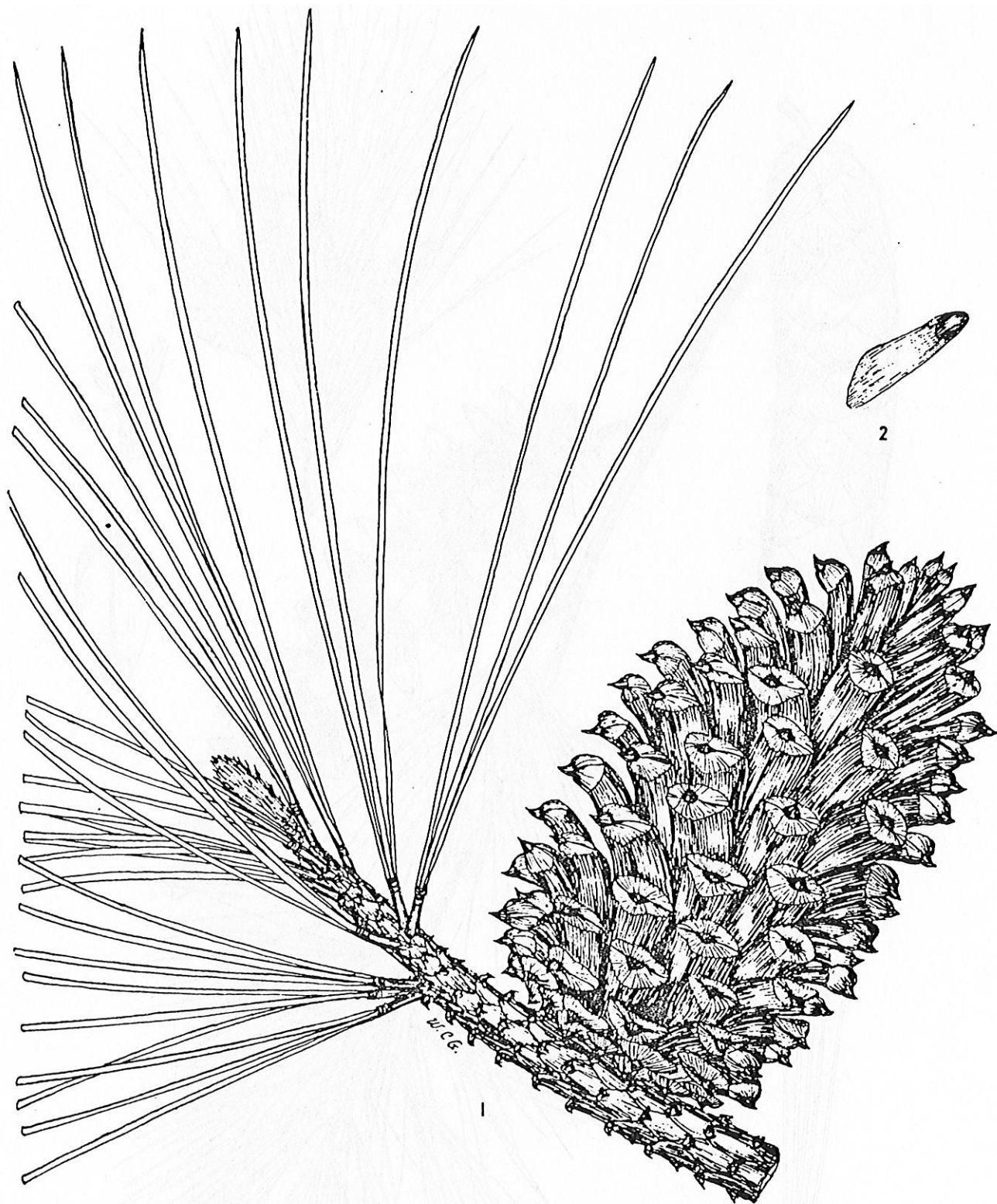


EASTERN WHITE PINE

Wm. C. Grimm.

1. Branch with leaves and open cone.
2. Cluster of leaves.
3. Closed cone.
4. Tip of branch with first year cones.
5. Cone scale with seeds.
6. Buds.



LOBLOLLY PINE

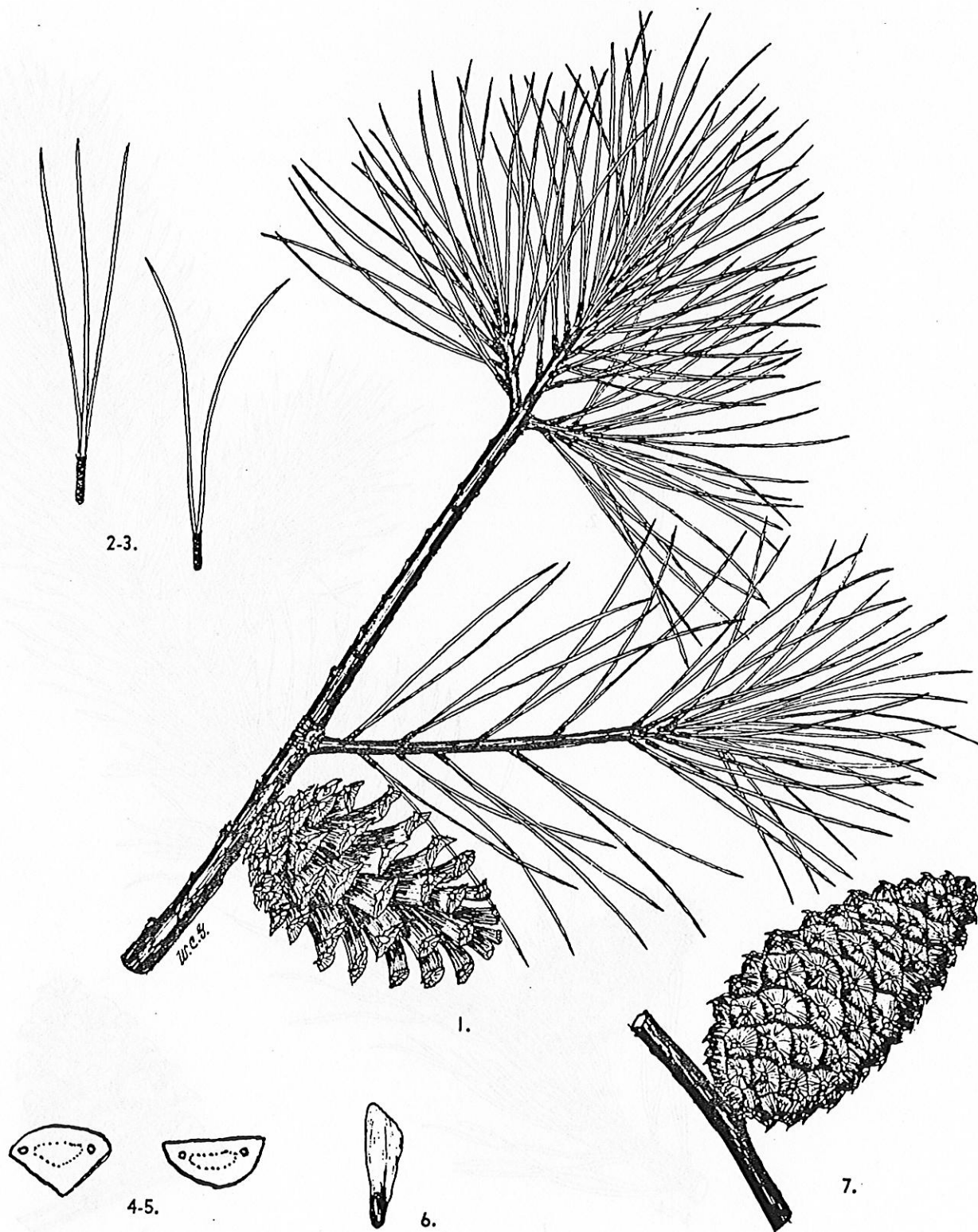
1. Branch with leaves and opened cone. 2. Seed.



VIRGINIA PINE

1. Branch with closed cone.
2. Cluster of leaves.

3. Open cone.
4. Seed.



SHORT-LEAF PINE

1. Branch with open cone.
- 2-3. Clusters of leaves.
- 4-5. Cross-sections of leaves.

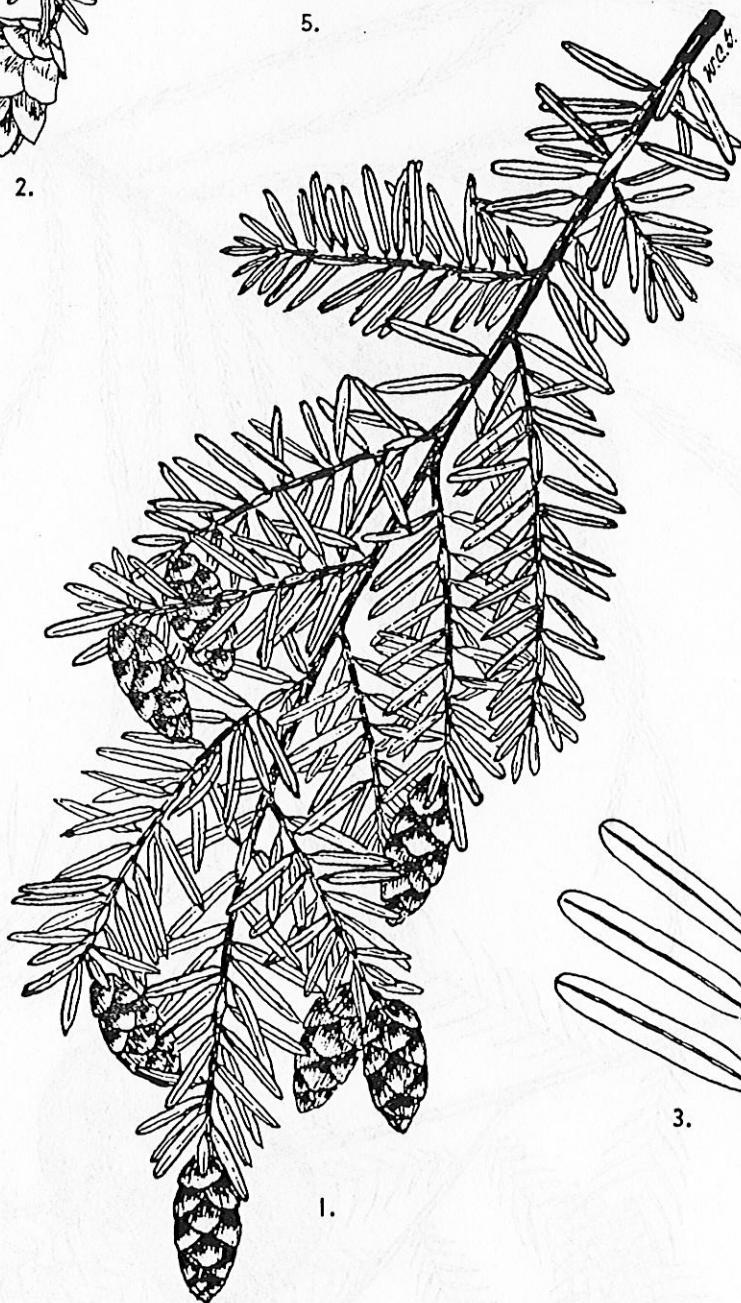
6. Seed.
7. Closed cone.



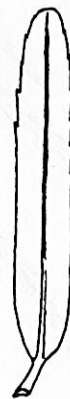
2.



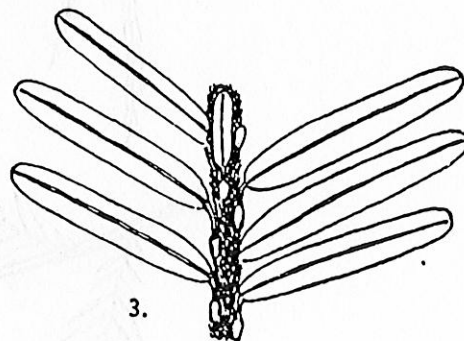
5.



