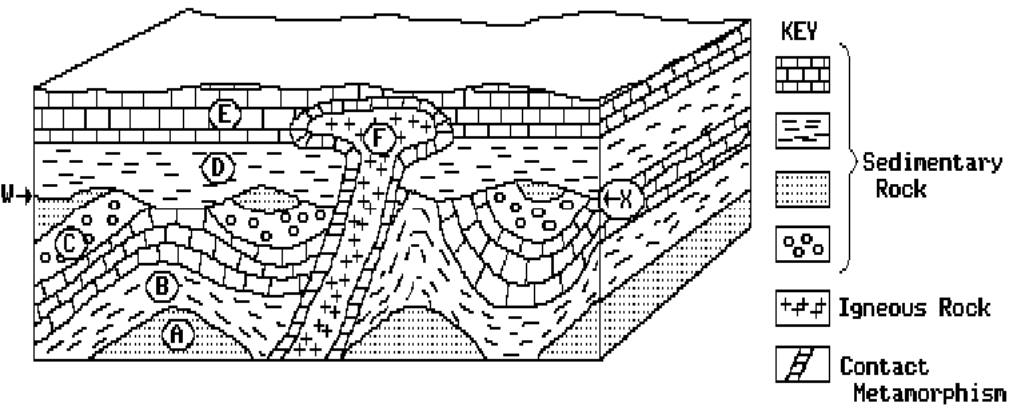


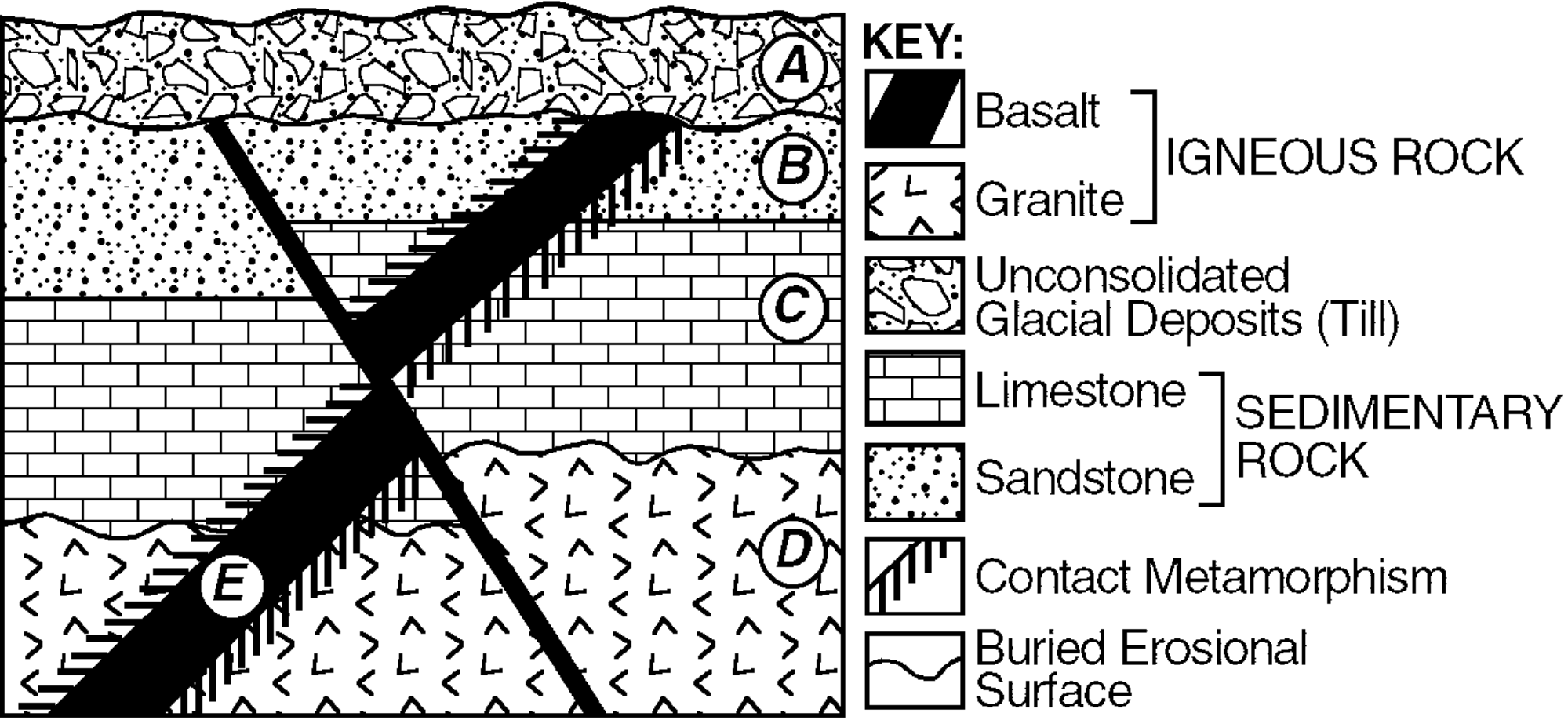

KEY

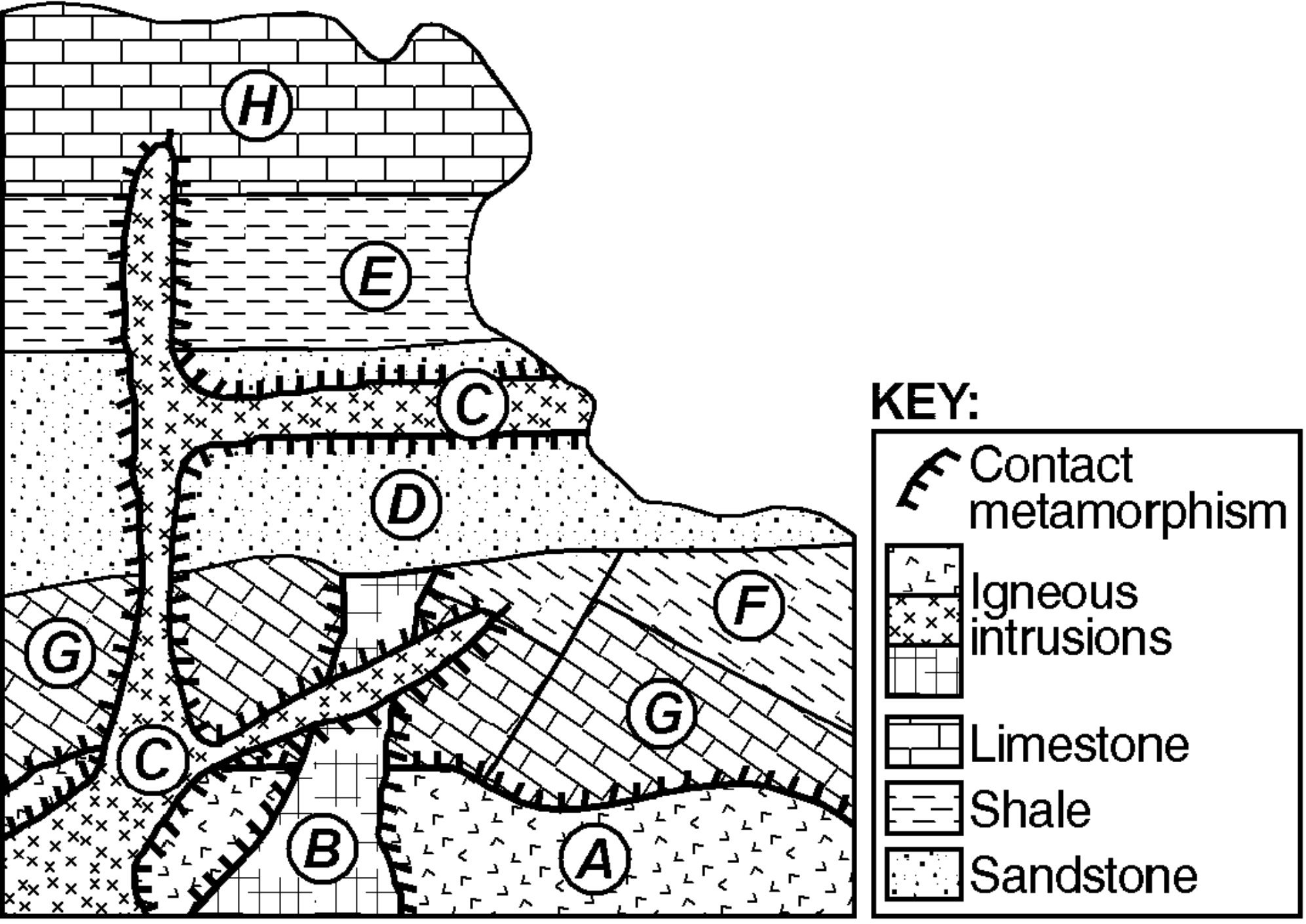
SEDIMENTARY ROCKS

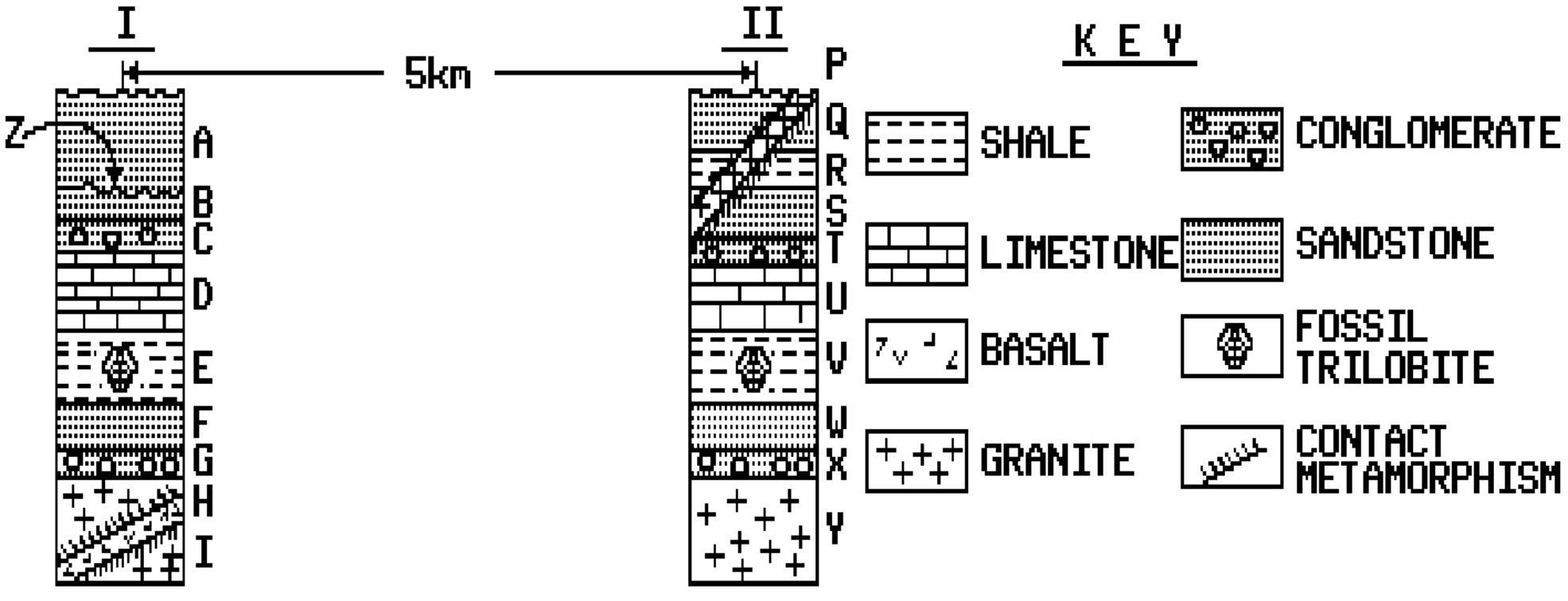
IGNEOUS ROCK

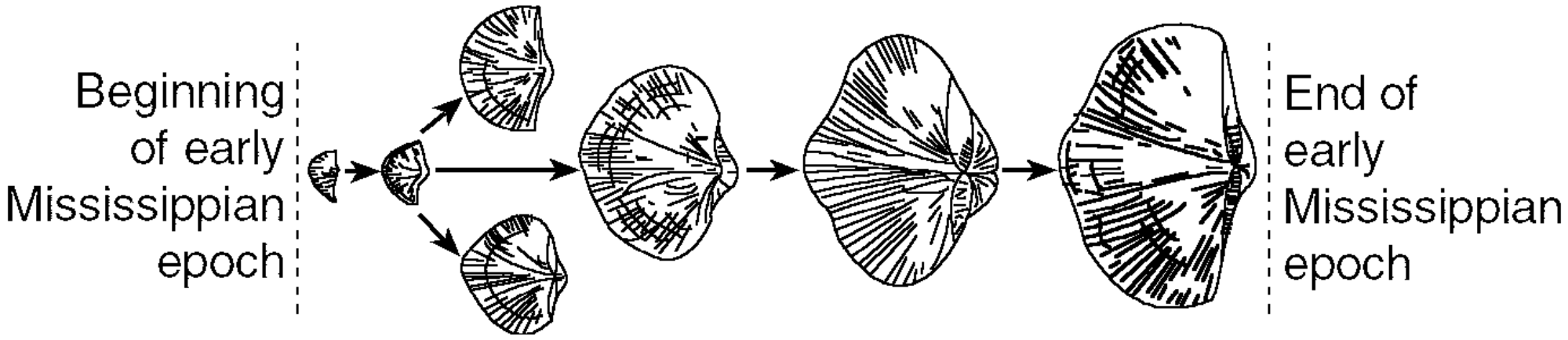
CONTACT METAMORPHISM

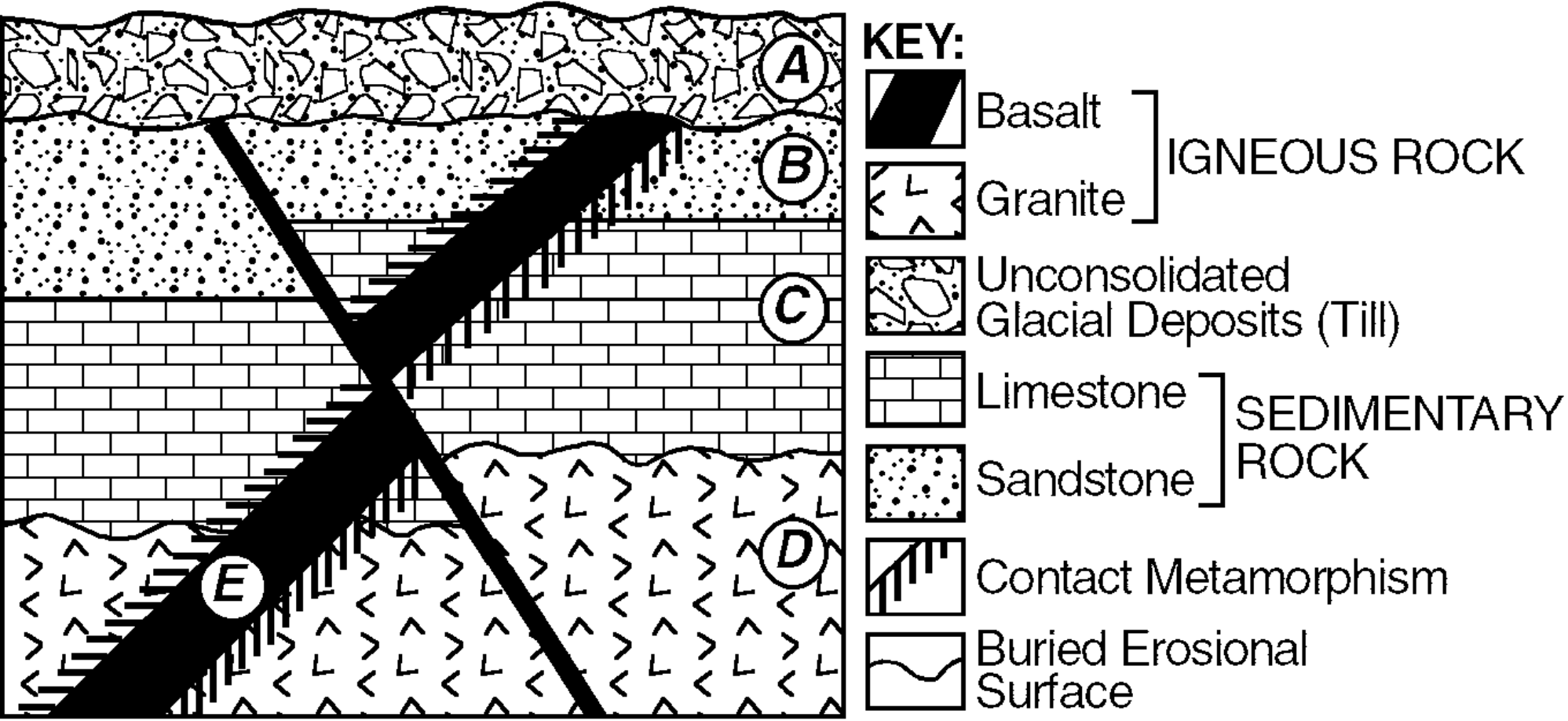

E
F
D
W
X
C
B
A
KEY
Sedimentary Rock
Igneous Rock
Contact Metamorphism

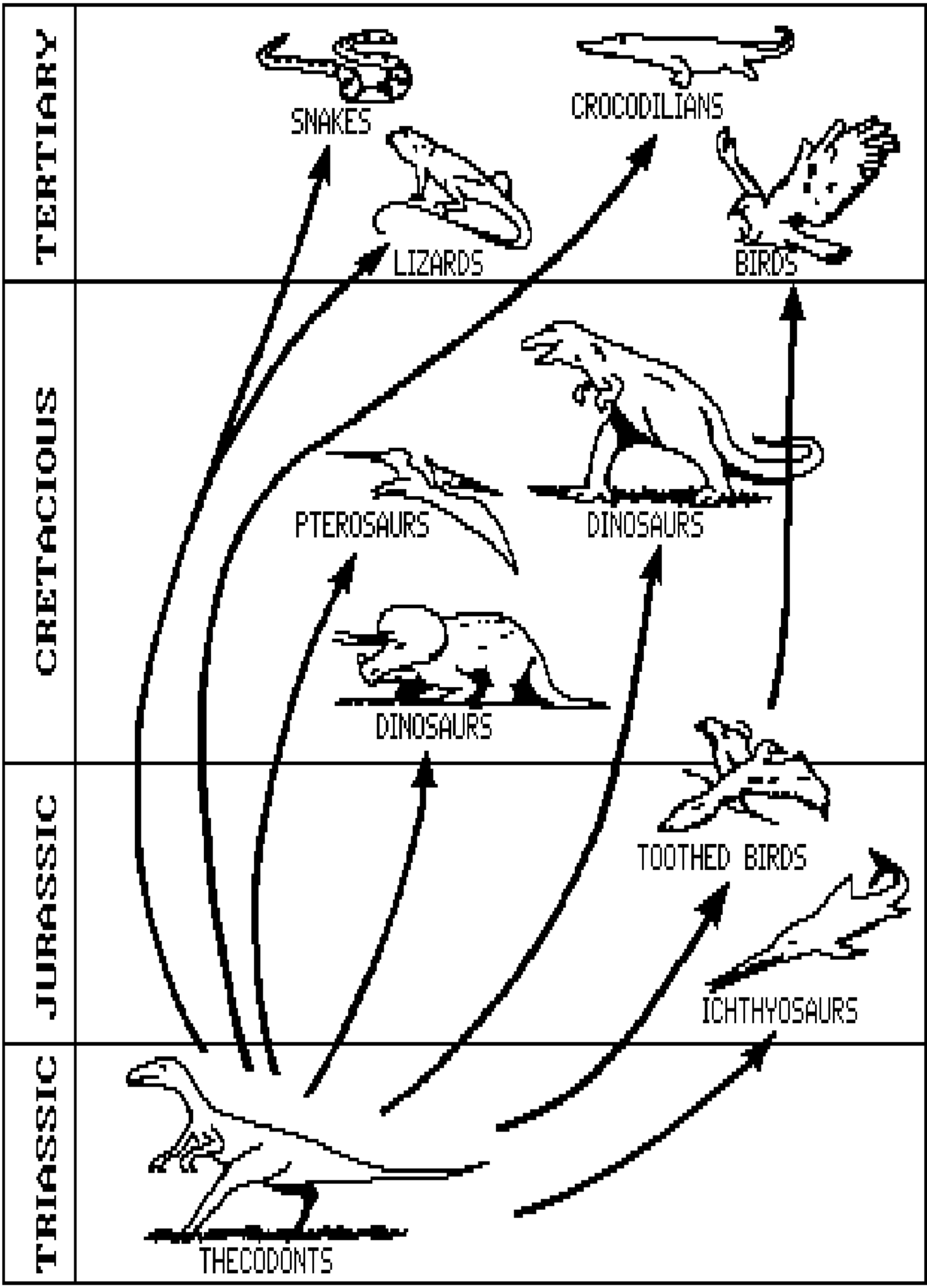

A
B
C
D
E
KEY:
Basalt
Granite
IGNEOUS ROCK
Unconsolidated
Glacial Deposits (Till)
Limestone
Sandstone
SEDIMENTARY
ROCK
Contact Metamorphism
Buried Erosional
Surface


H
E
C
D
F
G
G
C
B
A
KEY:
Contact metamorphism
Igneous intrusions