1.



4.

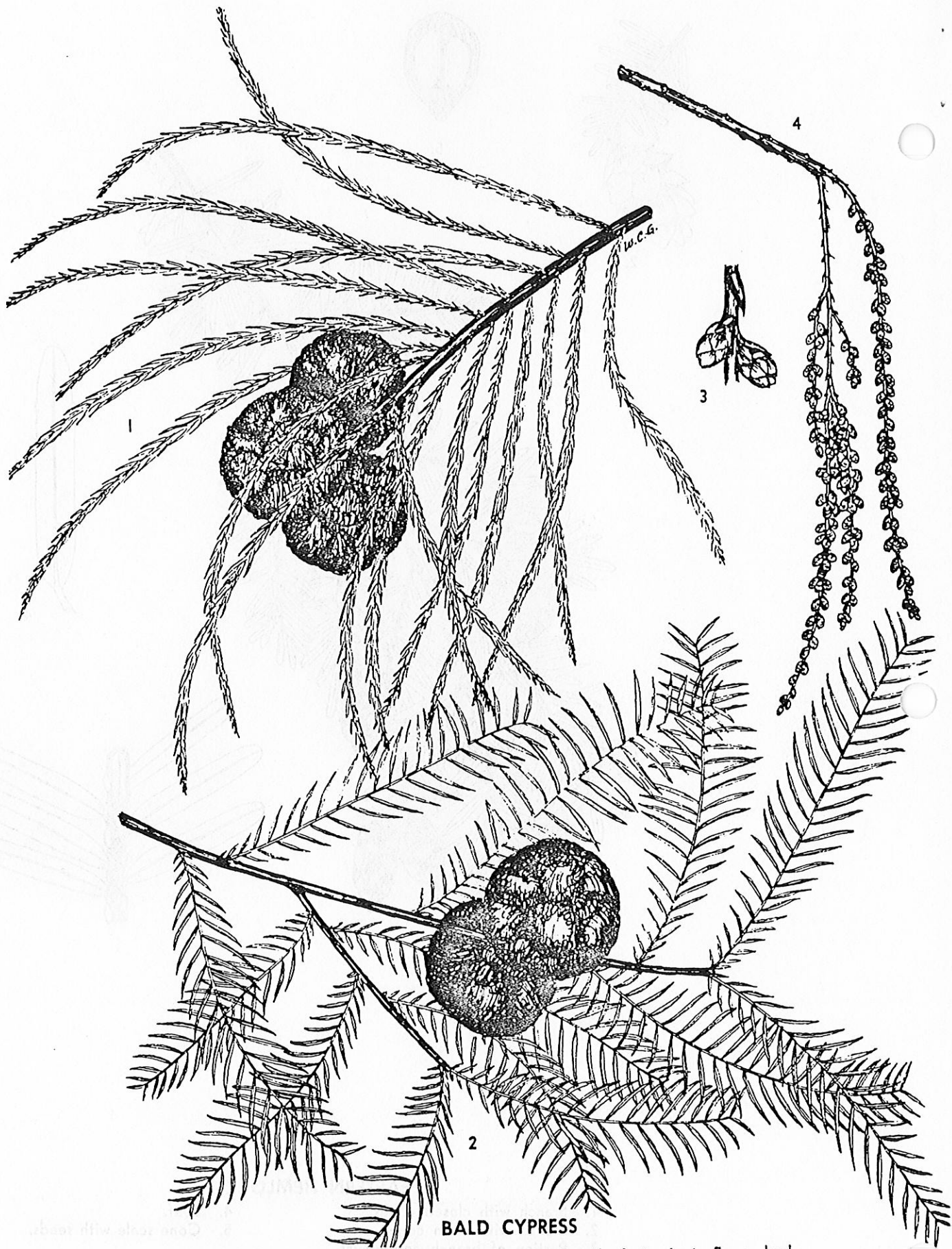


3.

EASTERN HEMLOCK

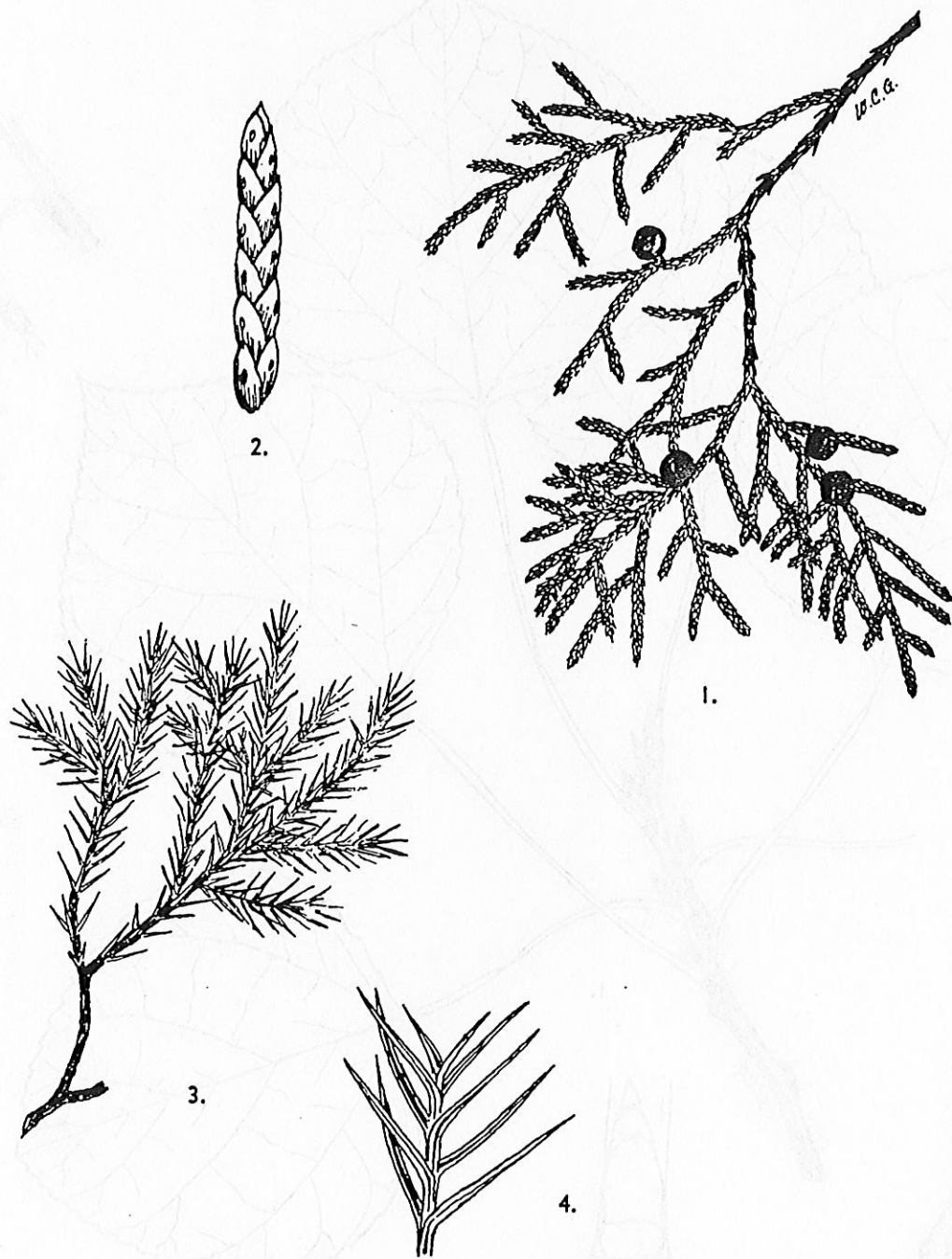
1. Branch with closed cones.
2. Branch with open cone.
3. Portion of branch and leaves.

4. Leaf.
5. Cone scale with seeds.



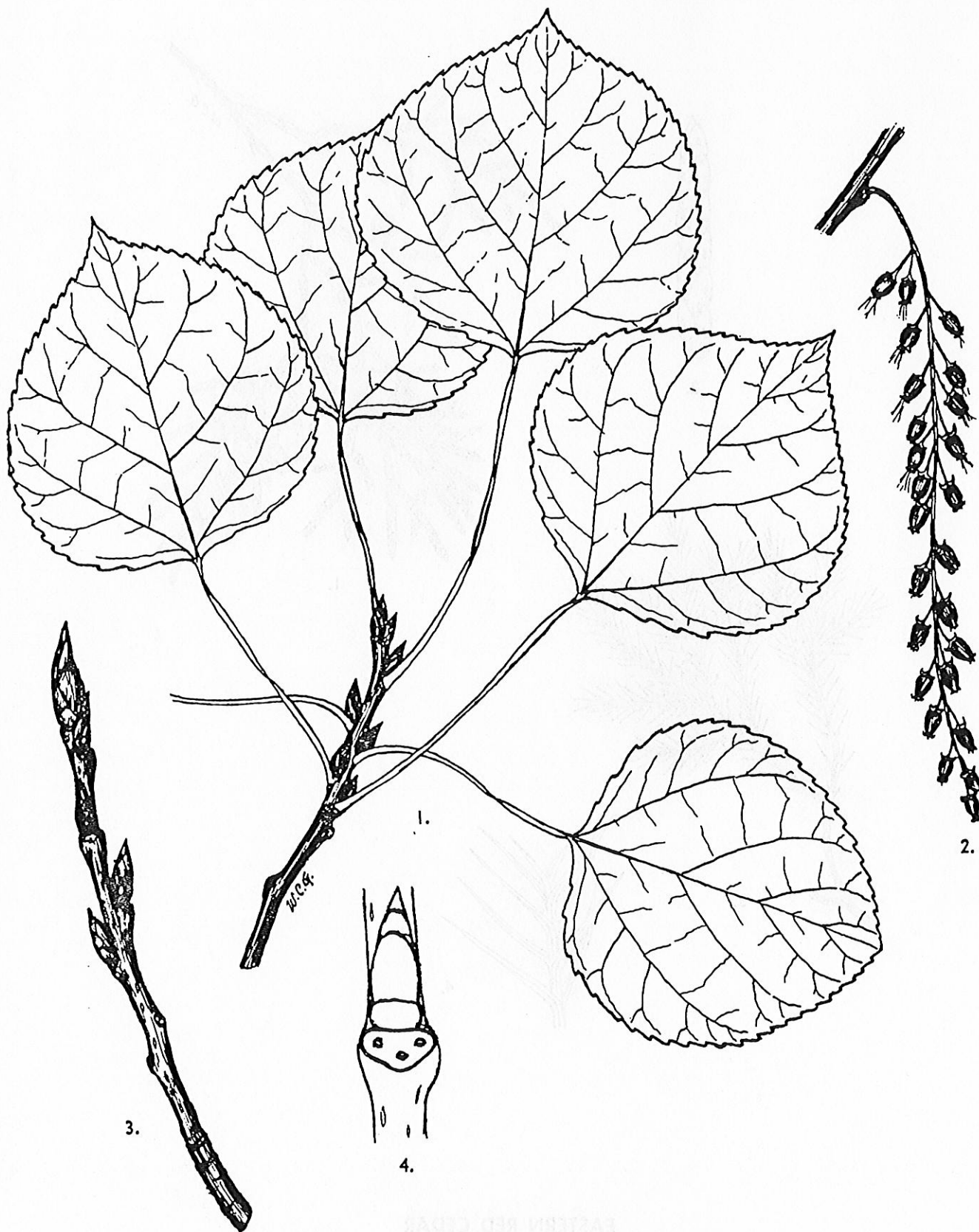
BALD CYPRESS

1. Branch of form with appressed leaves (Pond Cypress).
2. Branch of typical form with leaves and cones.
3. Detail of staminate flower bud.
4. Winter twig with staminate flower buds.



EASTERN RED CEDAR

1. Branch with scale-like leaves and fruits.
2. Portion of branch with scale-like leaves.
3. Branch with awl-like leaves.
4. Portion of branch with awl-like leaves.