Limestone
Shale
Sandstone

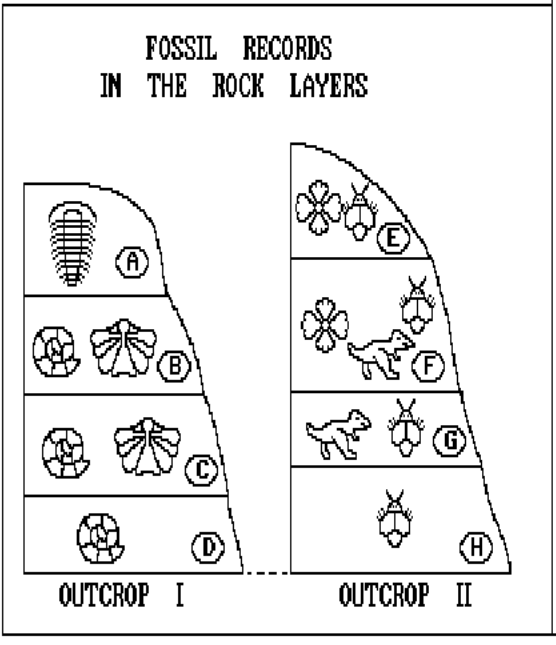

I
II
5km
Z
A
B
C
D
E
F
G
H
I
P
Q
R
S
T
U
V
W
X
Y
K E Y
SHALE
CONGLOMERATE
LIMESTONE
SANDSTONE
BASALT
FOSSIL
TRILOBITE
GRANITE
CONTACT
METAMORPHISM


Beginning of early Mississippian epoch
End of early Mississippian epoch

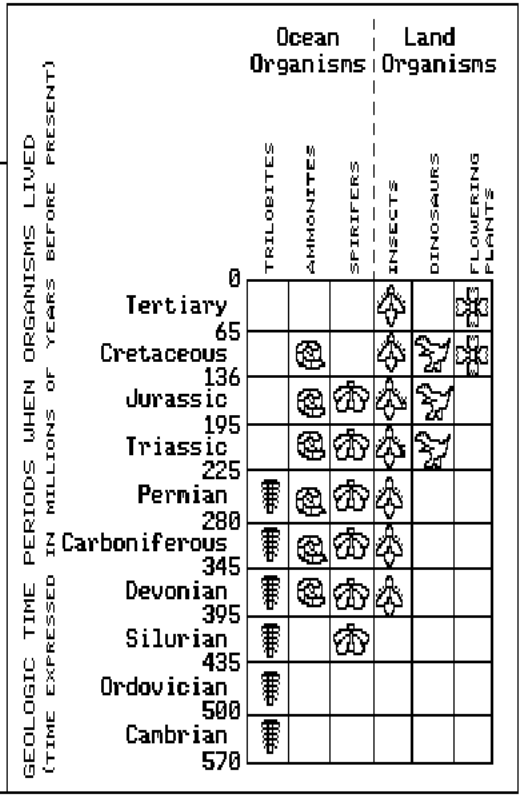

A
B
C
D
E
KEY:
Basalt
Granite
IGNEOUS ROCK
Unconsolidated
Glacial Deposits (Till)
Limestone
Sandstone
SEDIMENTARY
ROCK
Contact Metamorphism
Buried Erosional
Surface


TERTIARY
CRETACIOUS
JURASSIC
TRIASSIC
SNAKES
CROCODILIANS
LIZARDS
BIRDS
PTEROSAURS
DINOSAURS
DINOSAURS
TOOTHED BIRDS
ICHTHYOSAURS
THECODONTS