EASTERN COTTONWOOD

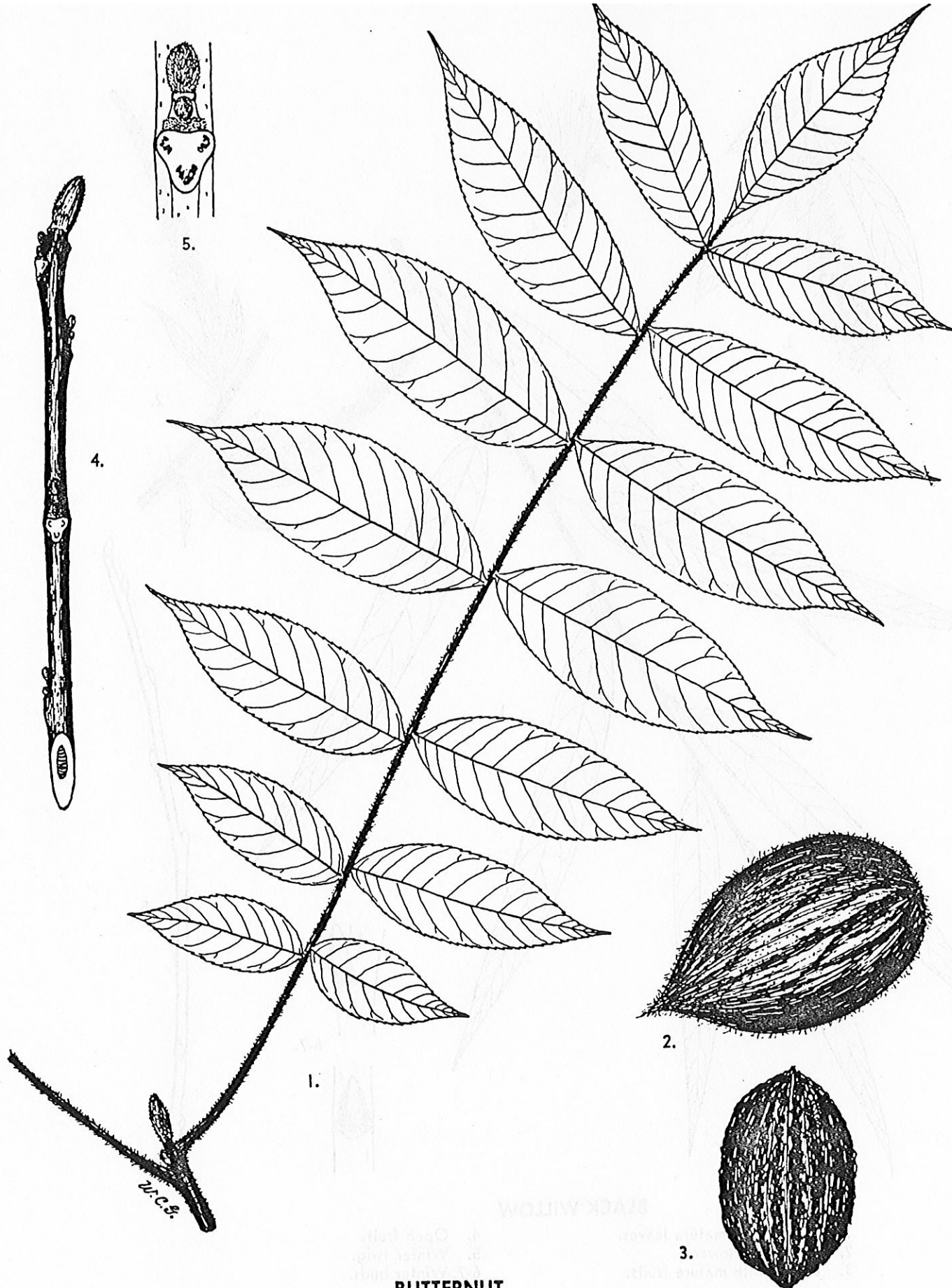
1. Branch with mature leaves.
2. Fruits.

3. Winter twig.
4. Details of winter bud and leaf scar.



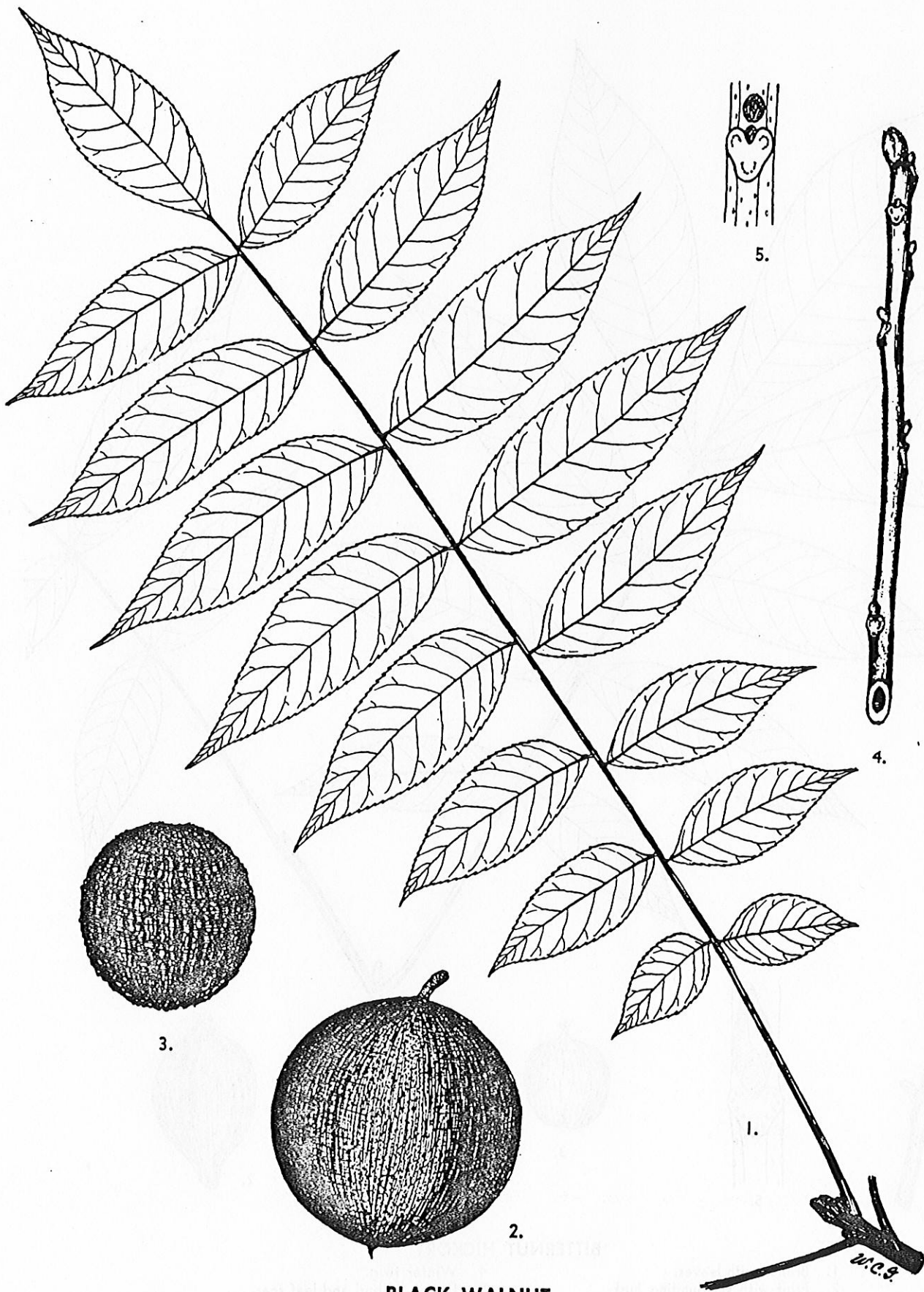
BLACK WILLOW

1. Branch with mature leaves.
2. Staminate flowers.
3. Branch with mature fruits.
4. Open fruit.
5. Winter twig.
- 6-7. Winter buds.