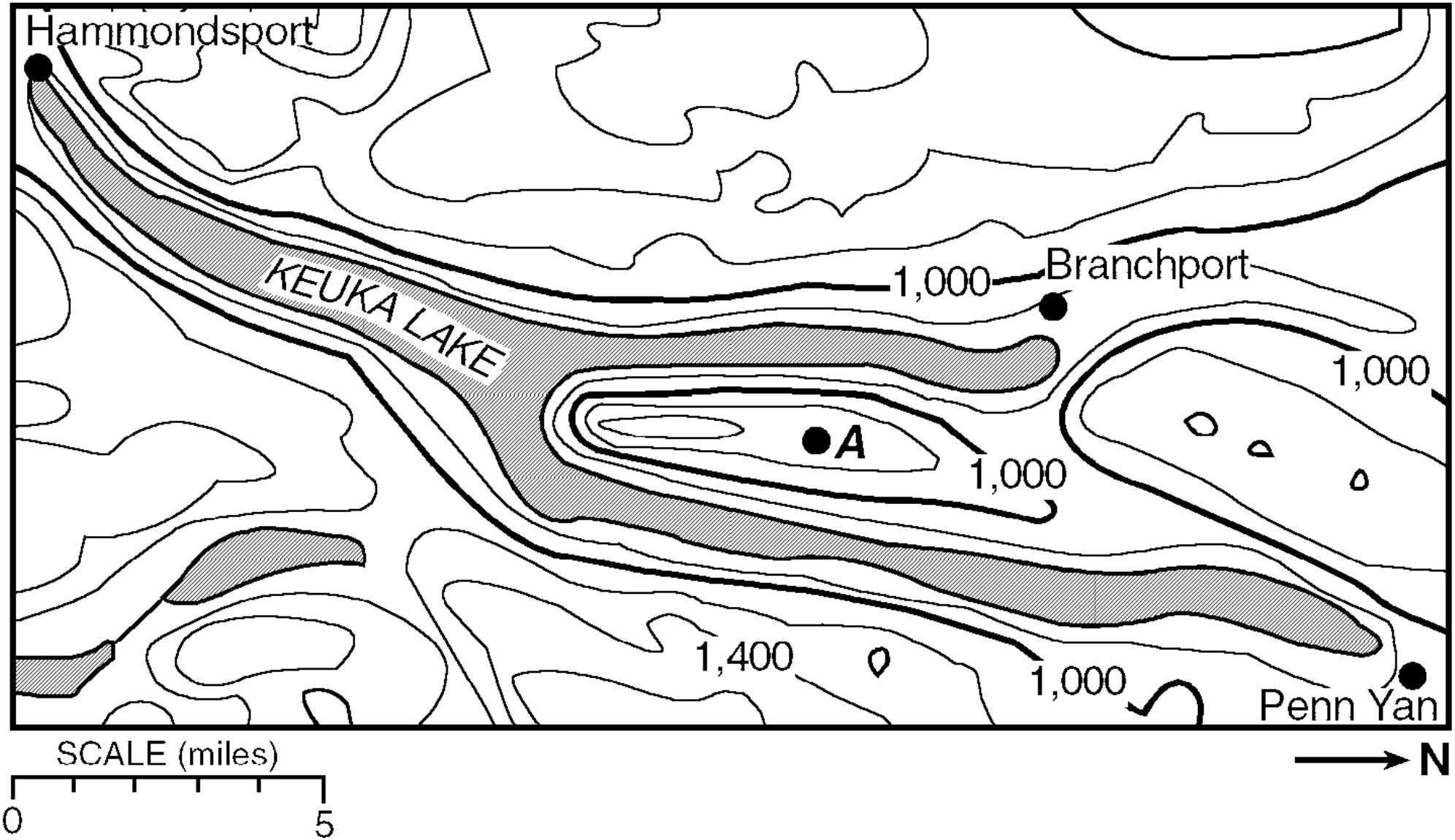
DIAGRAM

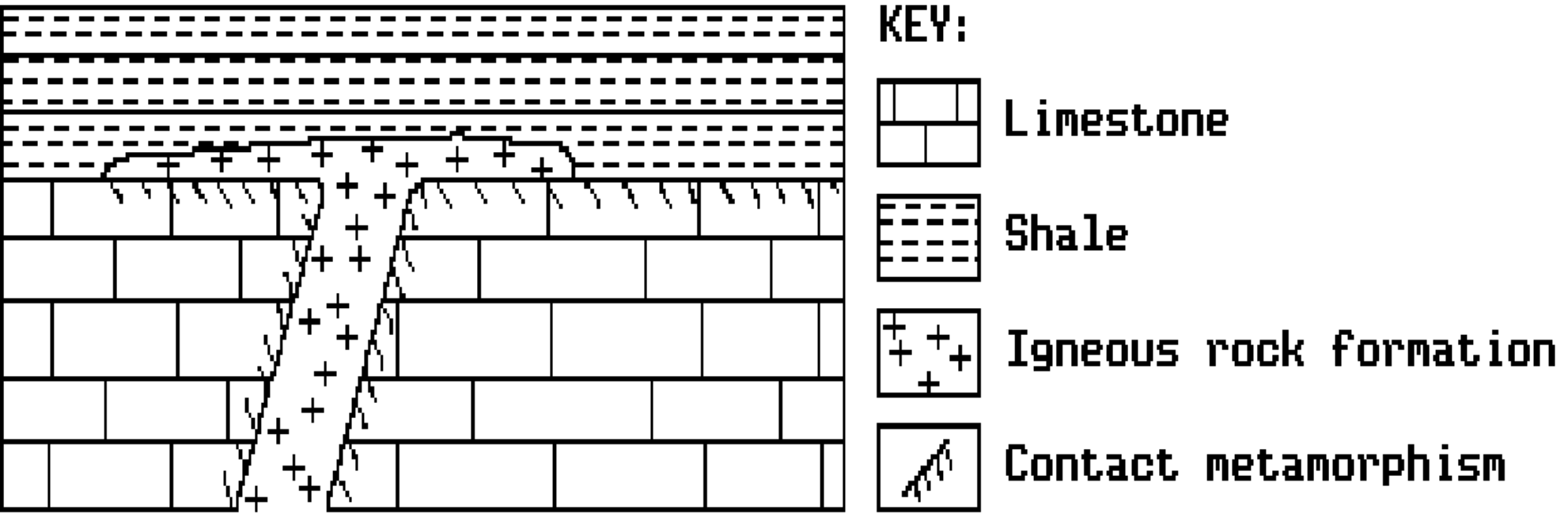


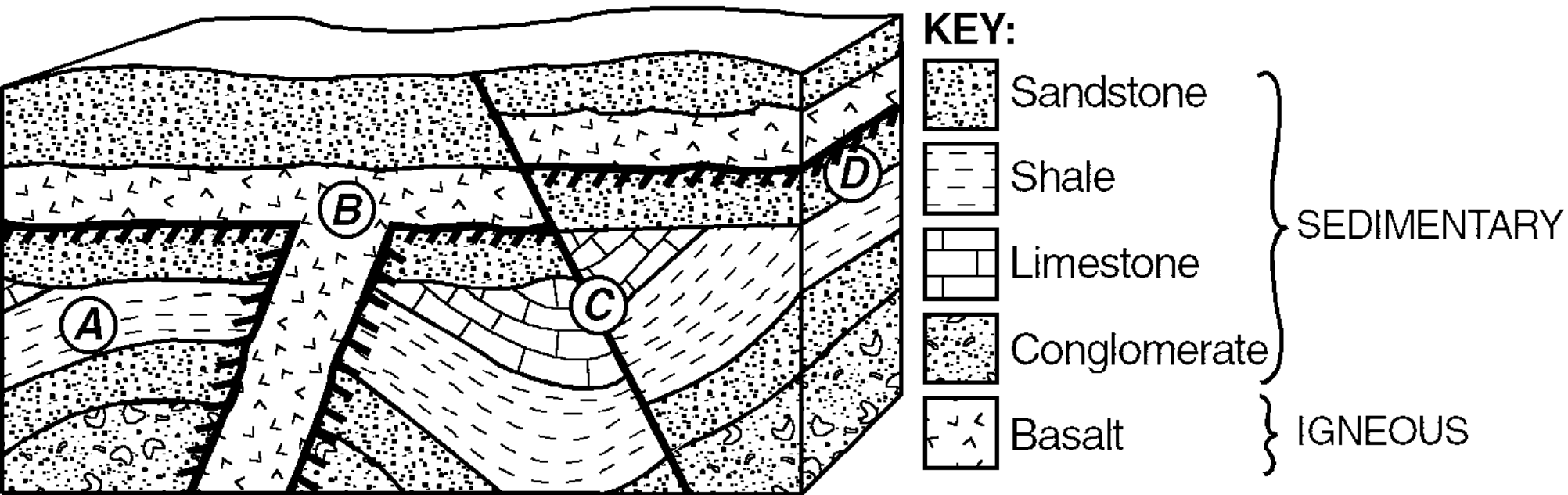

CHART

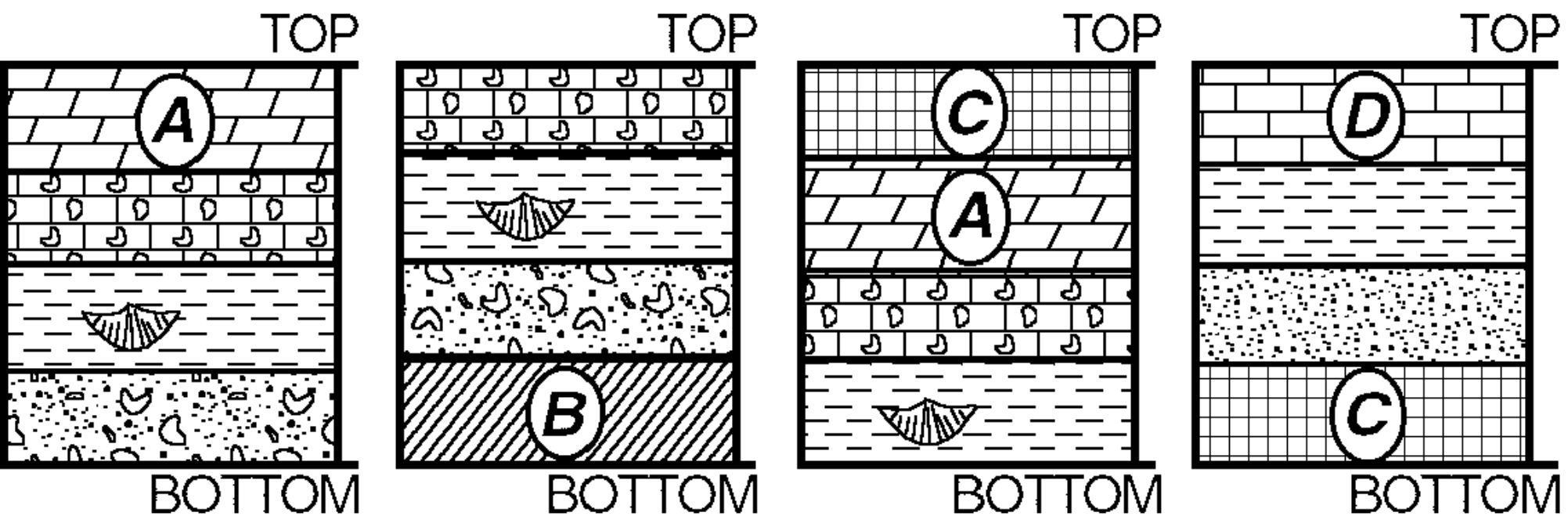


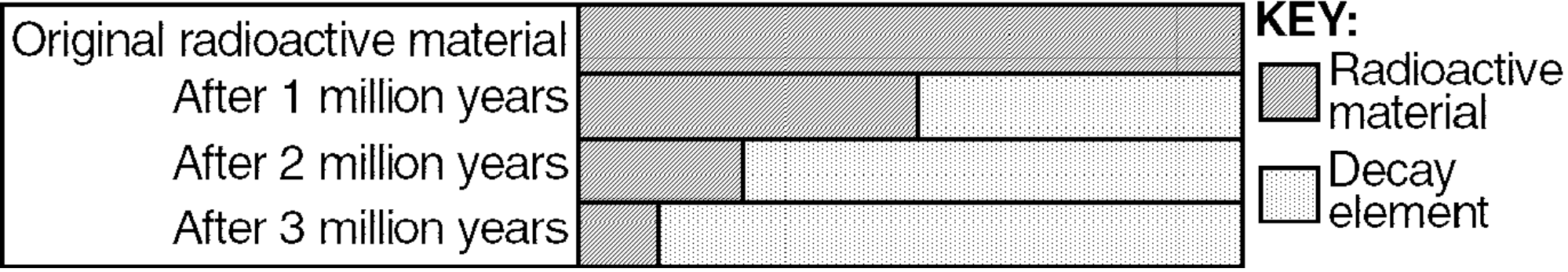
# TOPOGRAPHIC MAP

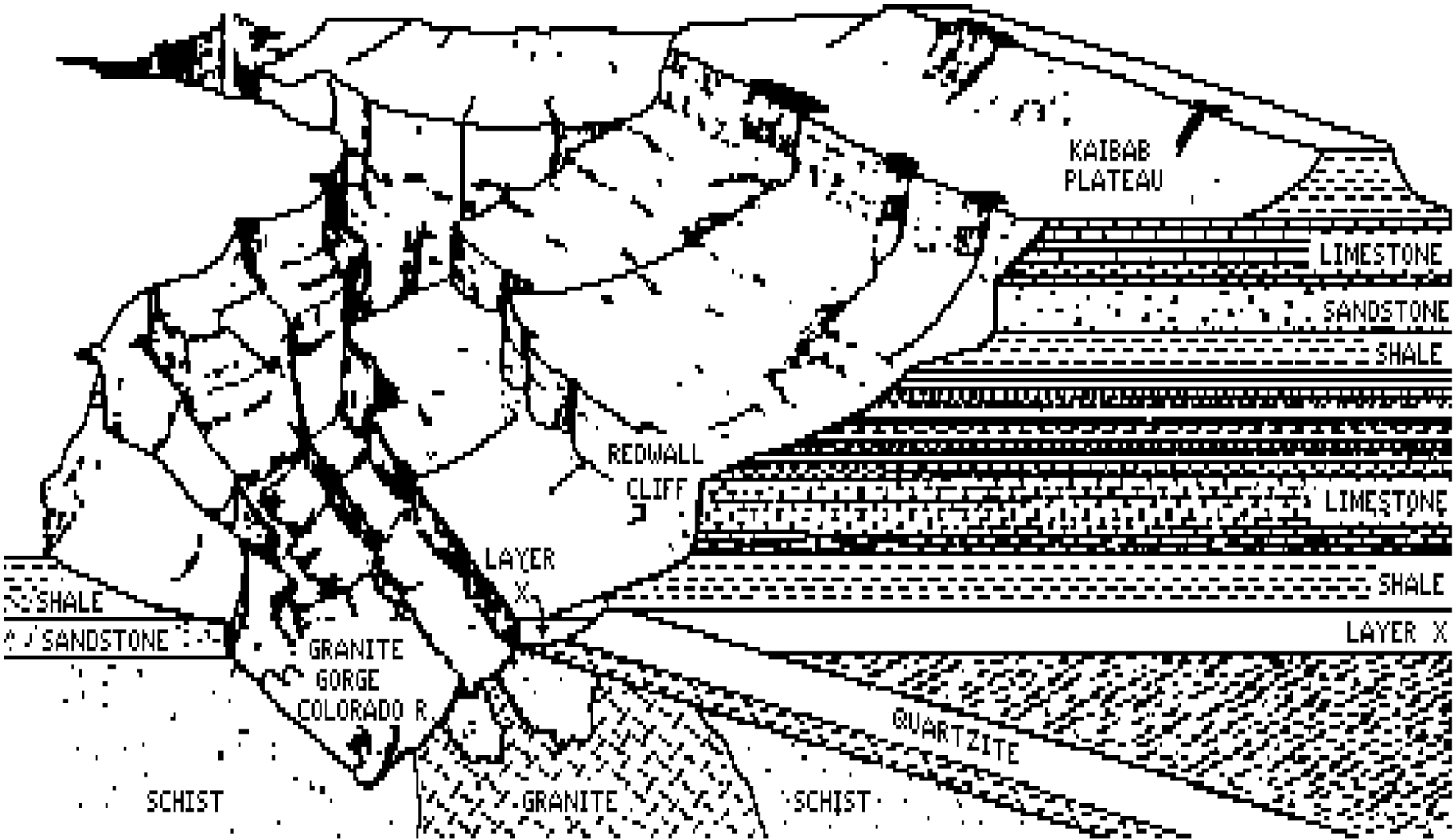


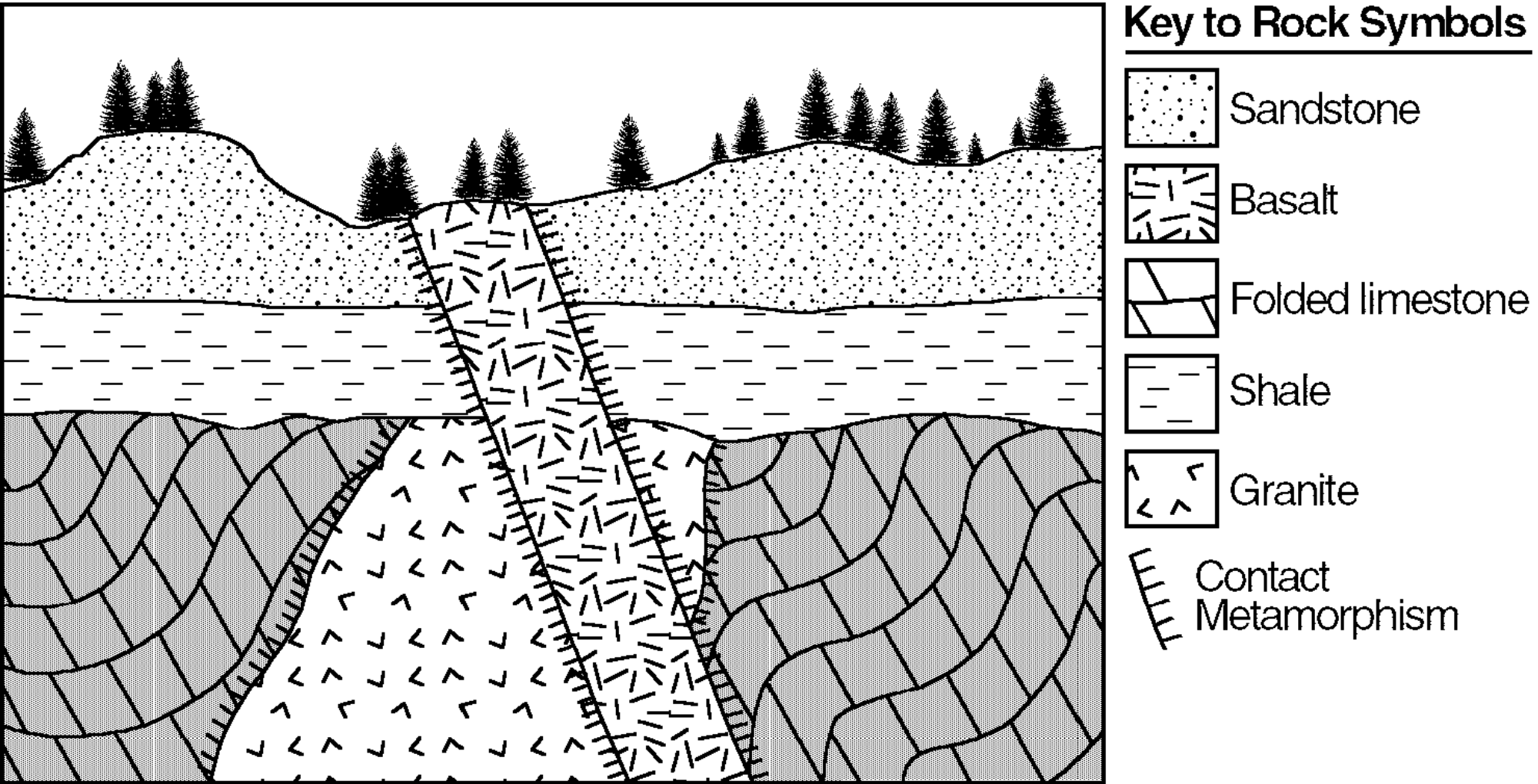

KEY:
Limestone
Shale
Igneous rock formation
Contact metamorphism

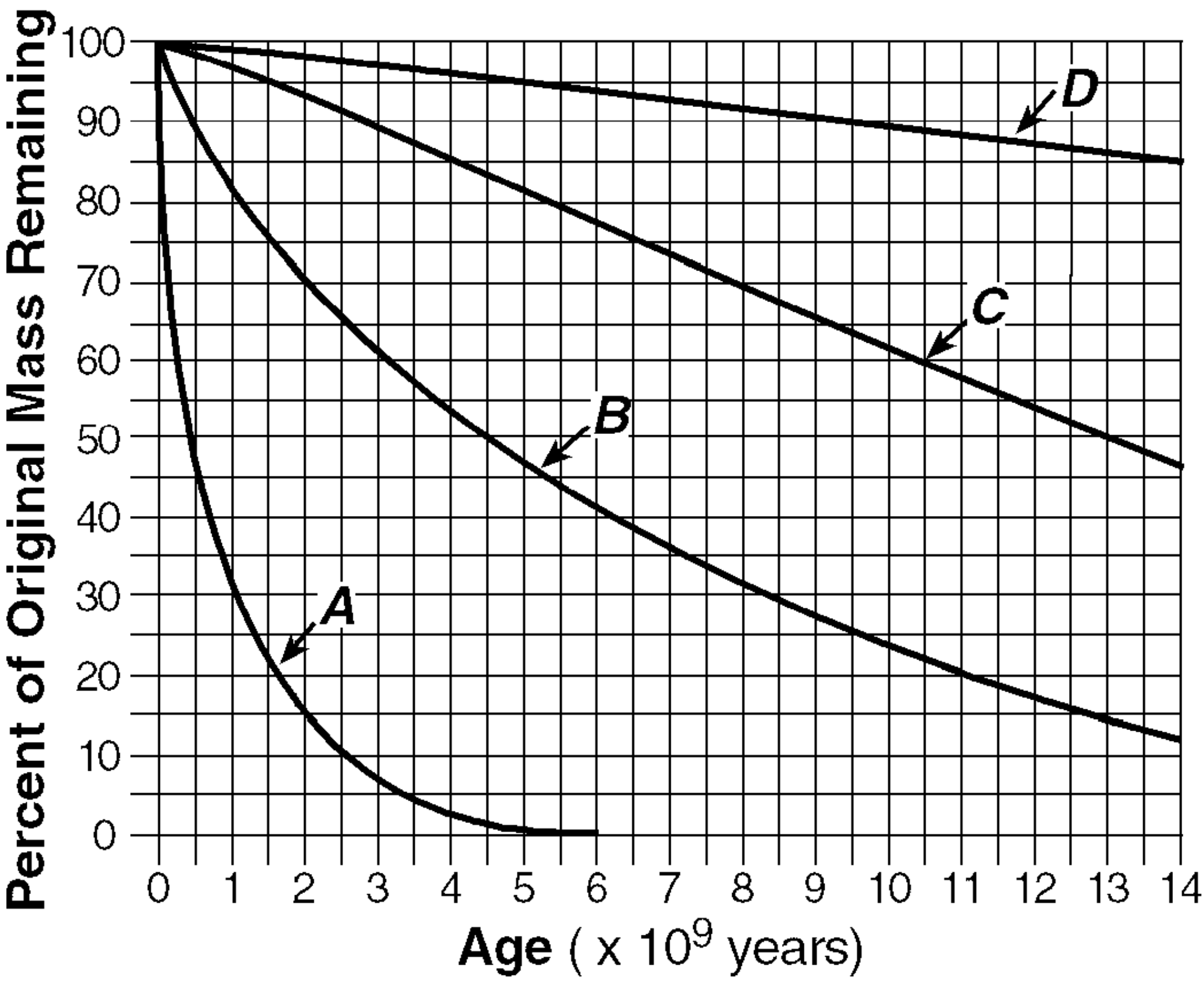

A
B
C
D
KEY:
Sandstone
Shale
Limestone
Conglomerate
SEDIMENTARY
Basalt
IGNEOUS

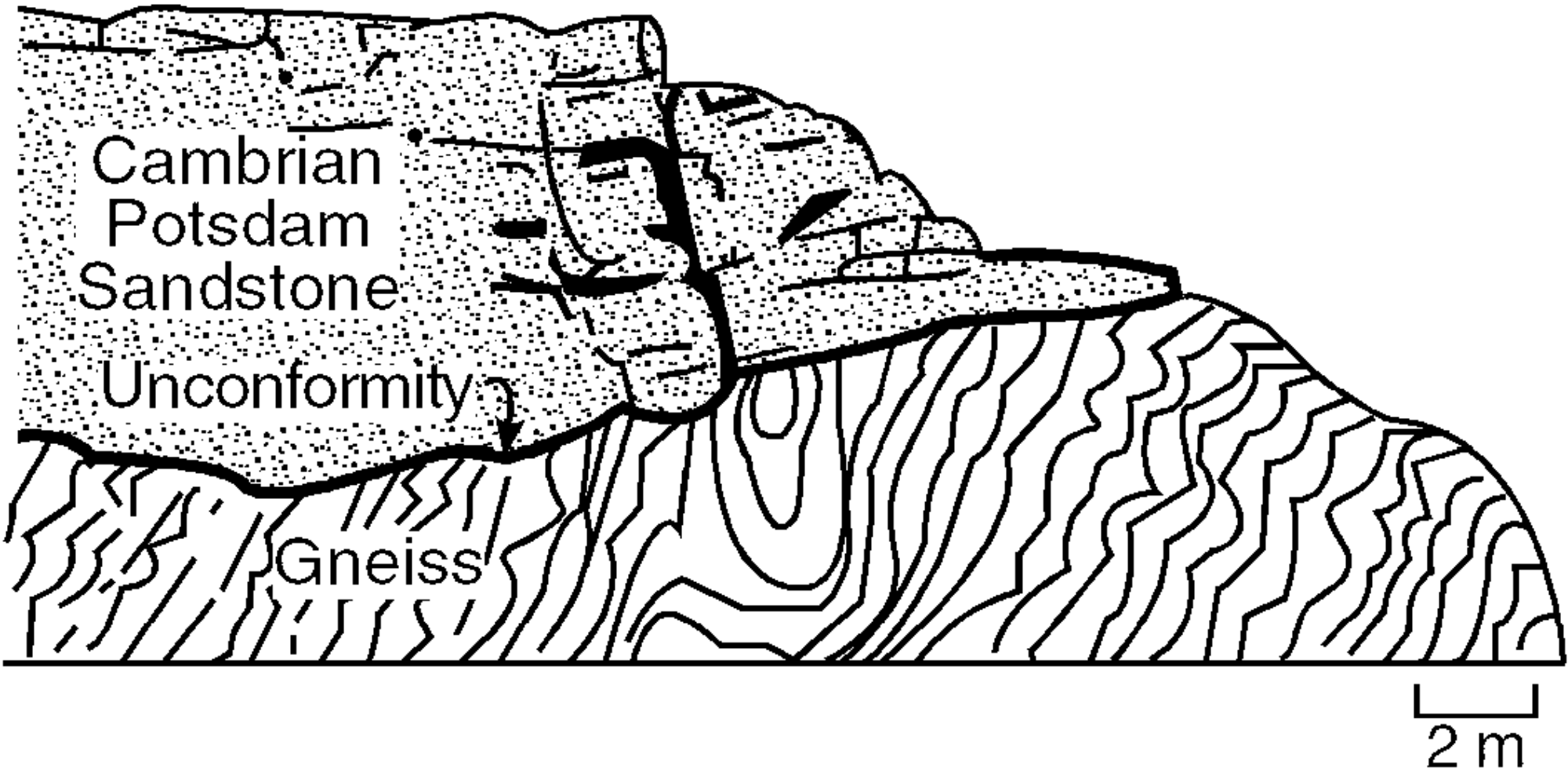

TOP
A
BOTTOM
TOP
B
BOTTOM
TOP
C
A
BOTTOM
TOP
D
C
BOTTOM

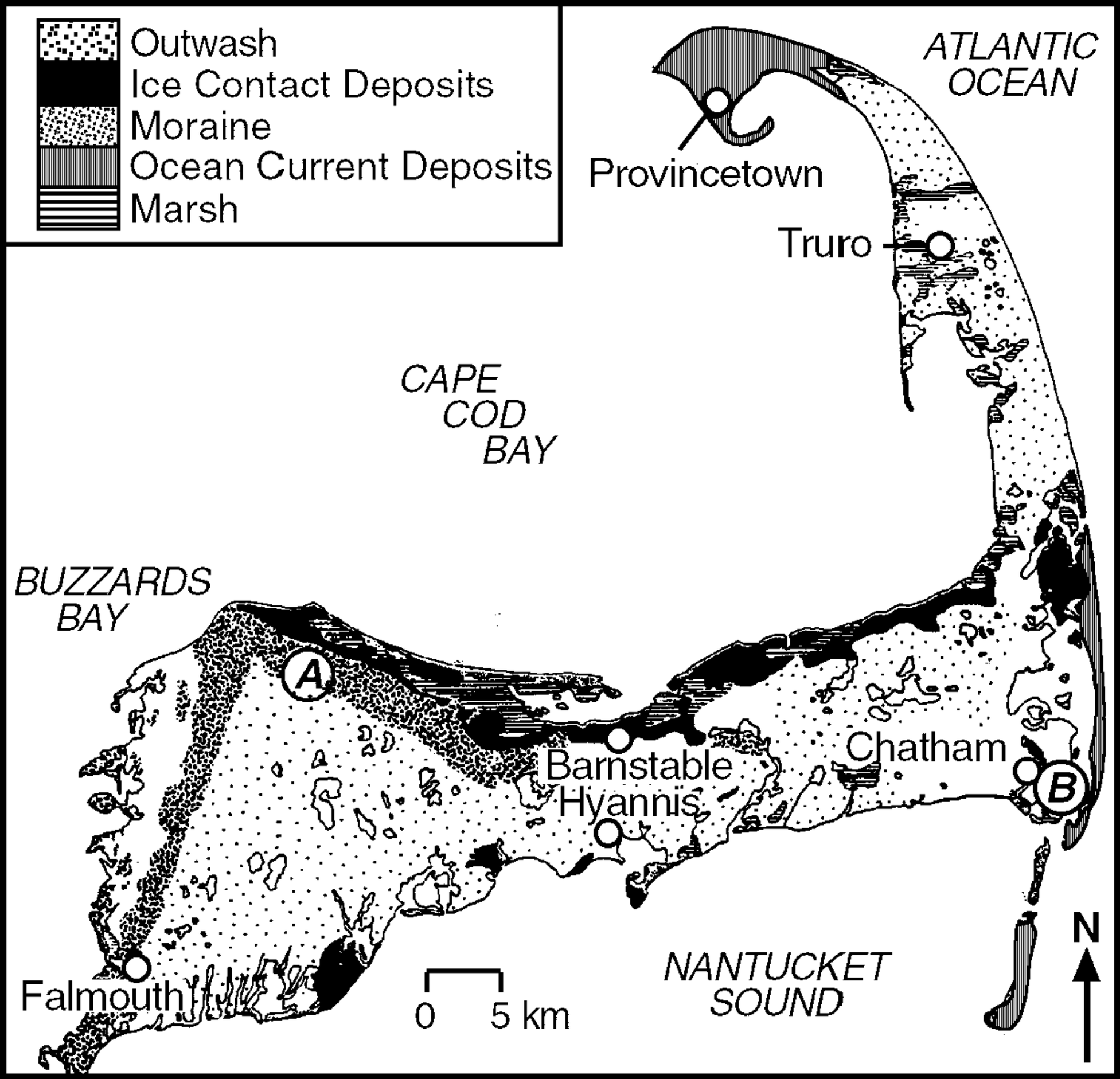

Original radioactive material
After 1 million years
After 2 million years
After 3 million years
KEY:
Radioactive material
Decay element

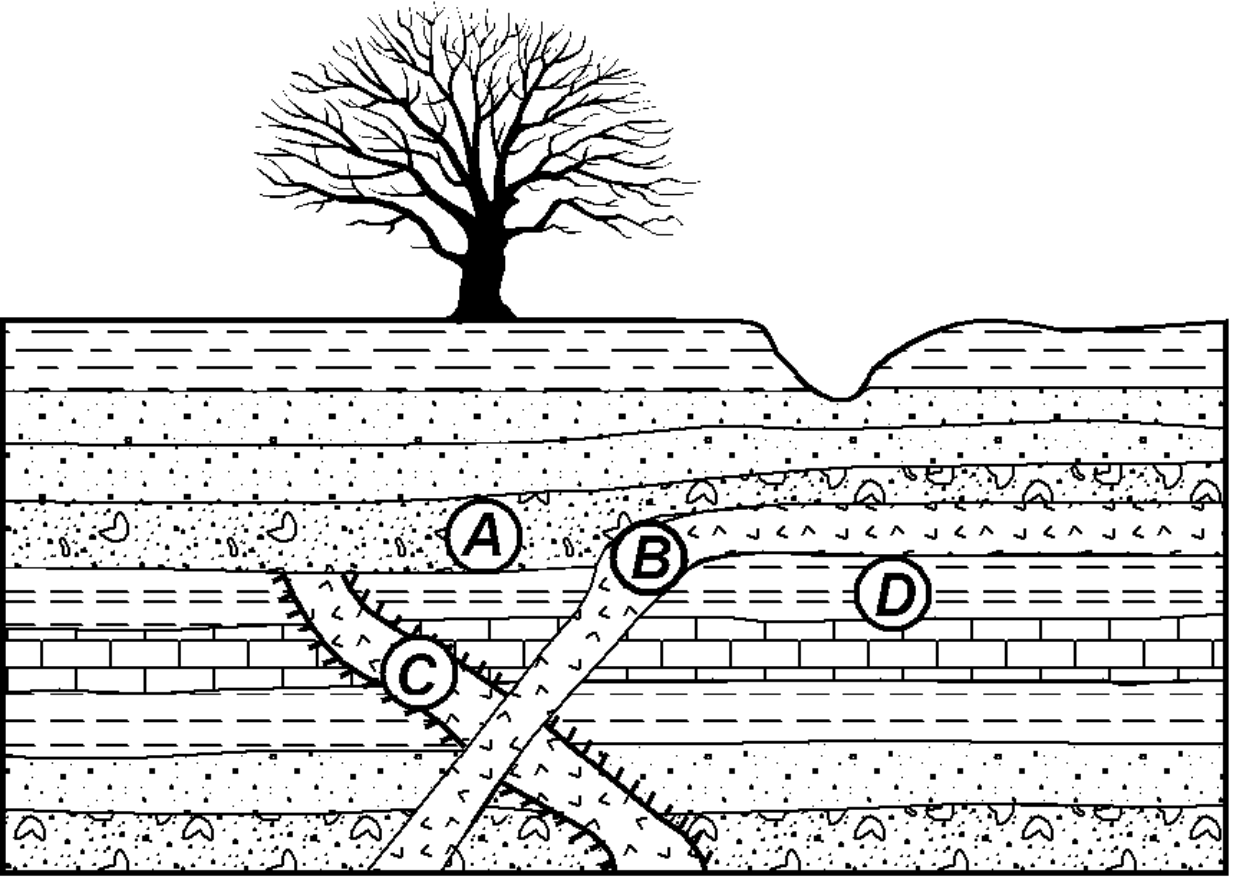

KAIBAB
PLATEAU
LIMESTONE
SANDSTONE
SHALE
REDWALL
CLIFF
LIMESTONE
LAYER
X
SHALE
SHALE
SANDSTONE
LAYER X
GRANITE
GORGE
COLORADO R.
QUARTZITE
SCHIST
GRANITE
SCHIST


Key to Rock Symbols
Sandstone
Basalt
Folded limestone
Shale
Granite
Contact Metamorphism


Percent of Original Mass Remaining
100
90
80
70
60
50
40
30
20
10
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Age ( x 10^9 years)
A
B
C
D


Cambrian
Potsdam
Sandstone
Unconformity
Gneiss
2 m

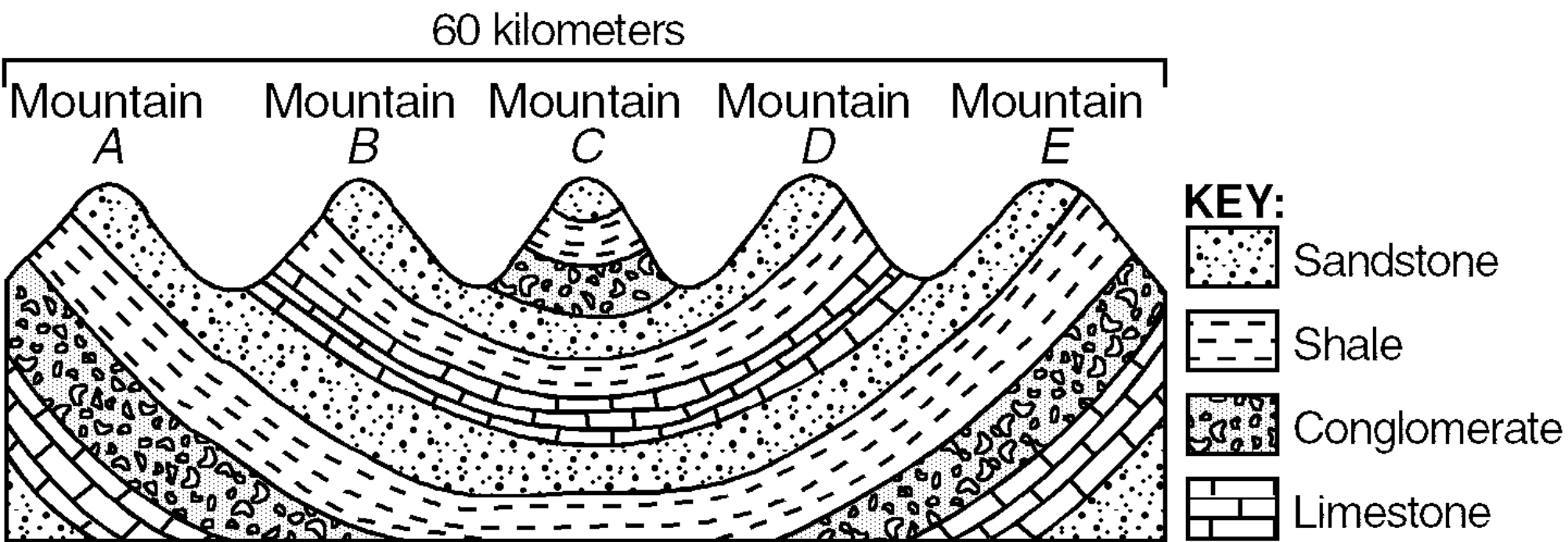

Outwash
Ice Contact Deposits
Moraine
Ocean Current Deposits
Marsh
ATLANTIC OCEAN
Provincetown
Truro
CAPE COD BAY
BUZZARDS BAY
A
Barnstable
Hyannis
Chatham
B
Falmouth
0 5 km
NANTUCKET SOUND
N