BUTTERNUT

1. Leaf.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.
5. Details of buds and leaf scar.



BLACK WALNUT

1. Leaf.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.
5. Details of winter buds and leaf scar.



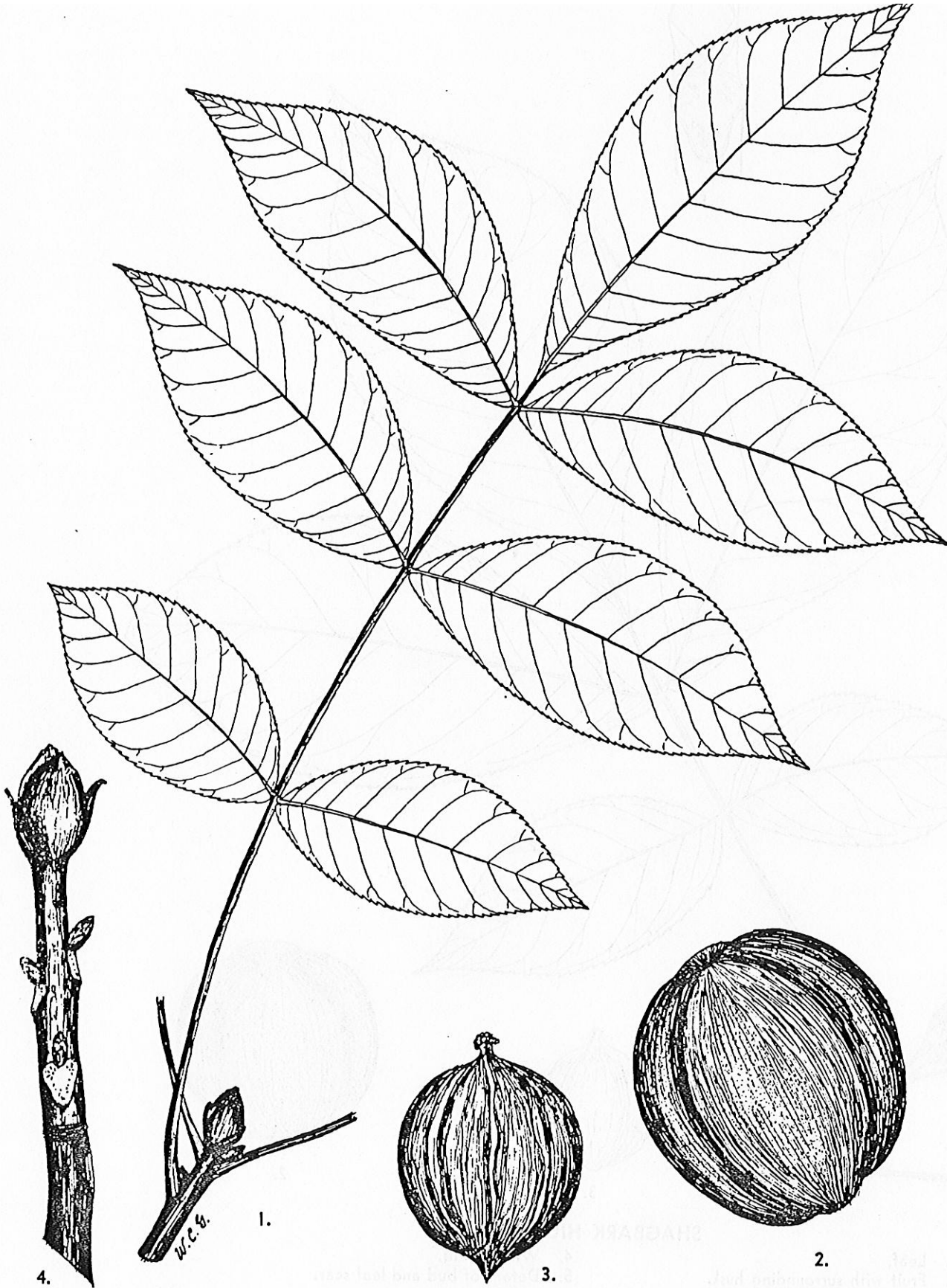
BITTERNUT HICKORY

1. Branch with leaves.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.
5. Details of bud and leaf scar.



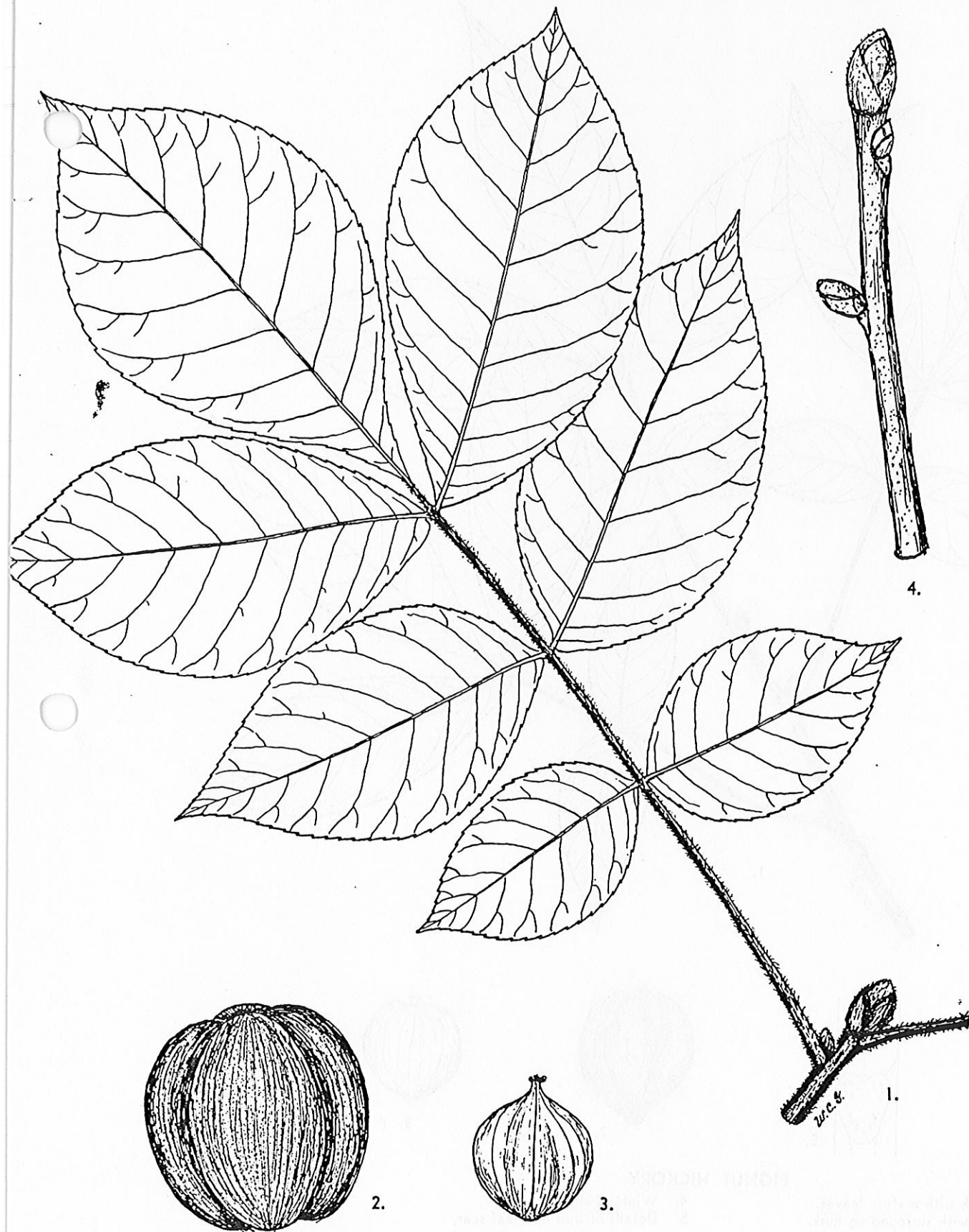
SHAGBARK HICKORY

1. Leaf.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.
5. Details of bud and leaf scar.



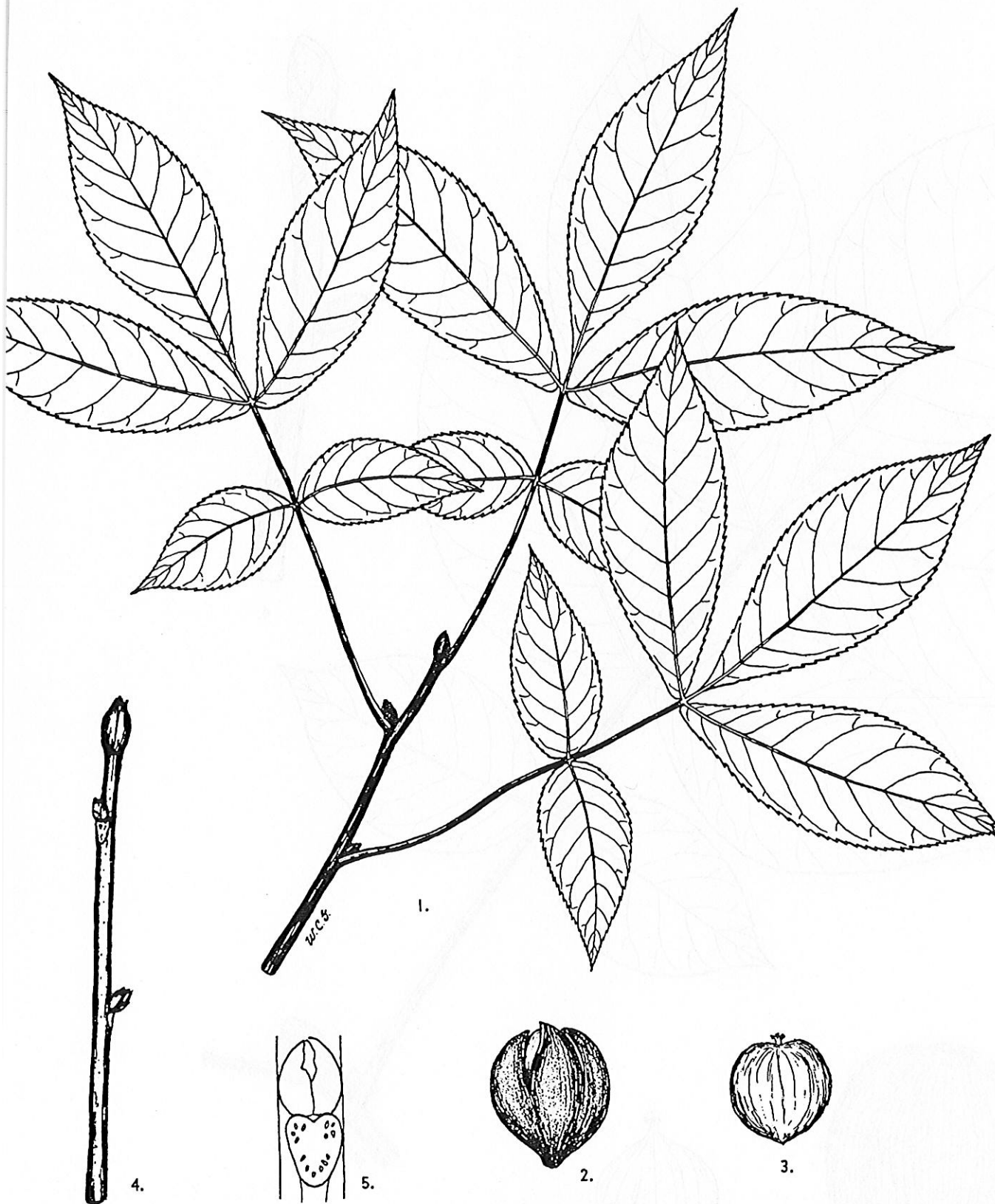
SHELLBARK HICKORY

1. Leaf.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.



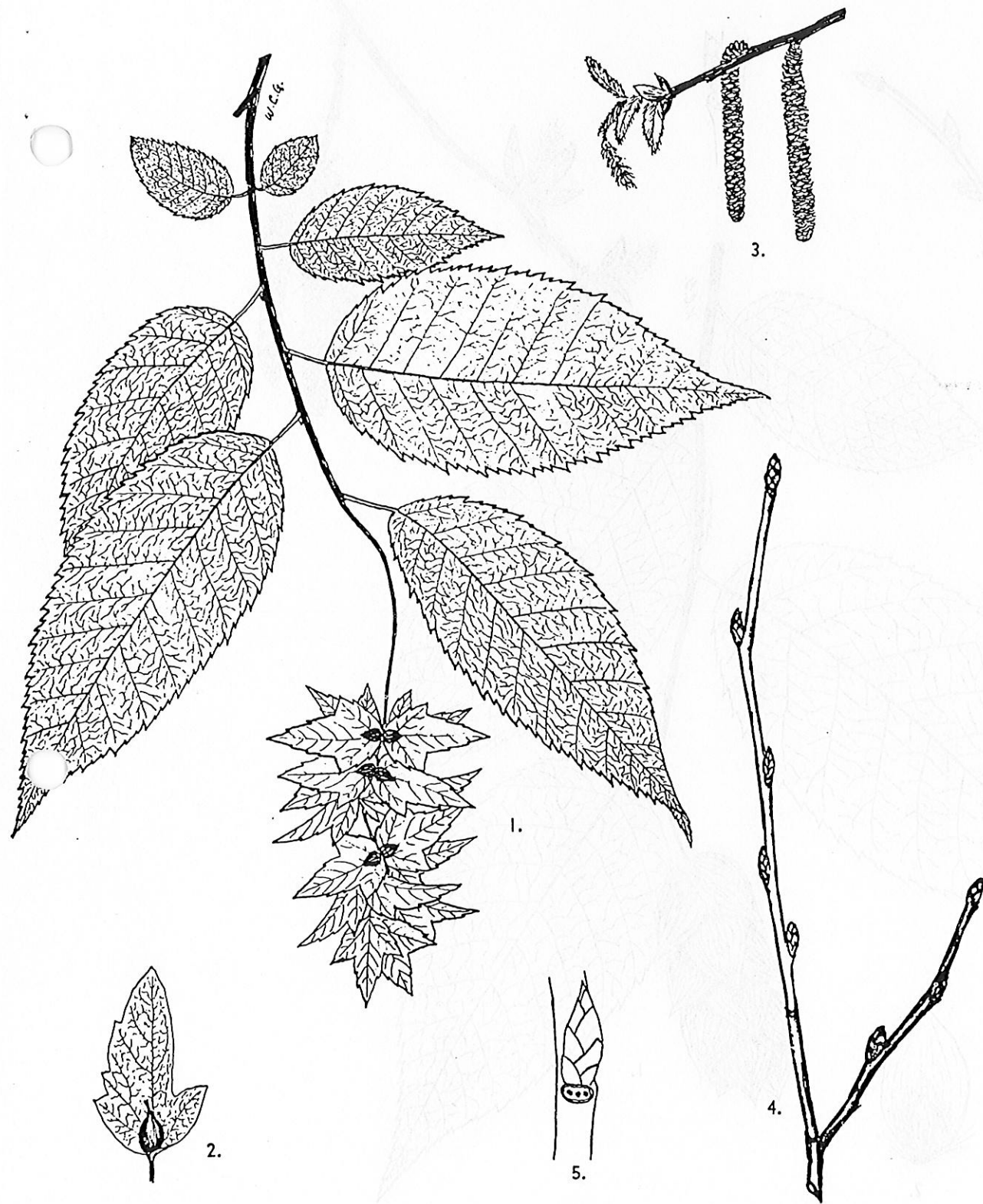
MOCKERNUT HICKORY

- | | |
|---------------------------------|---------------------------|
| 1. Leaf. | 3. Nut with husk removed. |
| 2. Fruit with surrounding husk. | 4. Winter twig. |