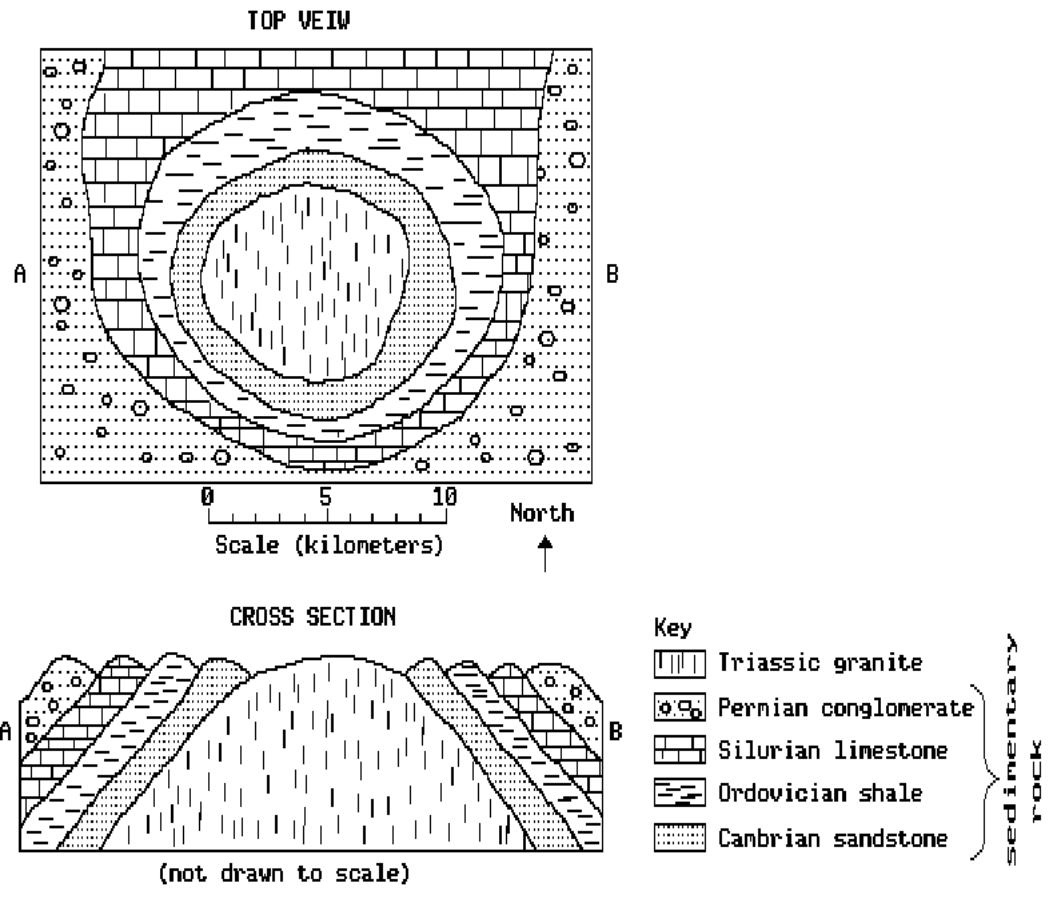


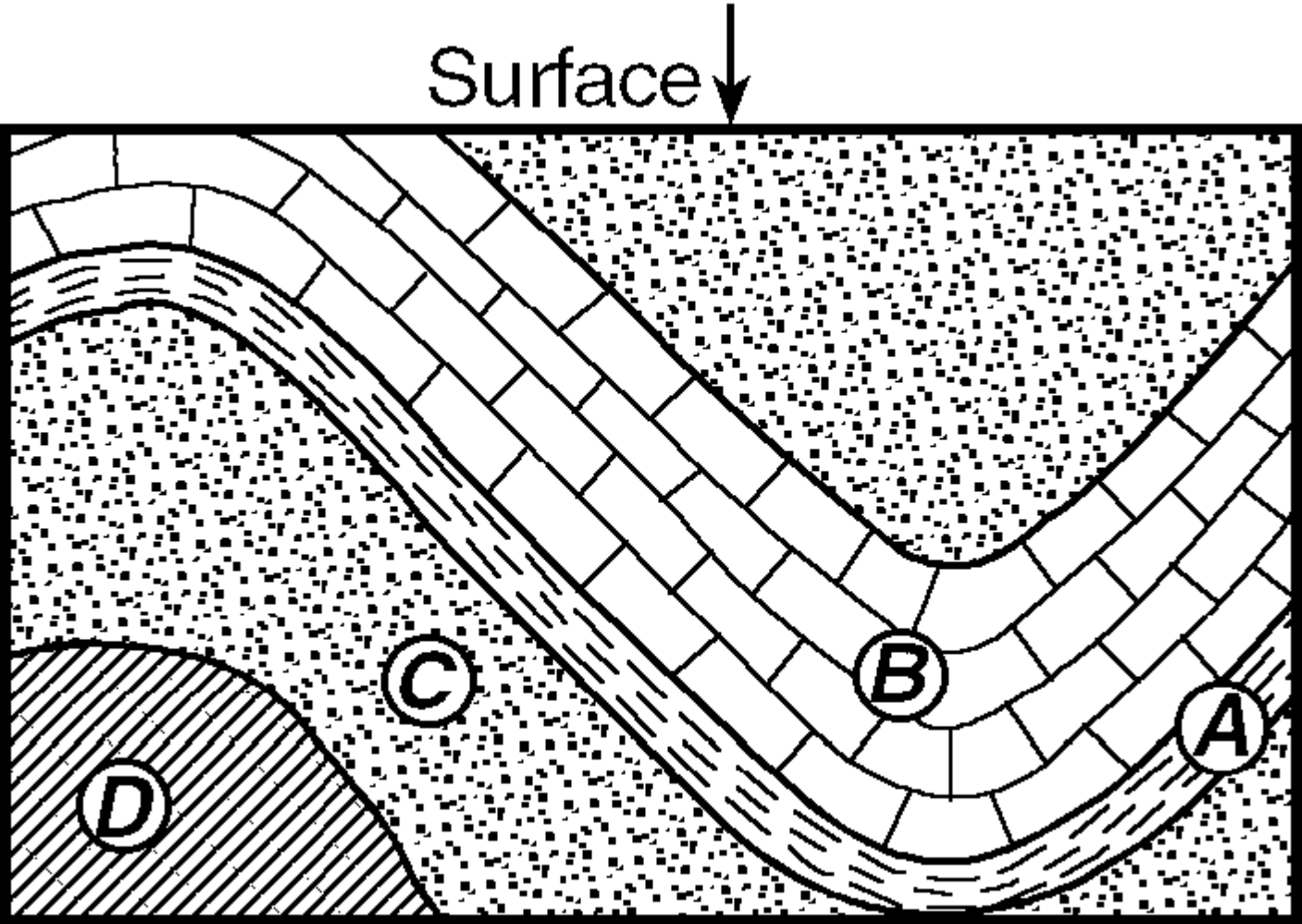

**KEY:**

Igneous rock

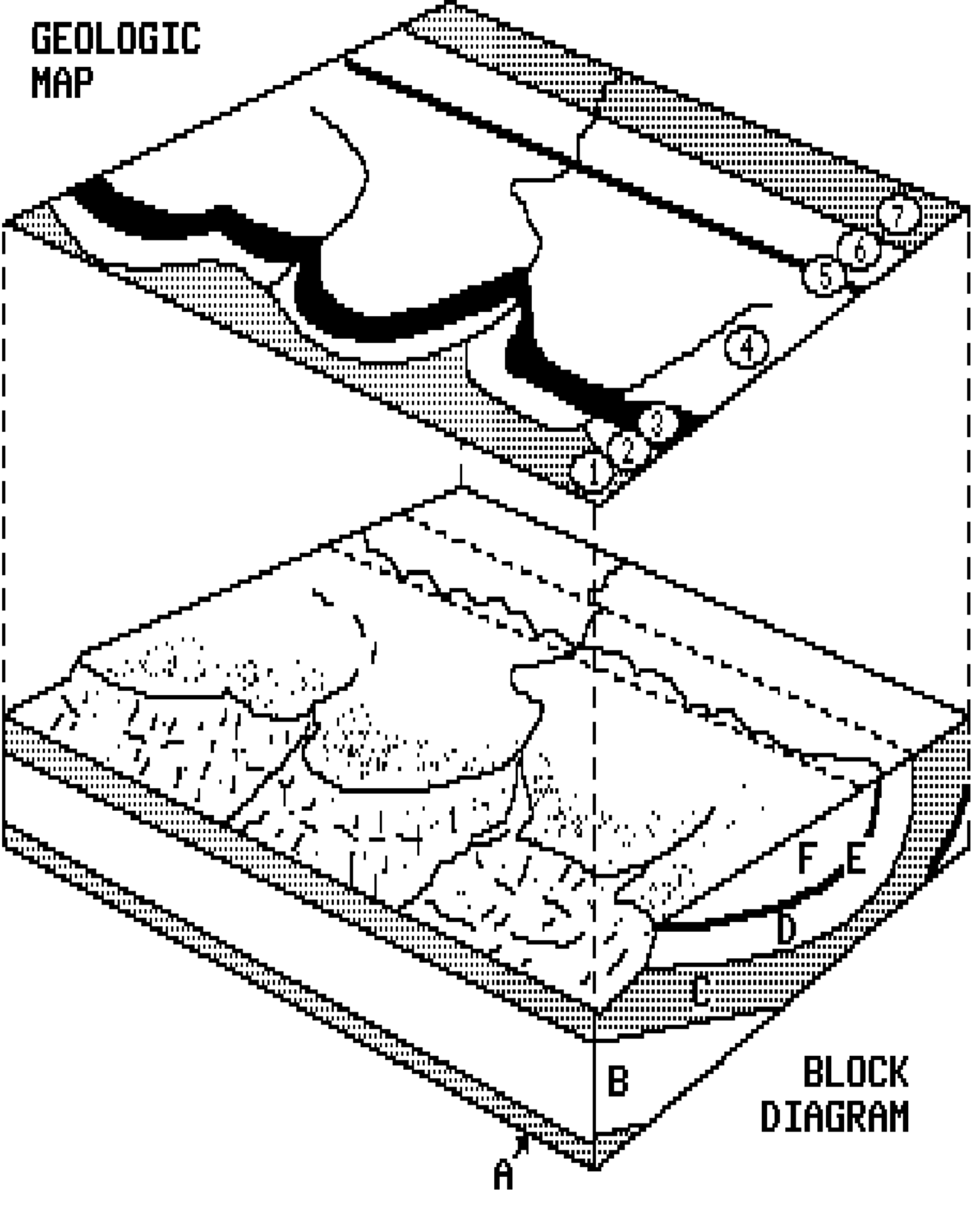
Contact metamorphism (transition zone)

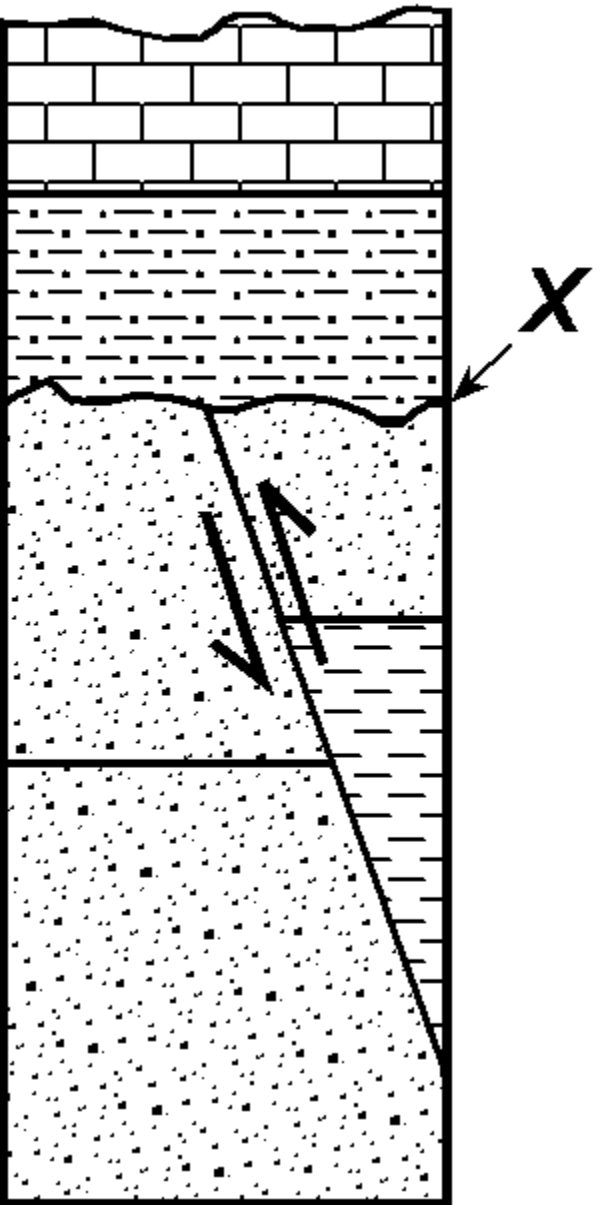

60 kilometers
Mountain A
Mountain B
Mountain C
Mountain D
Mountain E
KEY:
Sandstone
Shale
Conglomerate
Limestone

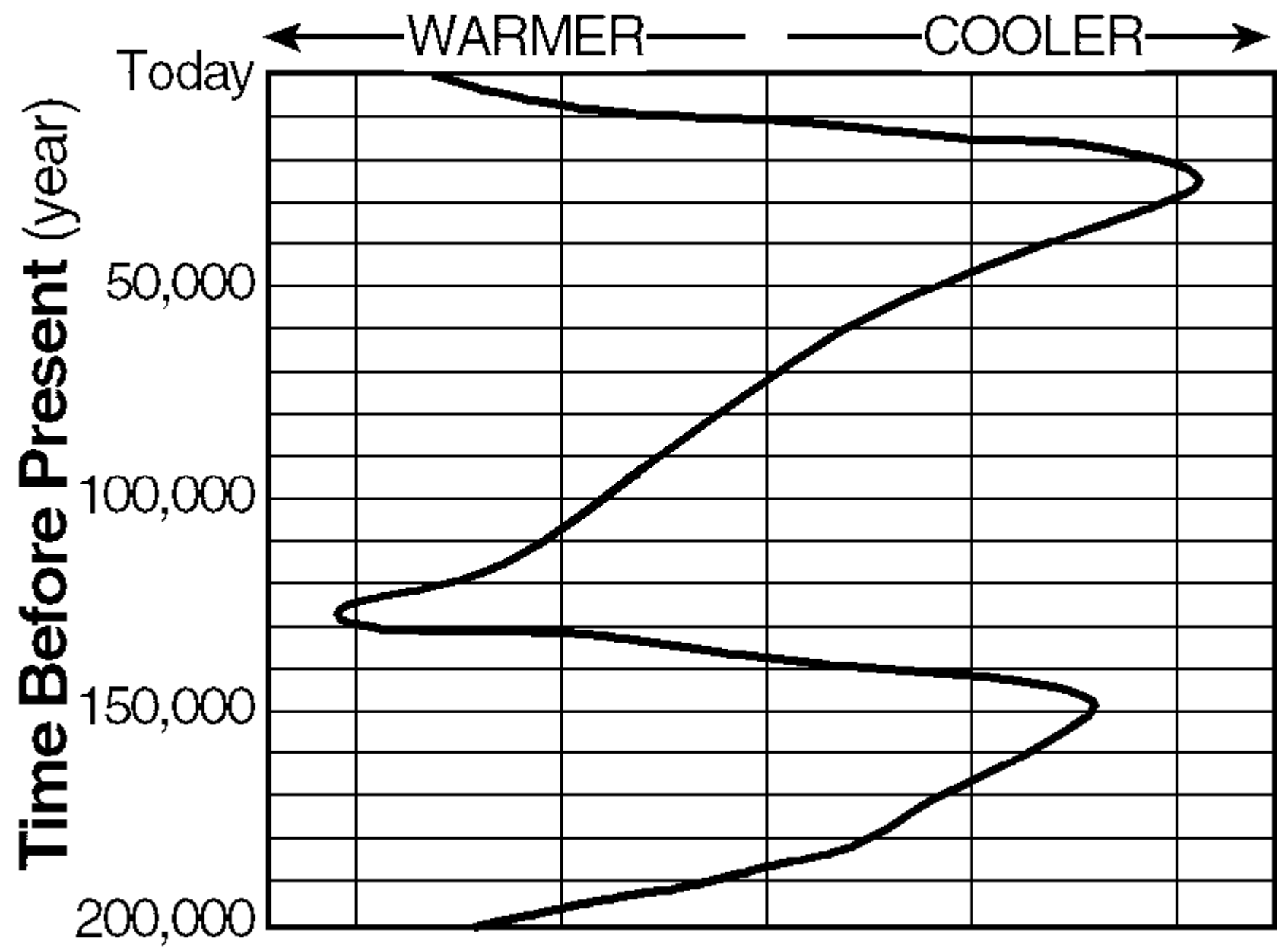

TOP VEIW
A
B
0
5
10
Scale (kilometers)
North
CROSS SECTION
A
B
(not drawn to scale)
Key
Triassic granite
Permian conglomerate
Silurian limestone
Ordovician shale
Cambrian sandstone
sedimentary rock

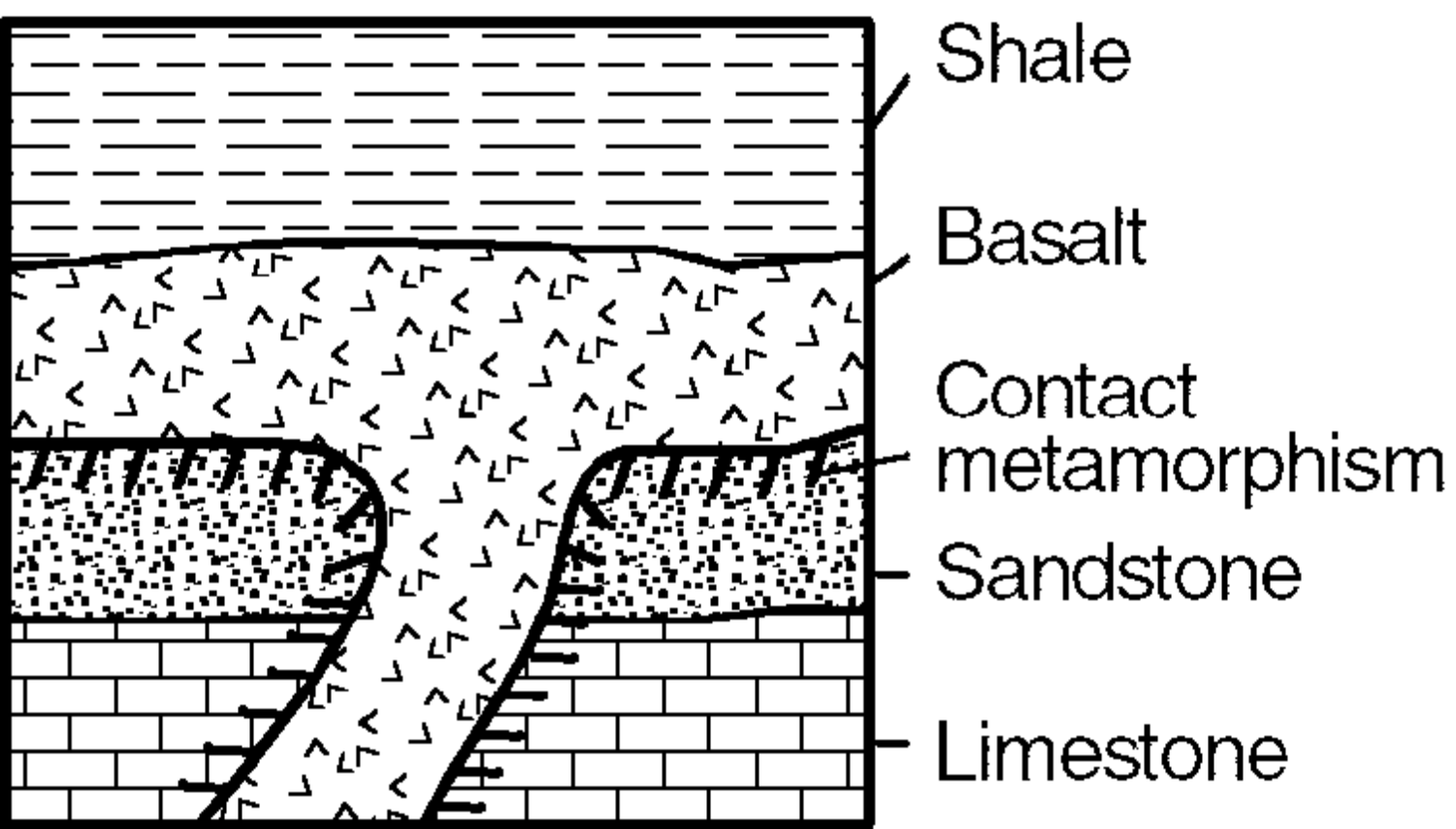

Surface
A
B
C
D

| Half-Life | Mass of Original C-14 Remaining (grams) | Number of Years |
|---|---|---|
| 0 | 1 | 0 |
| 1 | $\frac{1}{2}$ | 5,700 |
| 2 | $\frac{1}{4}$ | 11,400 |
| 3 | $\frac{1}{8}$ | 17,100 |
| 4 | | |
| 5 | | |
| 6 | | |


GEOLOGIC
MAP
7
6
5
4
3
2
1
F
E
D
C
B
A
BLOCK
DIAGRAM

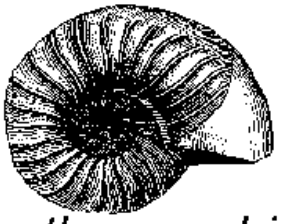

X


WARMER
COOLER
Today
50,000
100,000
150,000
200,000
Time Before Present (year)