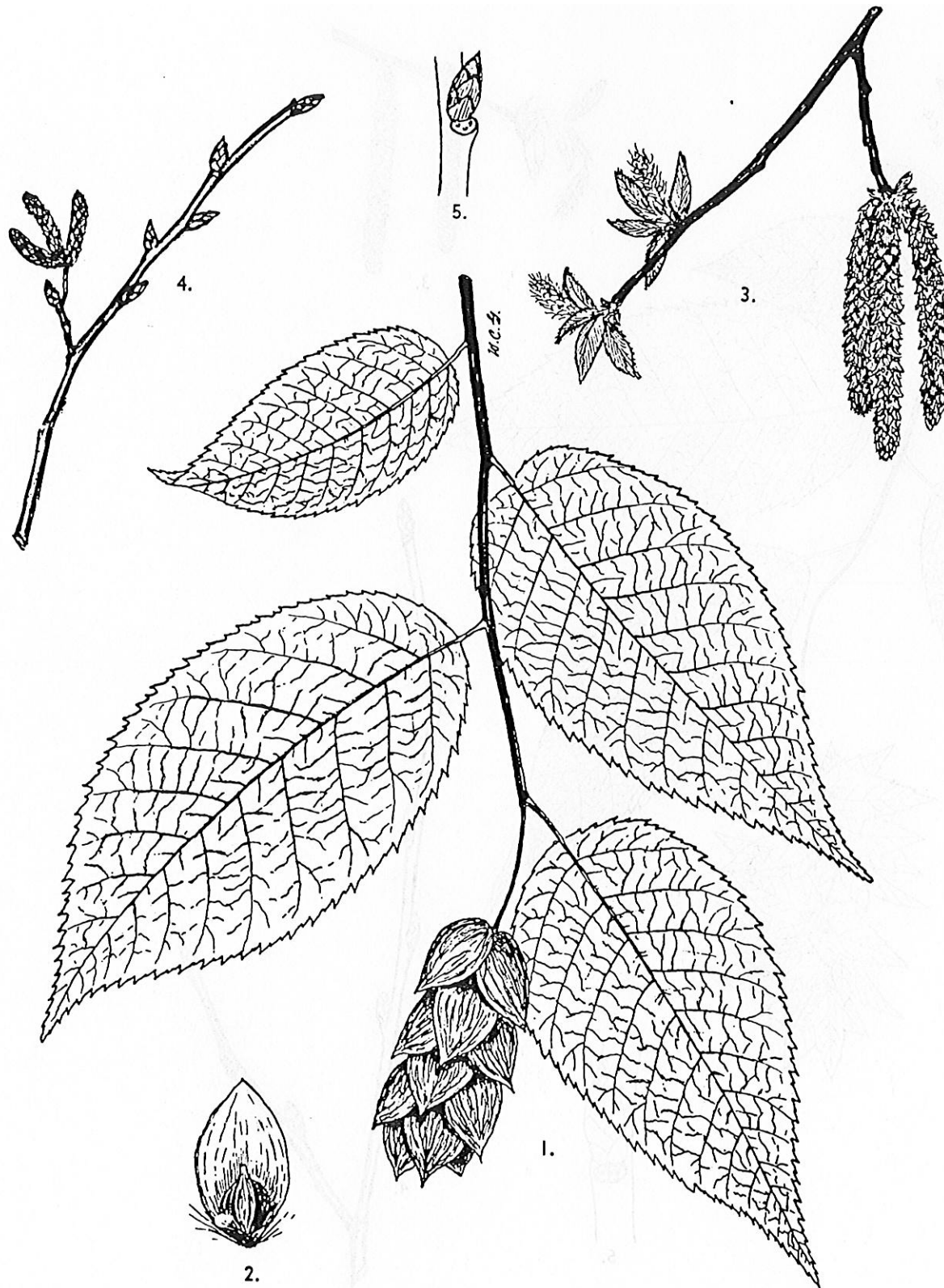
PIGNUT HICKORY

1. Branch with mature leaves.
2. Fruit with surrounding husk.
3. Nut with husk removed.
4. Winter twig.
5. Details of bud and leaf scar.



AMERICAN HORNBEAM

1. Branch with mature leaves and cluster of fruits.
2. Single bract with nutlet at its base.
3. Flowering branch.
4. Winter twig.
5. Detail of bud and leaf scar.



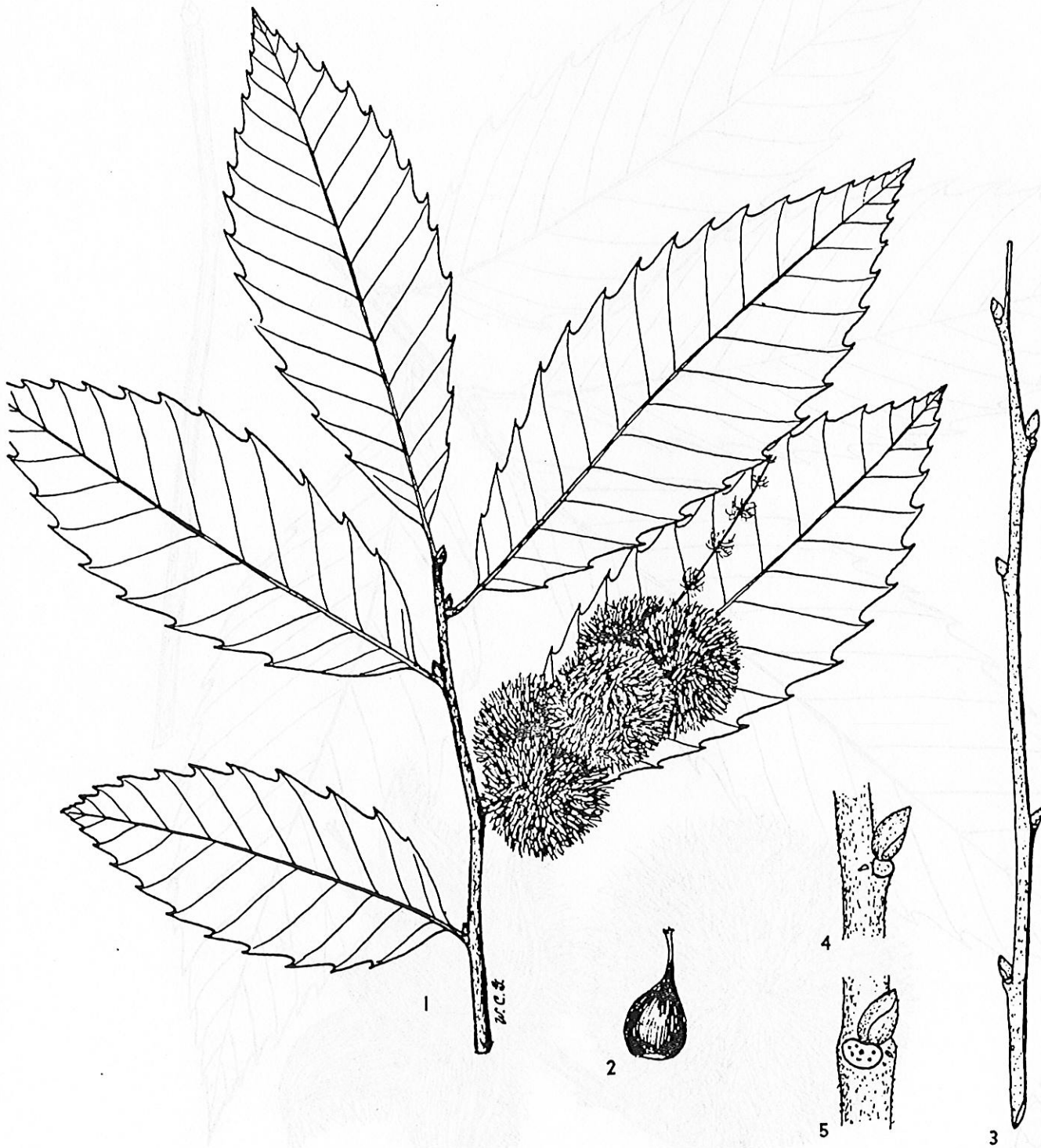
AMERICAN HOP HORNBEAM

1. Branch with mature leaves and cluster of fruits.
2. Bract which is opened to show the nutlet.
3. Flowering branch.
4. Winter twig with catkins.
5. Detail of bud and leaf scar.



CHESTNUT

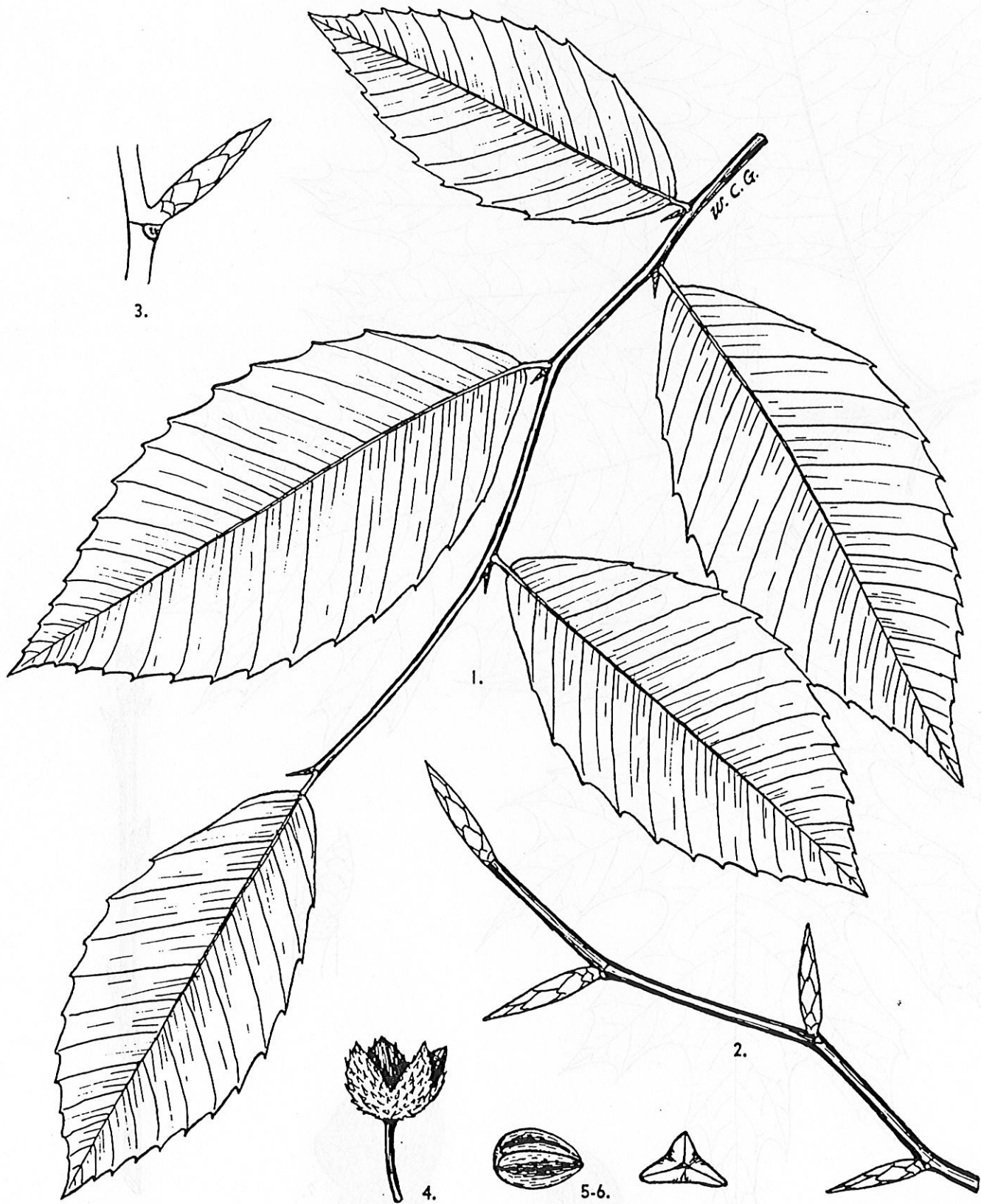
1. Branch with mature leaves.
2. Unopened and open bur showing the nuts.
3. Winter twig.
4. Details of bud and leaf scar.