Shale
Basalt
Contact
metamorphism
Sandstone
Limestone

MESOZOIC ERA

PALEOZOIC ERA



*Acanthoscaphites*

Cretaceous

*Meekoceras*

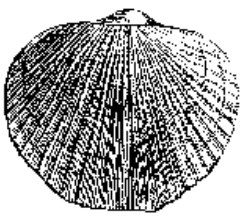
Jurassic

Triassic

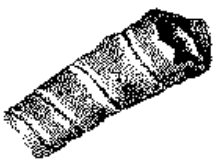
*Neospirifer*

Permian

Pennsylvanian



*Spirifer*



Crinoid stem

Mississippian

Carboniferous

*Mucrospirifer*

*Phacops*

Devonian

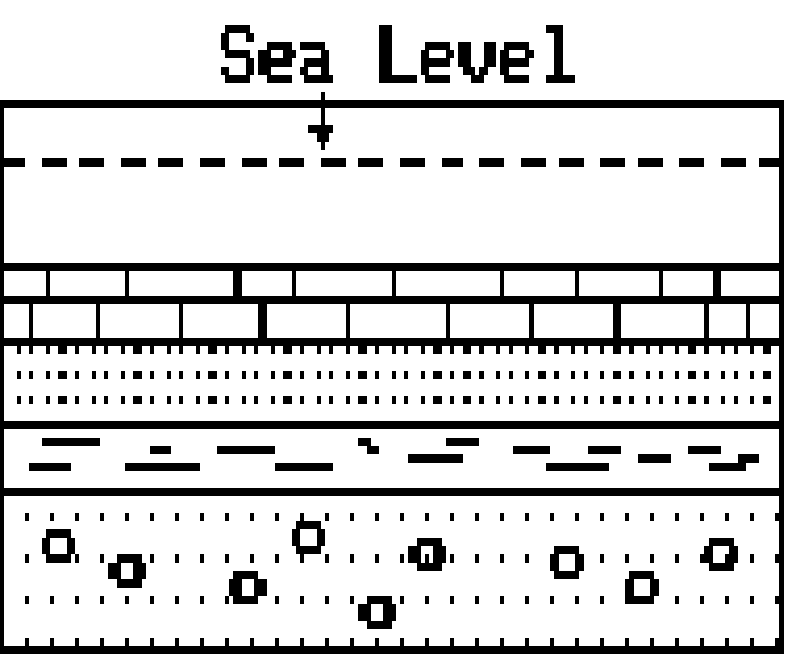
*Eospirifer*

Silurian

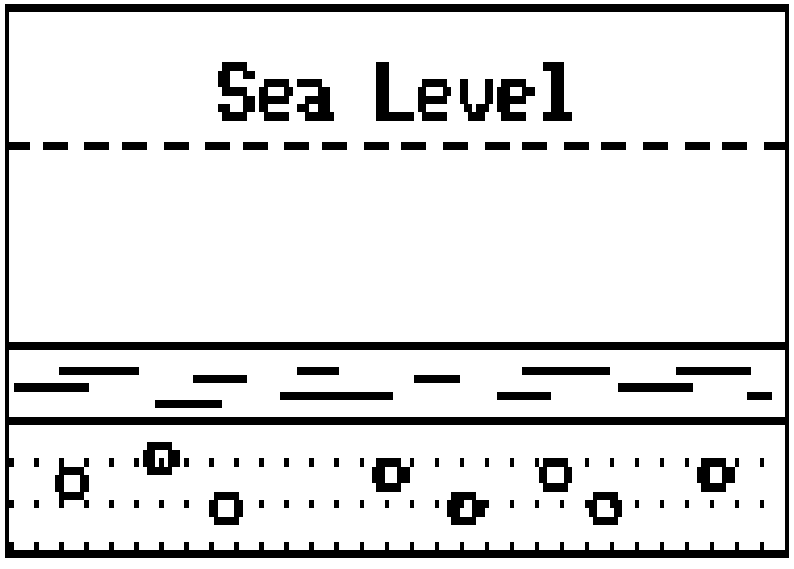
*Michelinoceras*

Ordovician

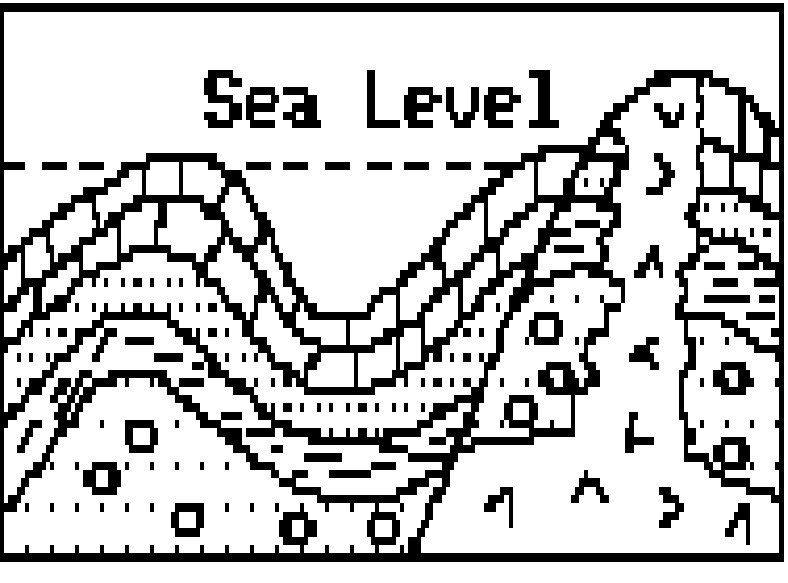
Cambrian



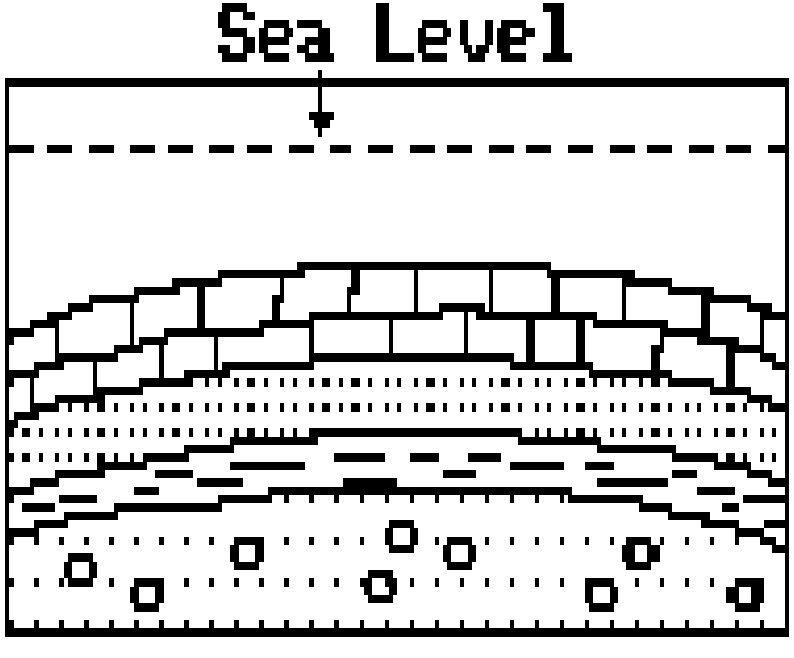

A



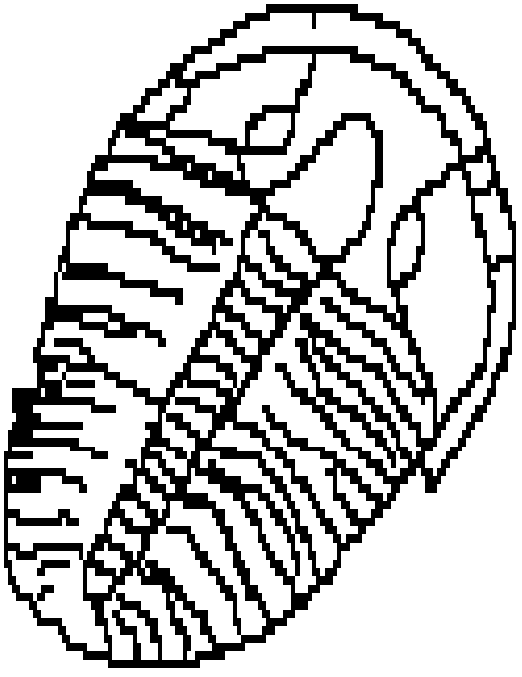

C



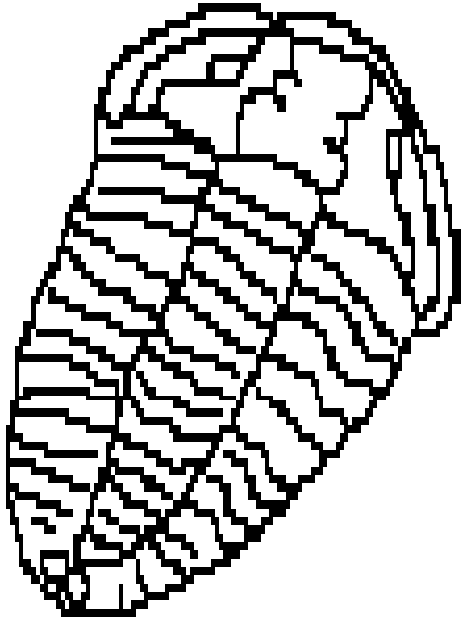

B



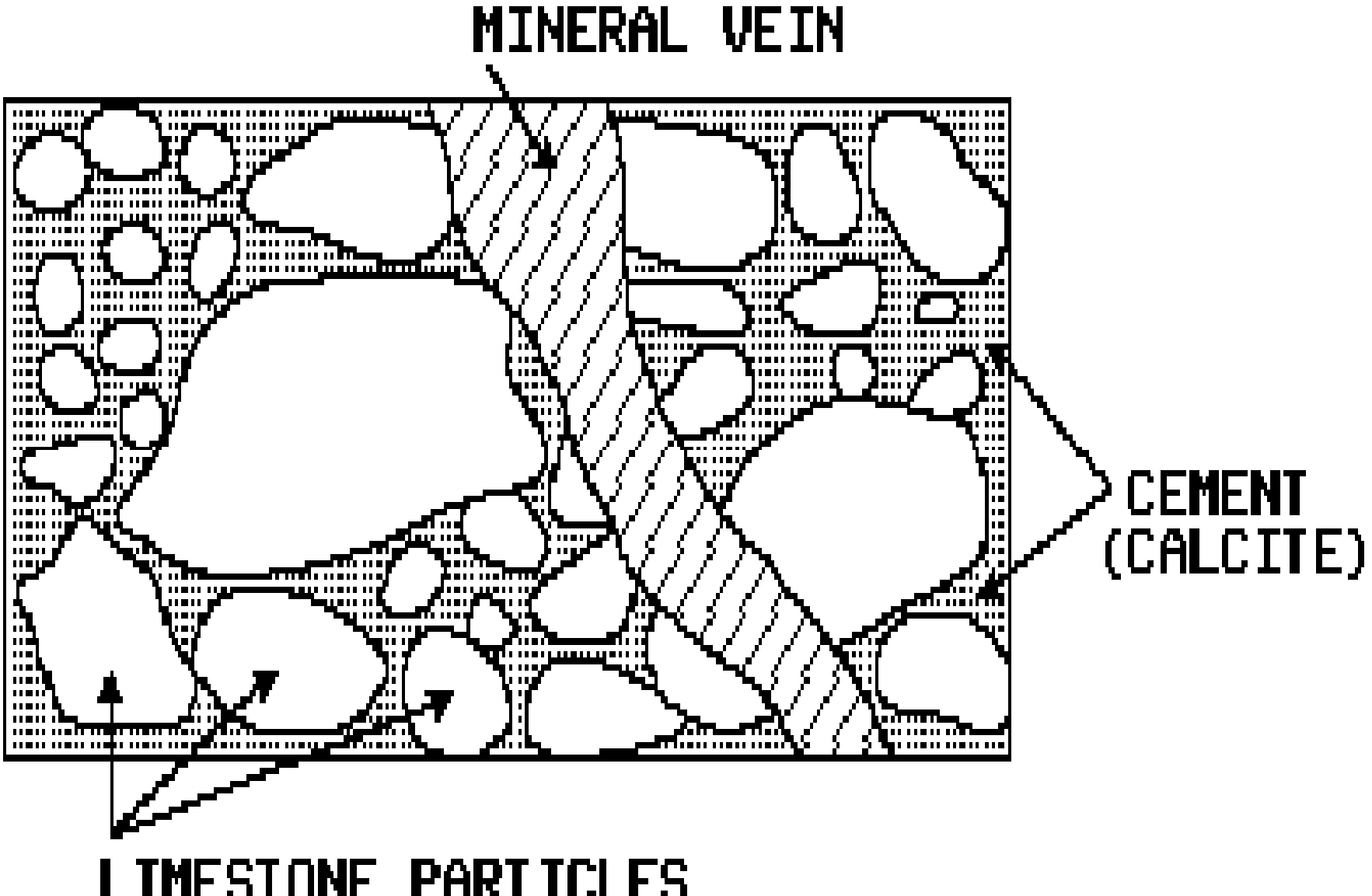

D

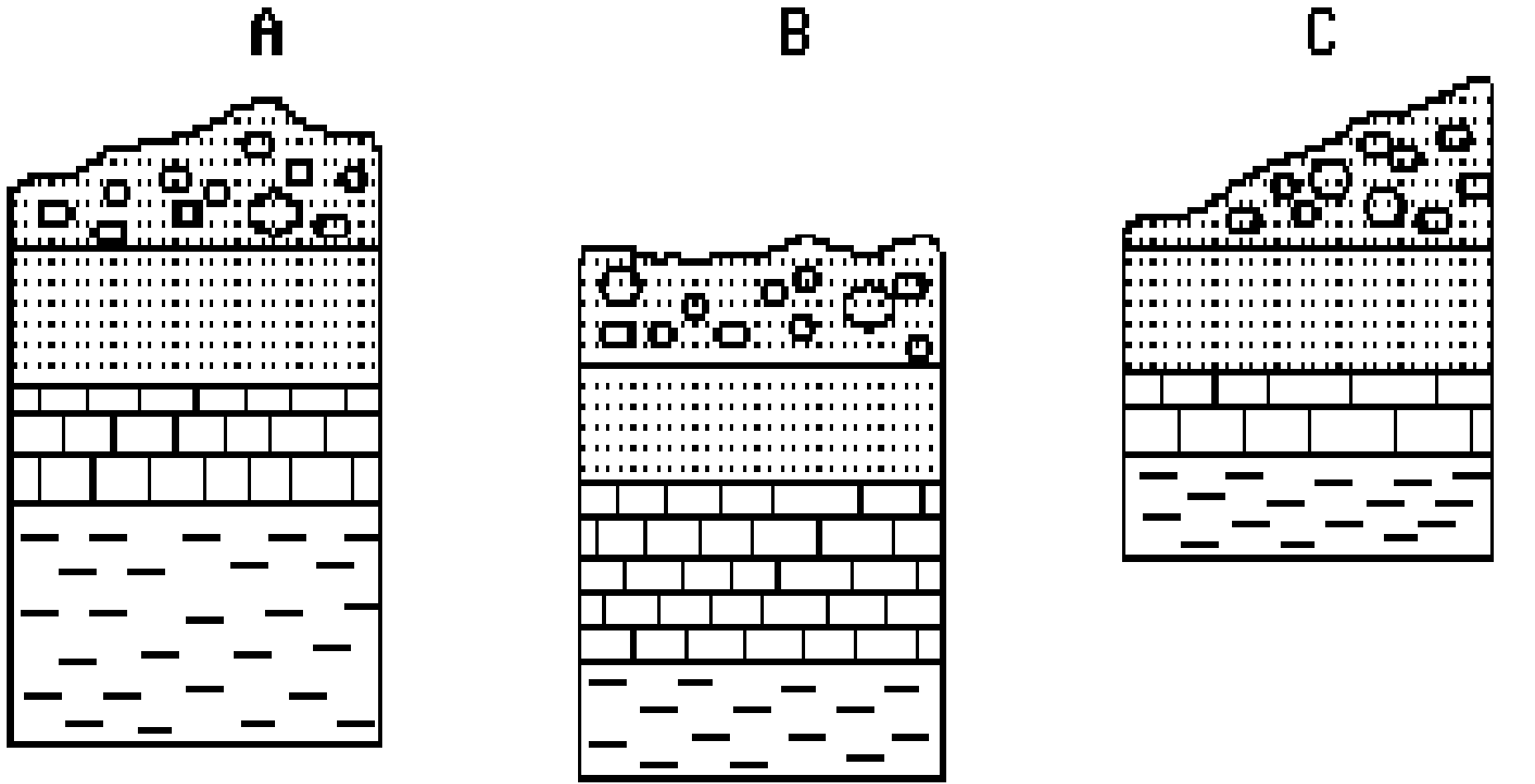


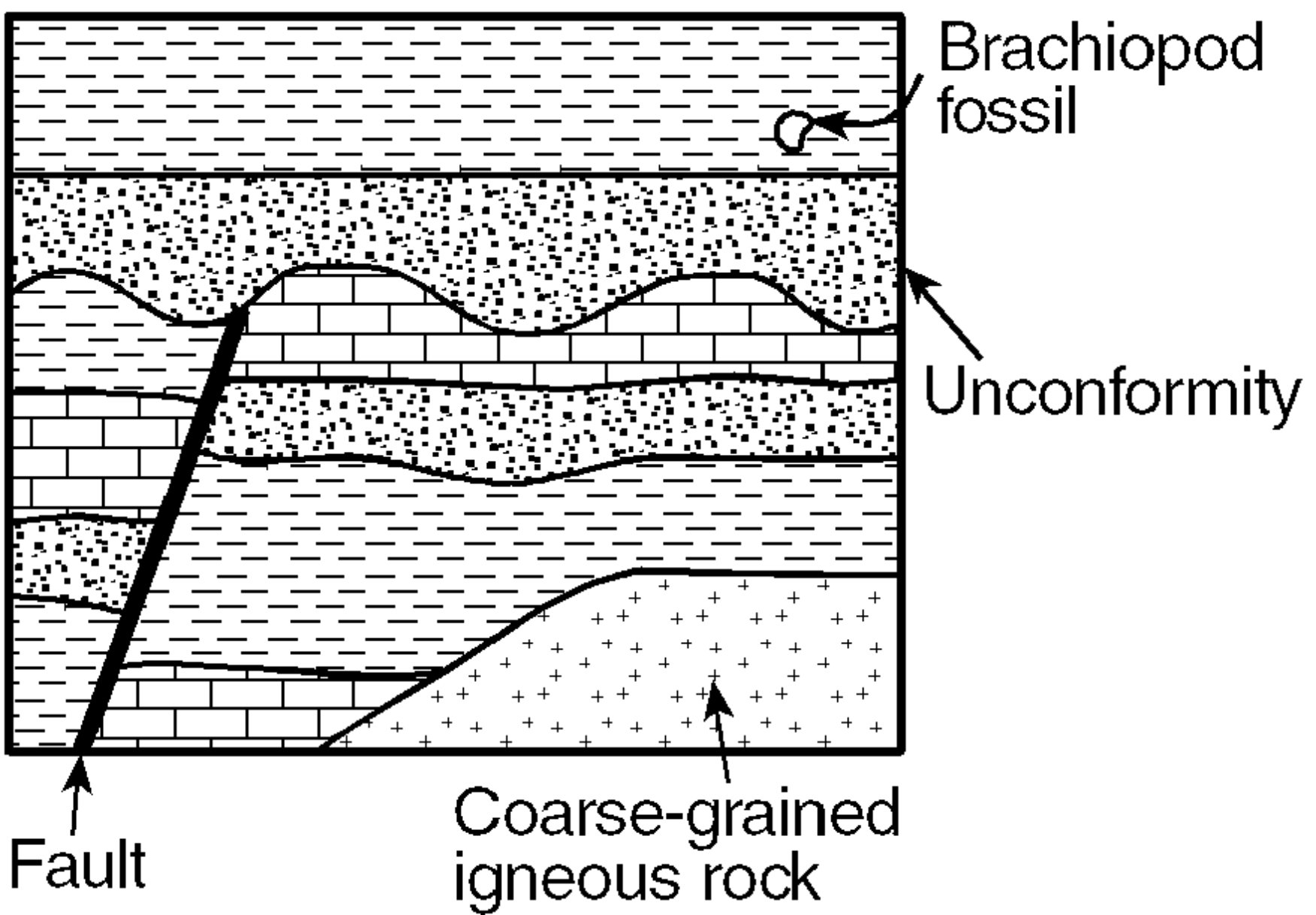
Middle Cambrian
Trilobite

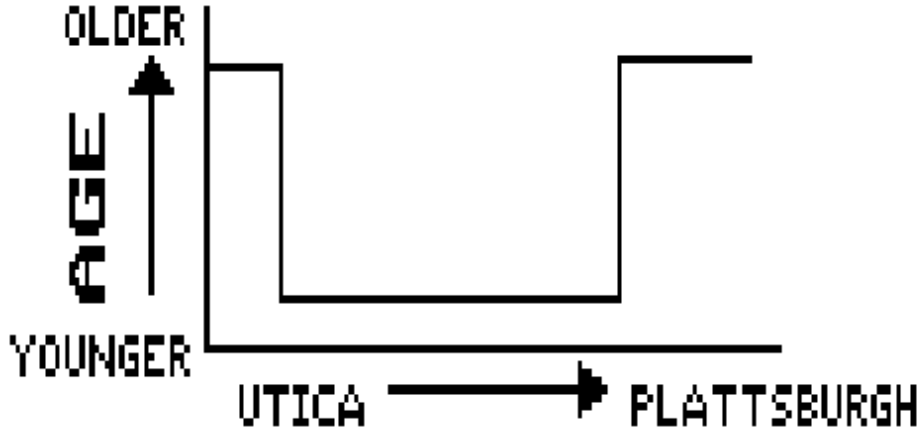


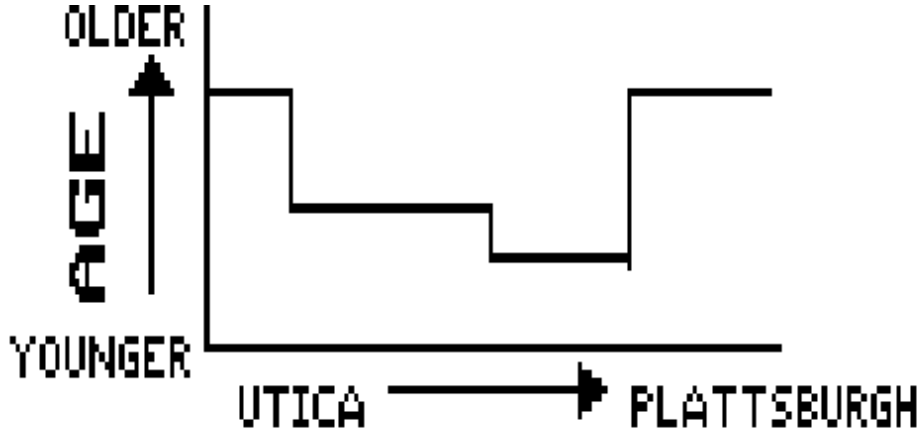
Silurian
Trilobite

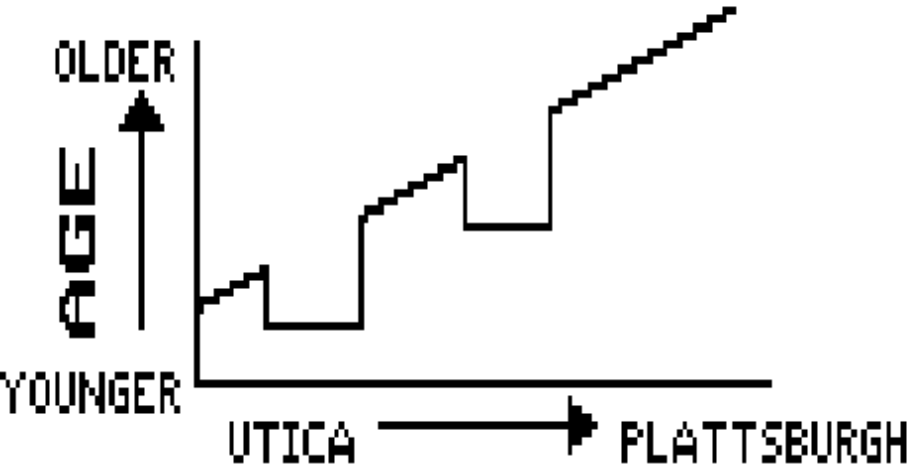

MINERAL VEIN
CEMENT
(CALCITE)
LIMESTONE PARTICLES

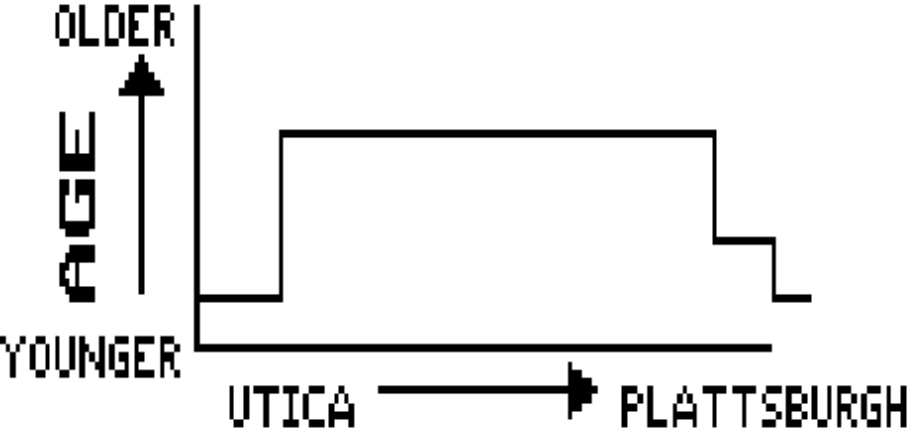

A
B
C

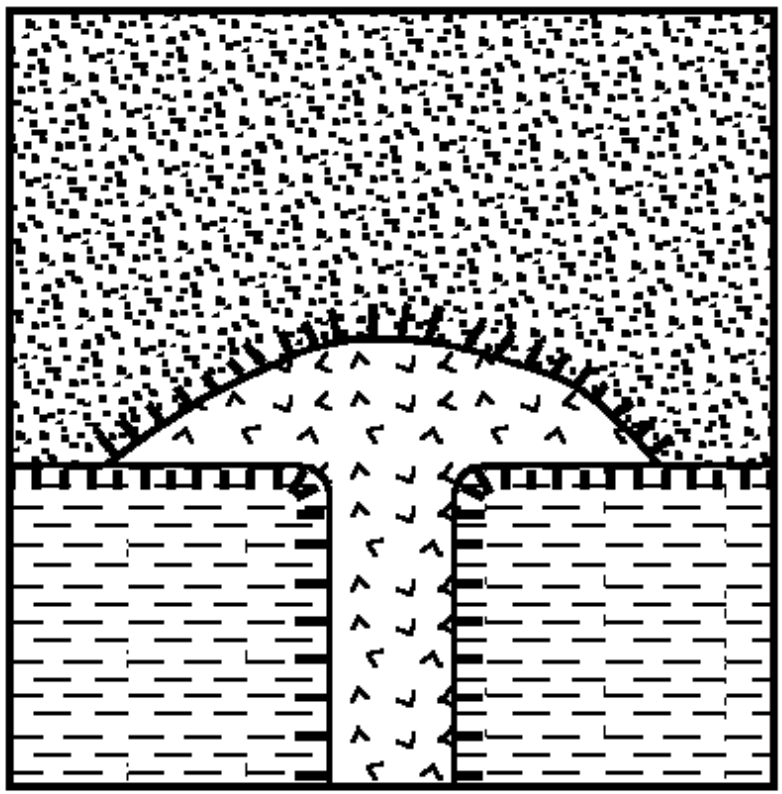

Brachiopod fossil
Unconformity
Fault
Coarse-grained igneous rock

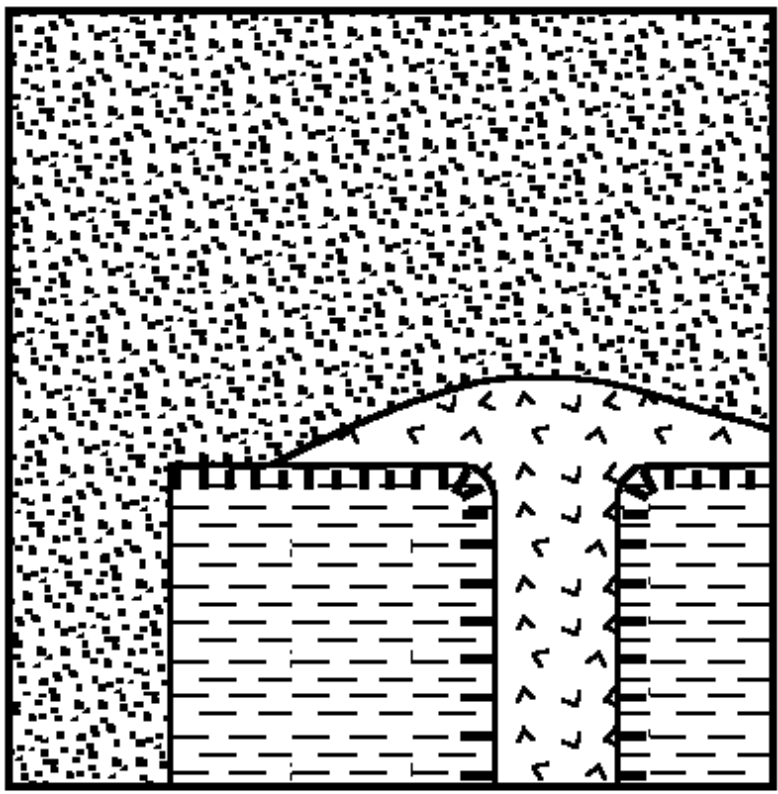

OLDER
AGE
YOUNGER
UTICA
PLATTSBURGH


OLDER
AGE
YOUNGER
UTICA
PLATTSBURGH


OLDER
AGE
YOUNGER
UTICA
PLATTSBURGH


OLDER
AGE
YOUNGER
UTICA
PLATTSBURGH




**KEY:**

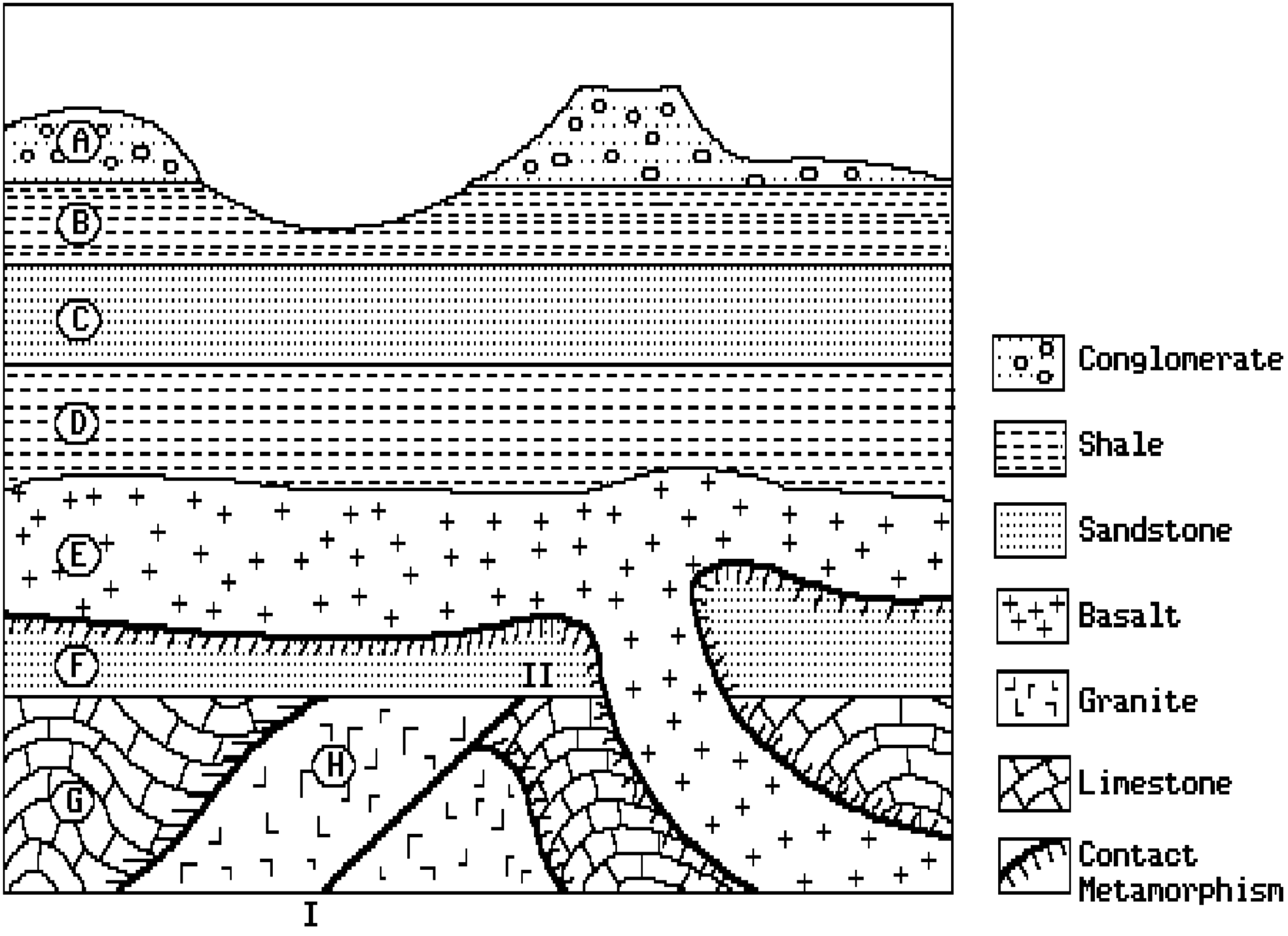
Sandstone

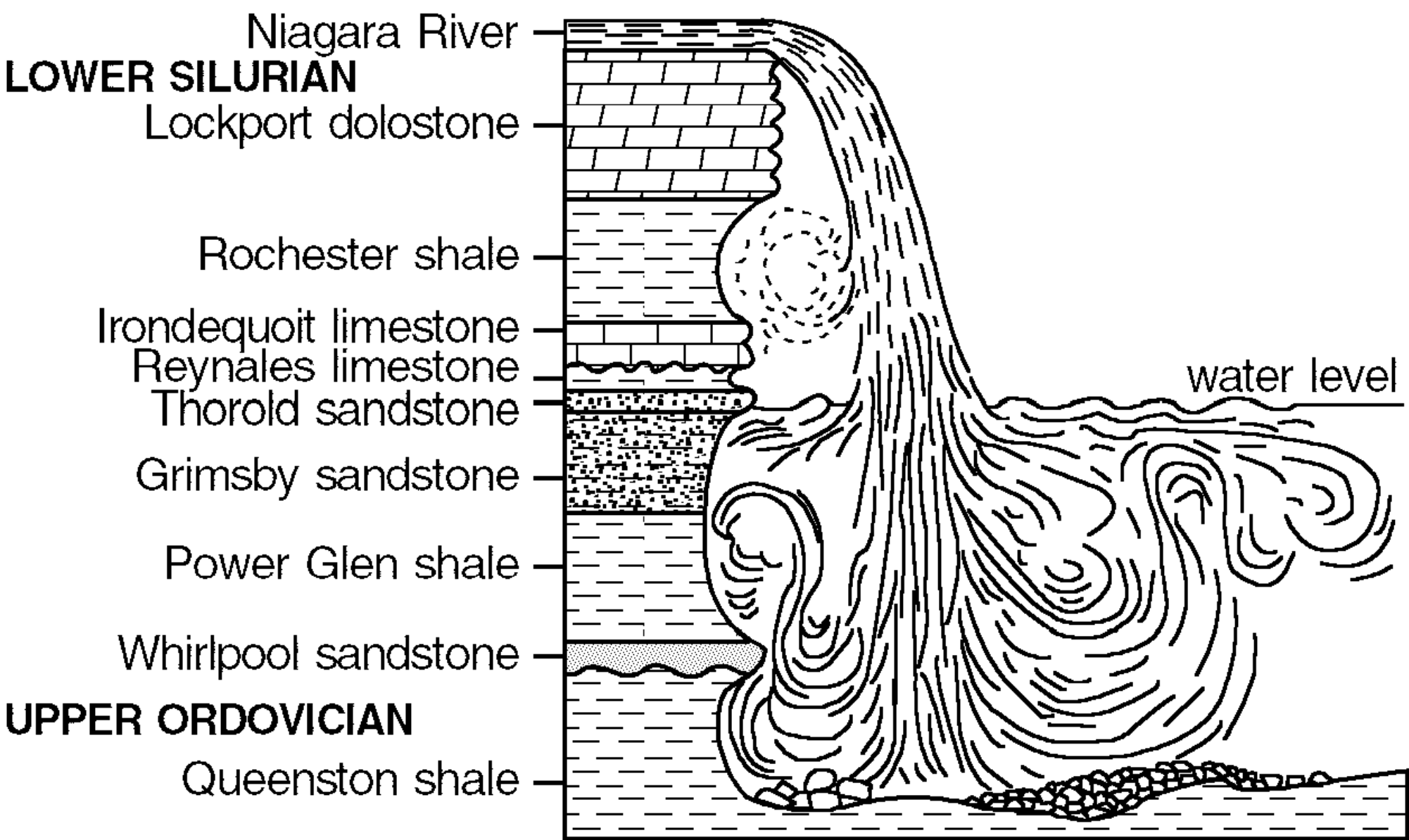
Shale

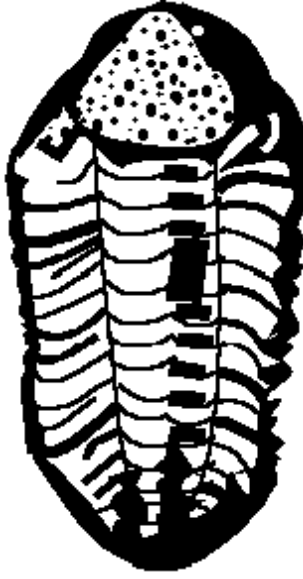
Igneous rock

Contact metamorphism

| Rock Layer | Fossil |
| --- | --- |
| *A* | trilobites |
| *B* | mastodont tusk |
| *C* | dinosaur bones |

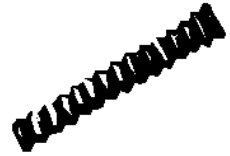
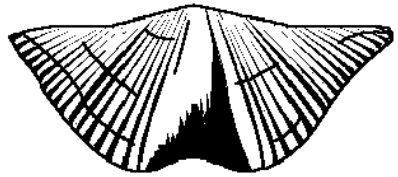

A
B
C
D
E
F
G
H
I
II
Conglomerate
Shale
Sandstone
Basalt
Granite
Limestone
Contact Metamorphism

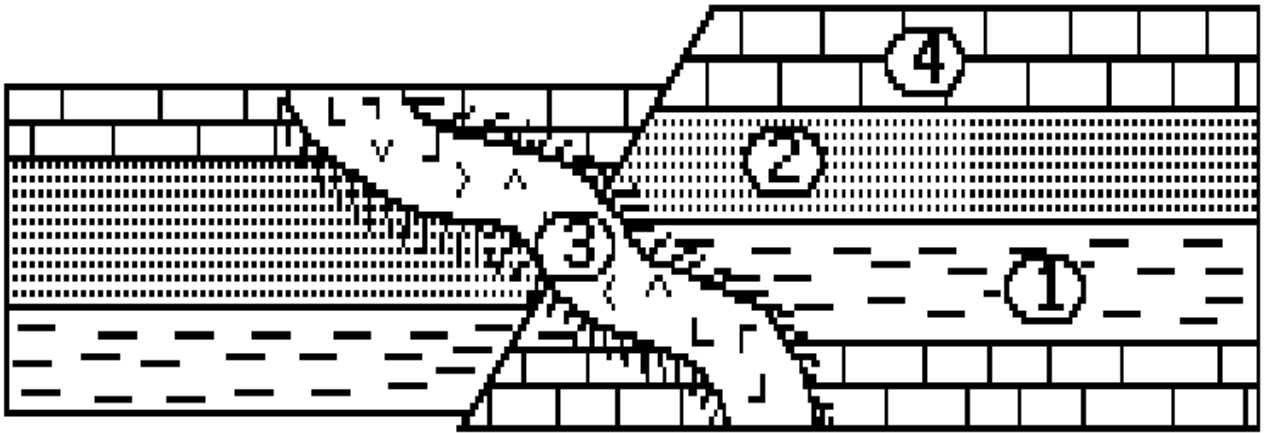

Niagara River
LOWER SILURIAN
Lockport dolostone