CHINQUAPIN

1. Branch with leaves and fruits.
2. Nut.

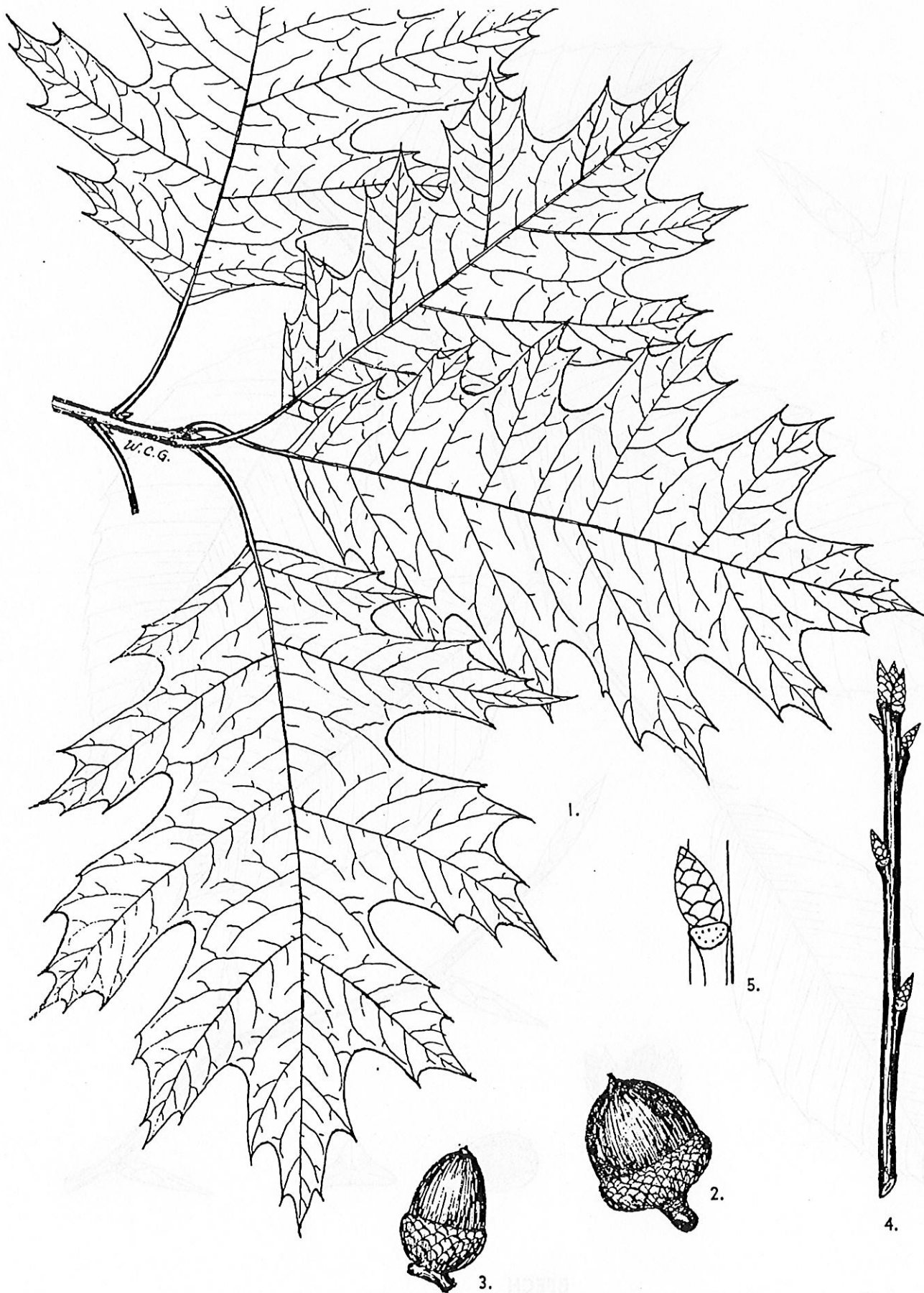
3. Winter twig.
- 4-5. Details of leaf-scars and winter buds.



BEECH

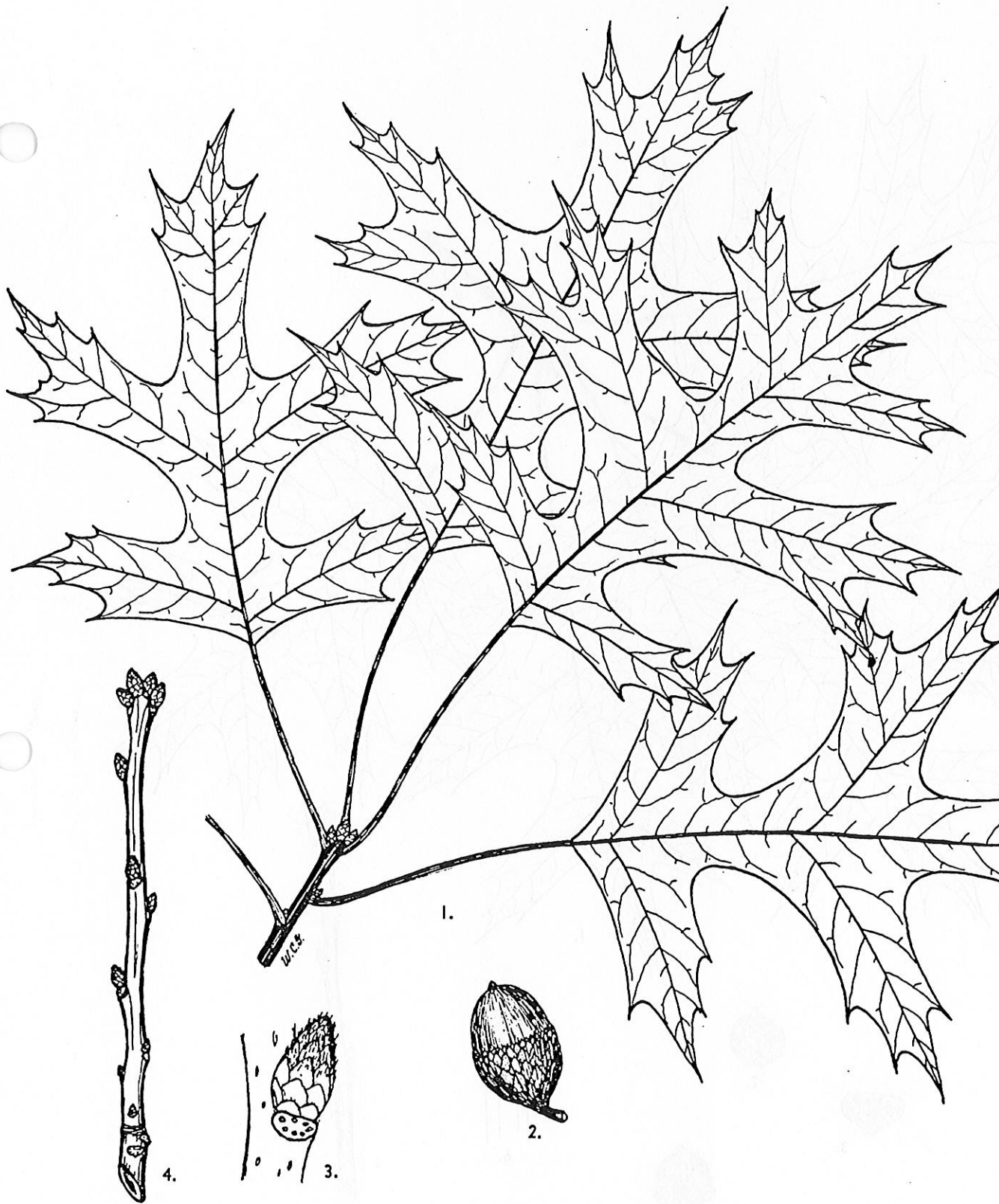
1. Branch with mature leaves.
2. Winter twig.
3. Details of bud and leaf scar.

4. Opened bur.
- 5-6. Nuts.



NORTHERN RED OAK

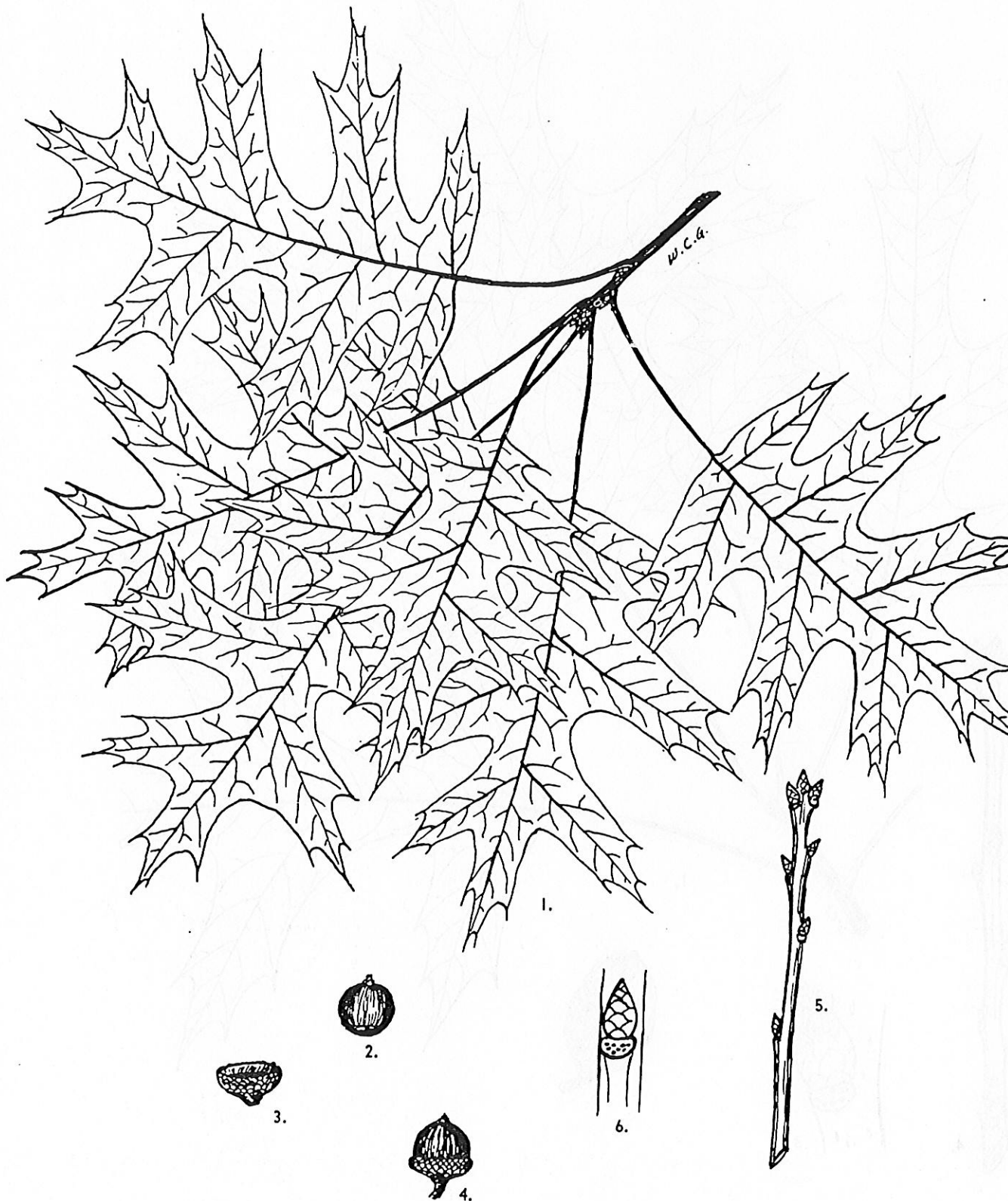
1. Branch with mature leaves.
2. Acorn.
3. Acorn of *Quercus borealis*.
4. Winter twig.
5. Details of bud and leaf scar.