Rochester shale
Irondequoit limestone
Reynales limestone
Thorold sandstone
Grimsby sandstone
Power Glen shale
Whirlpool sandstone
UPPER ORDOVICIAN
Queenston shale
water level



Phacops

# Muensteroceras

| Geologic Time | Index Fossils |
| --- | --- |
| Mississippian |  Spirifer  Muensteroceras  Crinoid Stem  Pentremites |
| Devonian |  Mucrospirifer  Phacops |
| Silurian |  Eospirifer |
| Ordovician |  Michelinoceras  Flexicalymene |




Key

Limestone

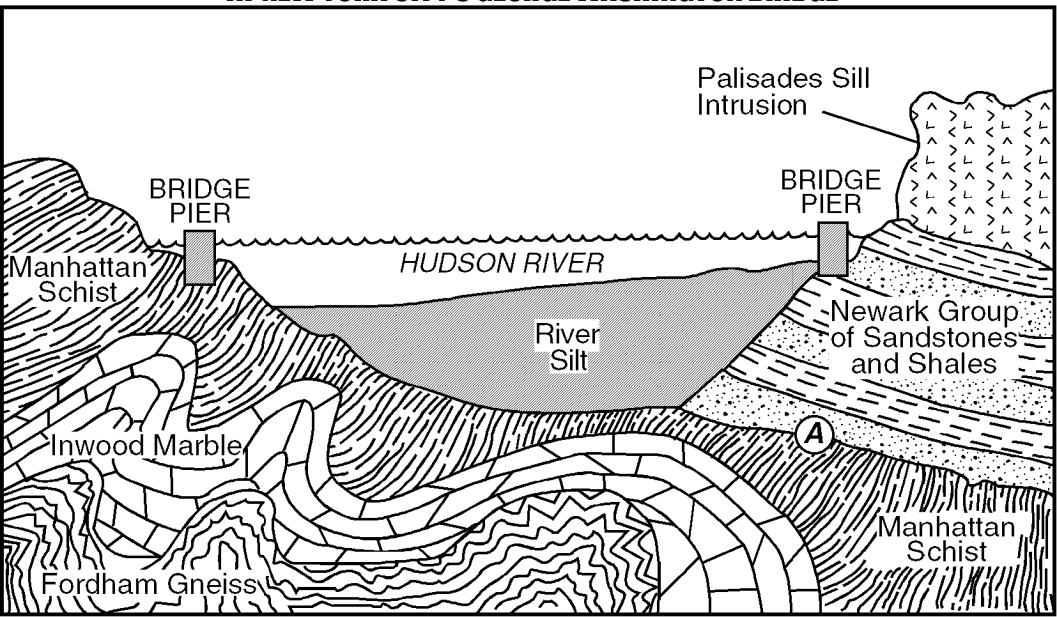
Sandstone

Shale

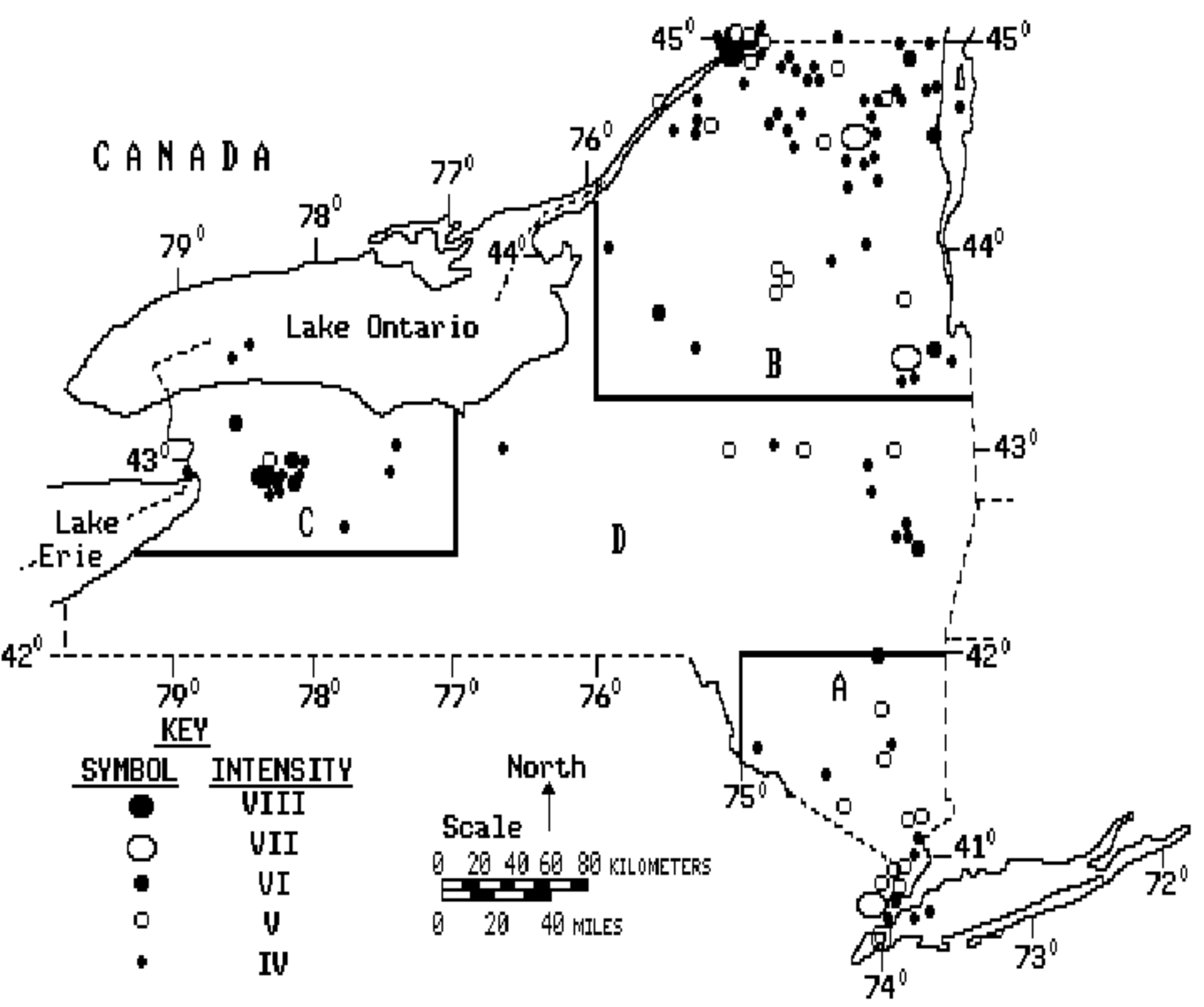
Basalt

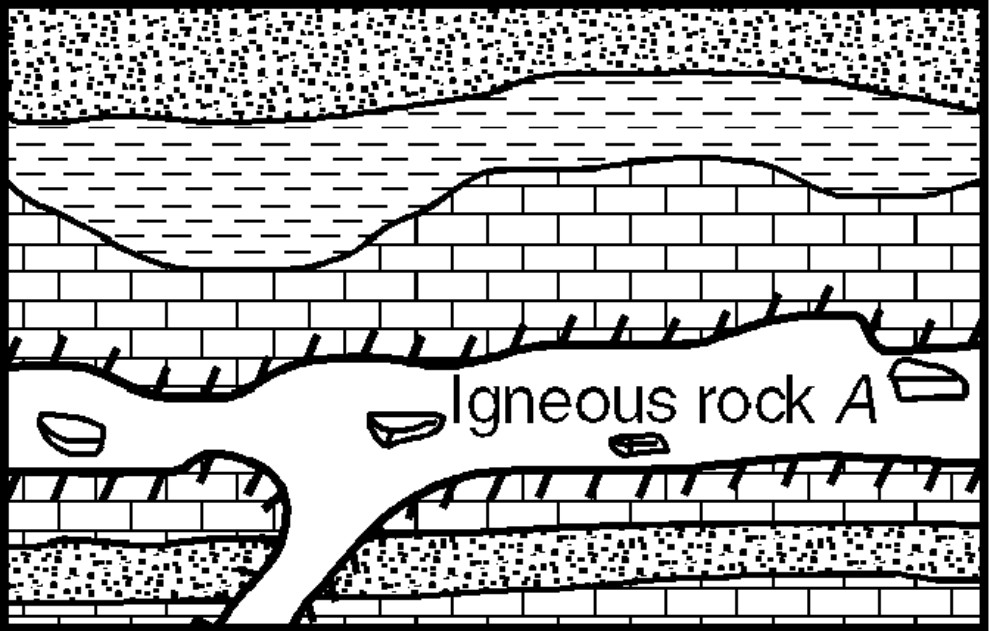
Contact Metamorphism

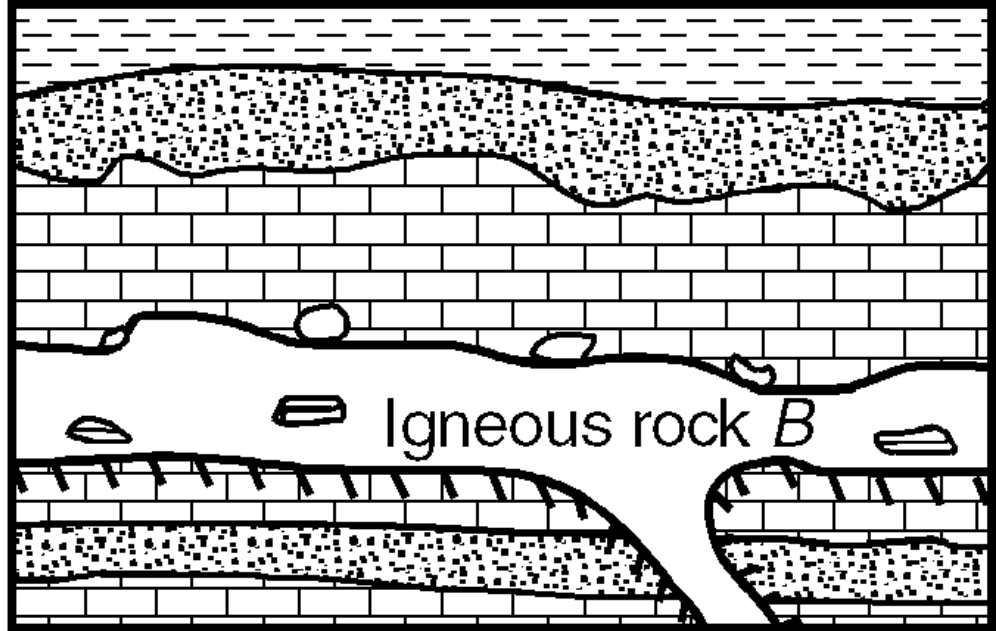
# GEOLOGIC SECTION ACROSS THE HUDSON RIVER AT NEW YORK CITY'S GEORGE WASHINGTON BRIDGE




(not drawn to scale)


CANADA
Lake Ontario
Lake Erie
A
B
C
D
45°
44°
43°
42°
79°
78°
77°
76°
75°
74°
73°
72°
41°
KEY
SYMBOL
INTENSITY
VIII
VII
VI
V
IV
North
Scale
0 20 40 60 80 KILOMETERS
0 20 40 MILES


Igneous rock A


Igneous rock B