SCARLET OAK

- 1. Branch with mature leaves.
- 2. Acorn.

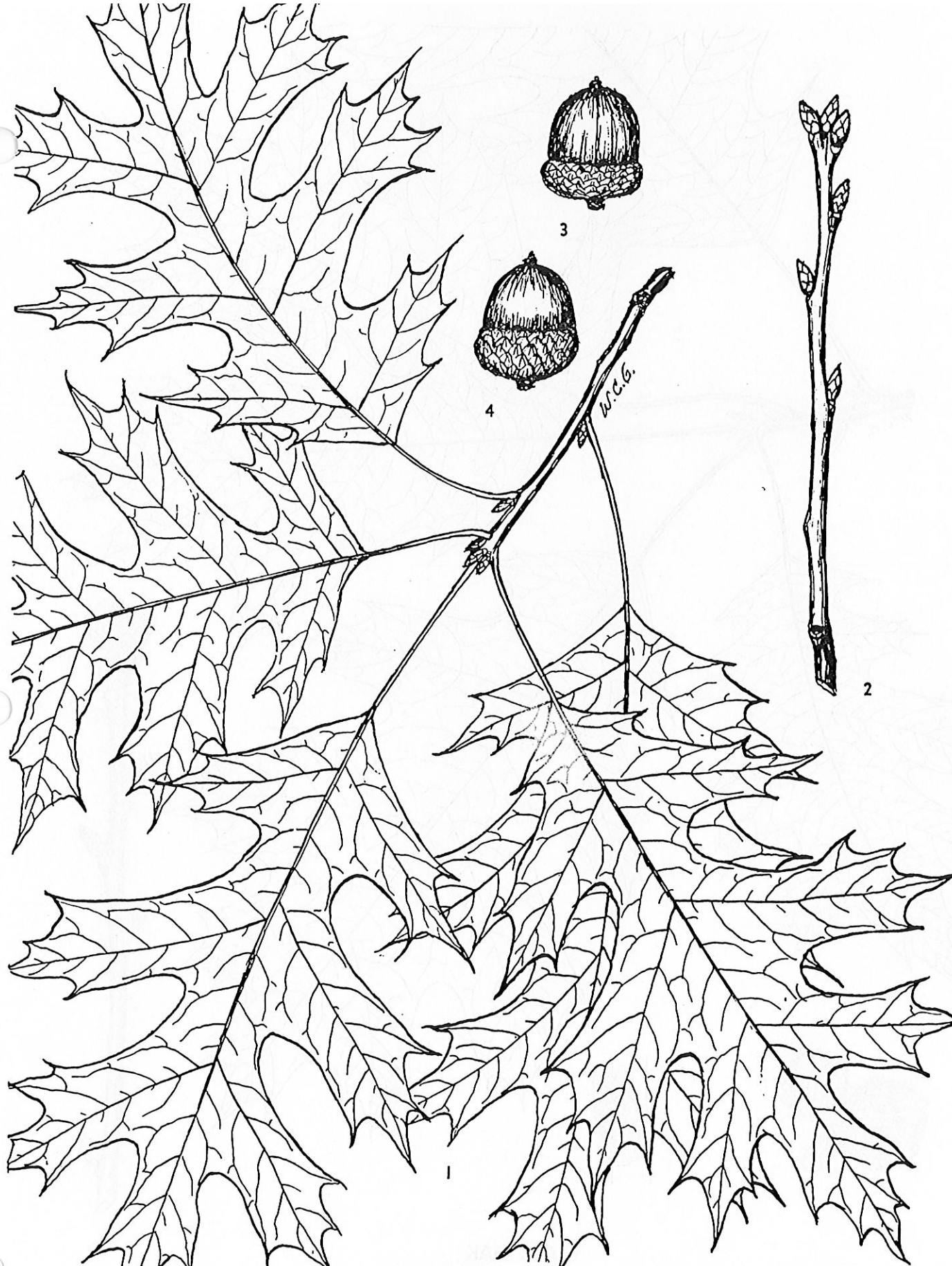
- 3. Detail of bud and leaf scar.
- 4. Winter twig.



PIN OAK

1. Branch with mature leaves.
2, 3, and 4. Acorns.

5. Winter twig.
6. Details of bud and leaf scar.



SHUMARD OAK

1. Branch with mature leaves.
2. Winter twig.

3. Acorn with shallow cup.
4. Acorn with deep cup.



BLACK OAK

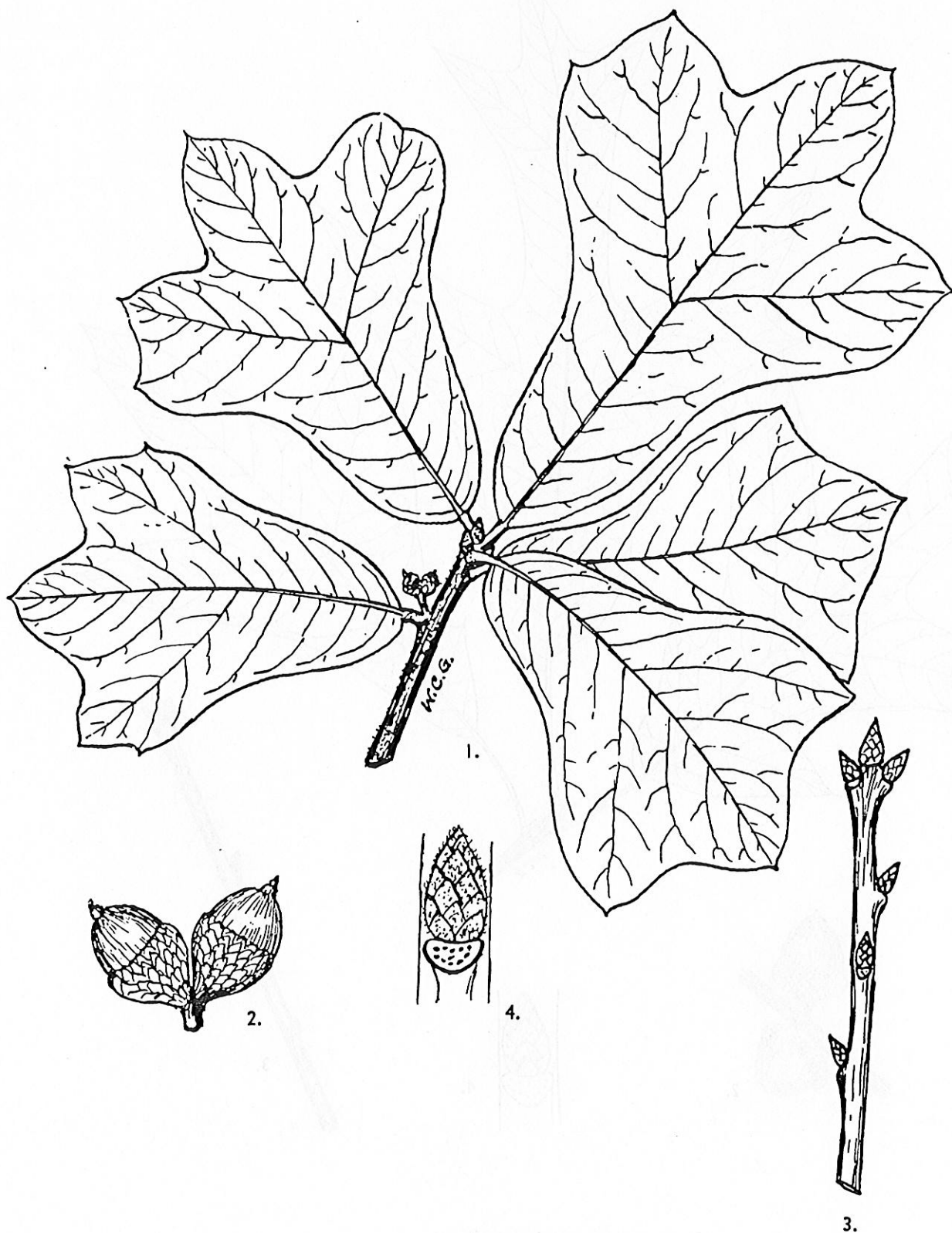
1. Branch with mature leaves.
2. Acorns.

3. Winter twig.
4. Details of bud and leaf scar.



SOUTHERN RED OAK

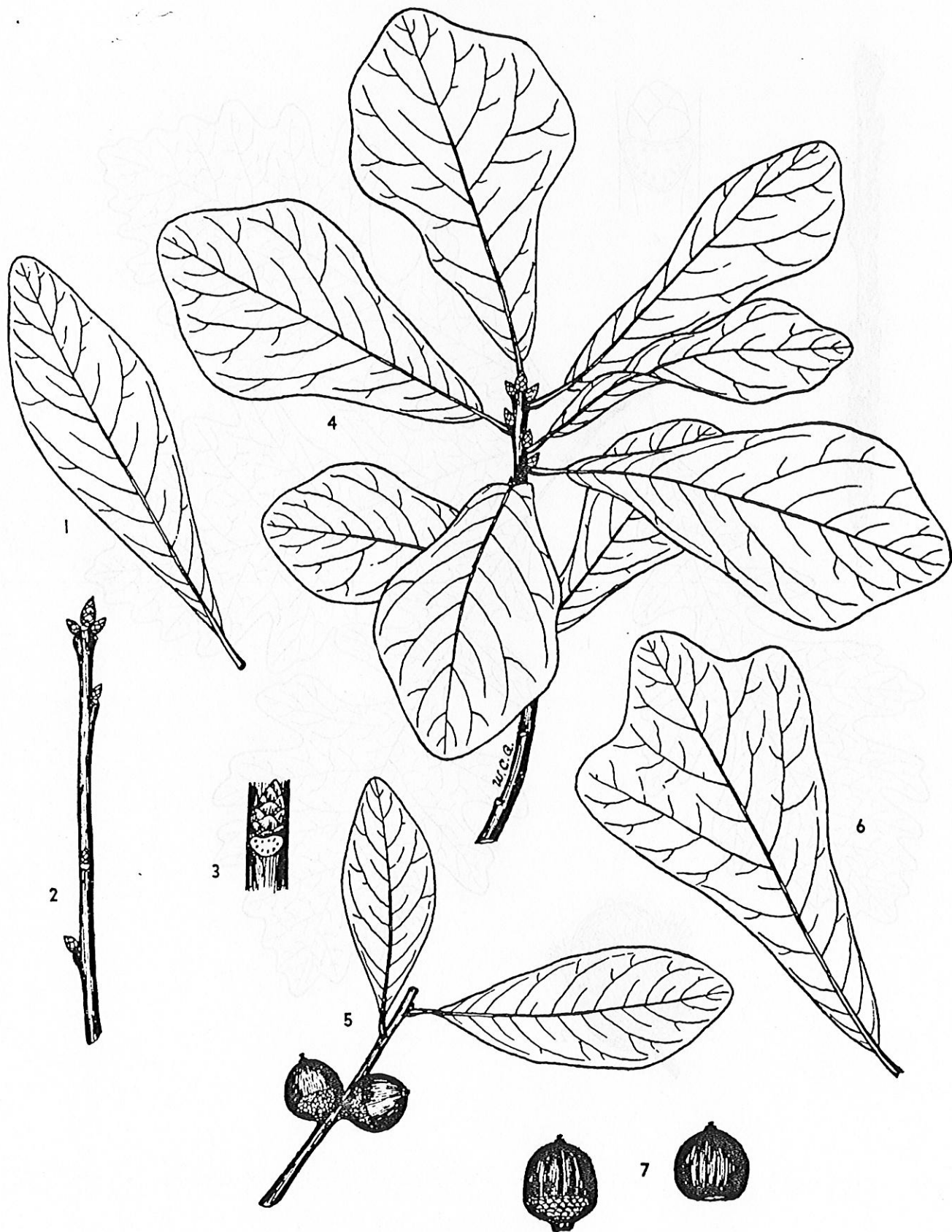
1. Leaf with mature leaves.
2. Acorns.
3. Winter twig.
4. Details of bud and leaf scar.



BLACK JACK OAK

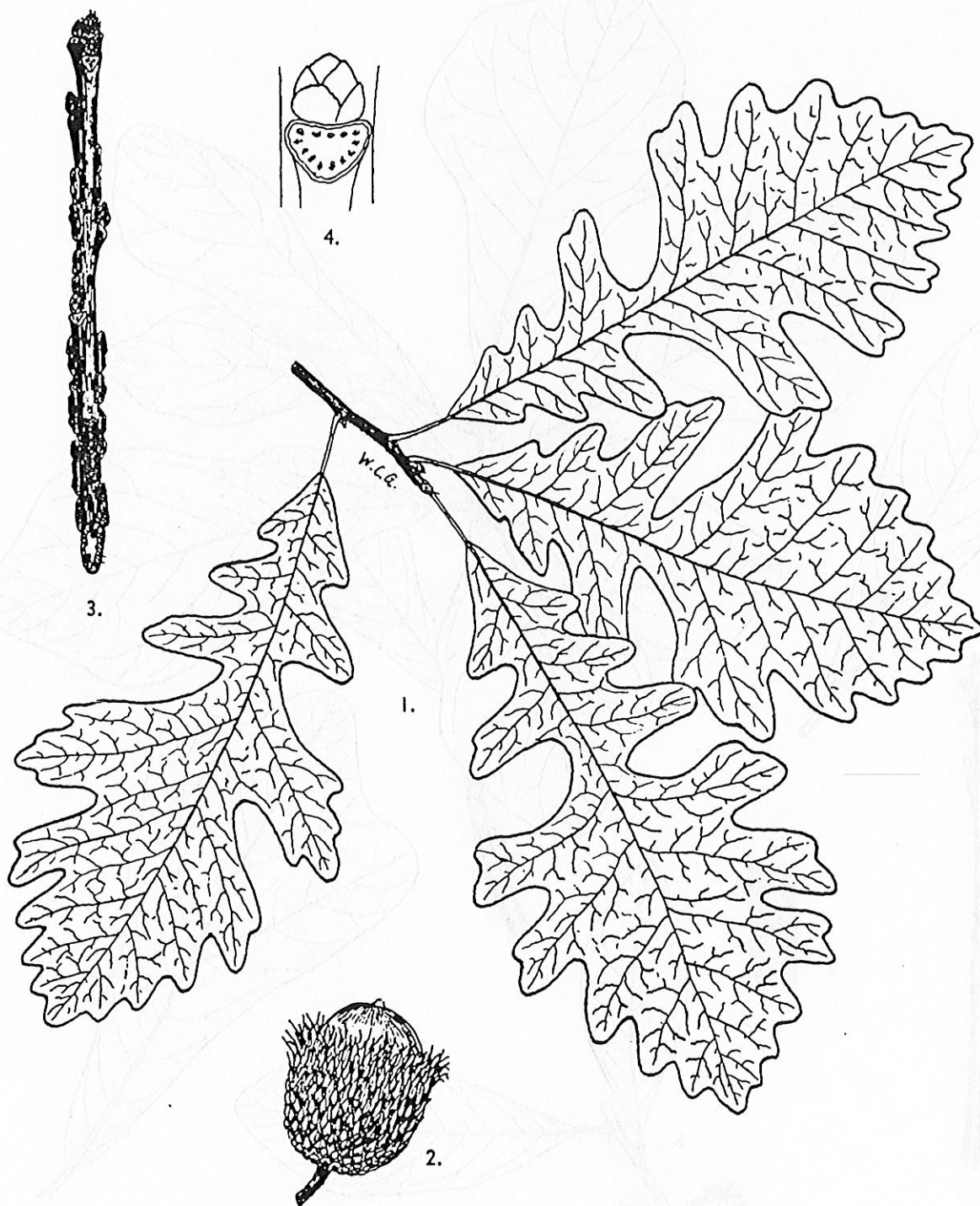
1. Branch with mature leaves.
2. Acorns.

3. Winter twig.
4. Details of bud and leaf scar.



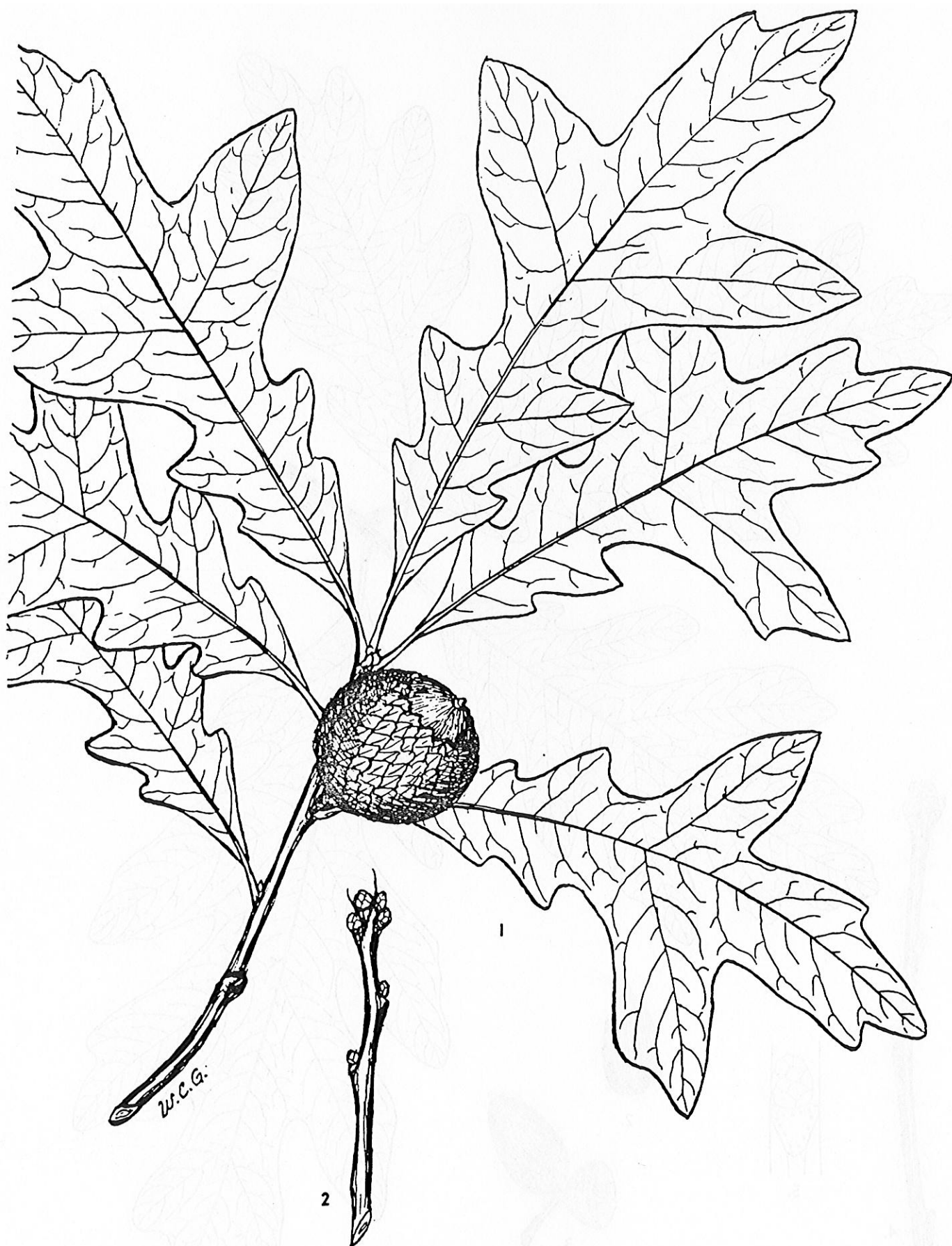
WATER OAK

1. Leaf.
2. Winter twig.
3. Detail of winter bud and leaf-scar.
4. Branch with mature leaves.
5. Branch with acorns.
6. Leaf.
7. Acorns.



BUR OAK

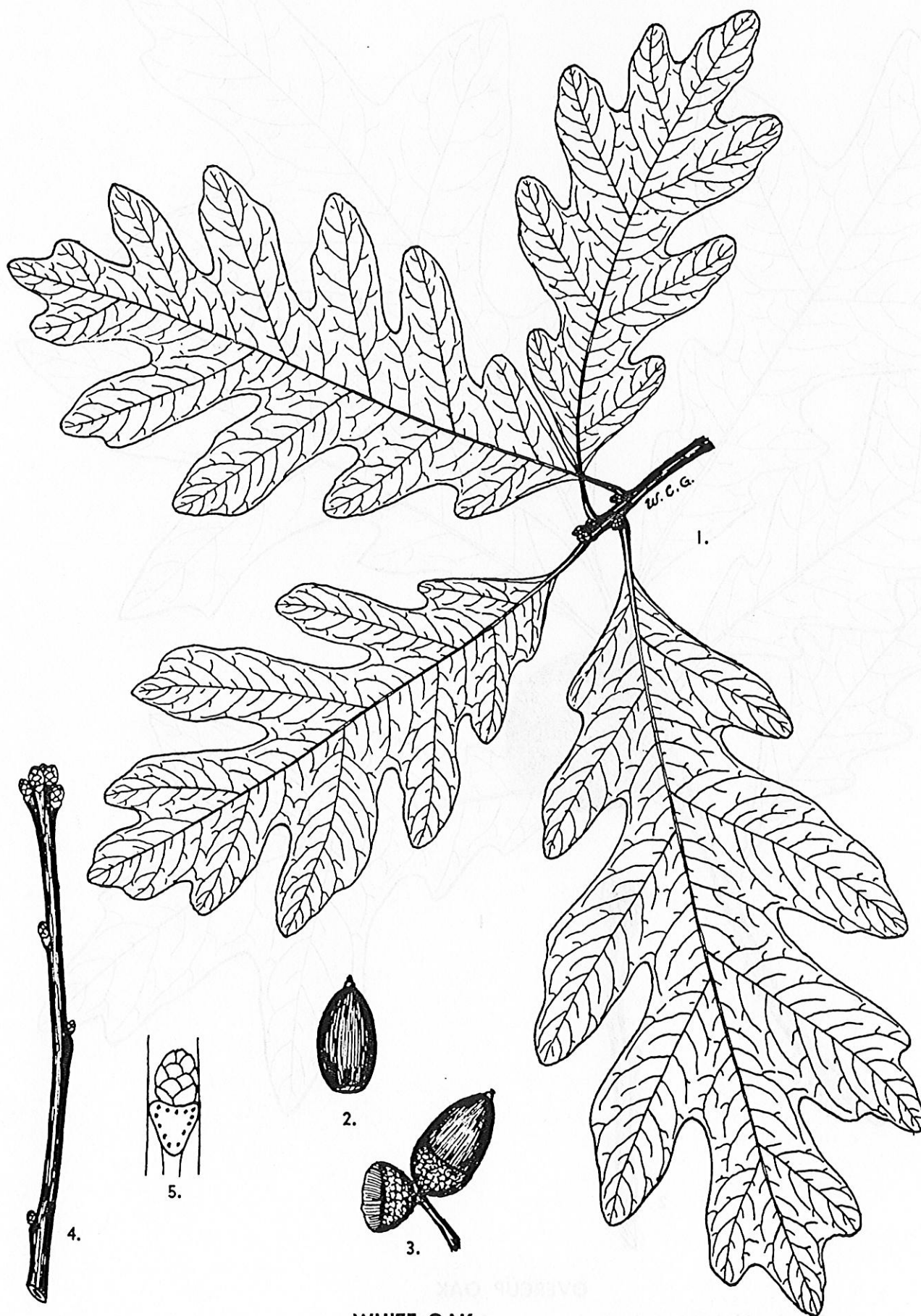
1. Branch with mature leaves.
2. Acorn.
3. Winter twig.
4. Details of bud and leaf scar.



OVERCUP OAK

1. Branch with leaves and acorn.

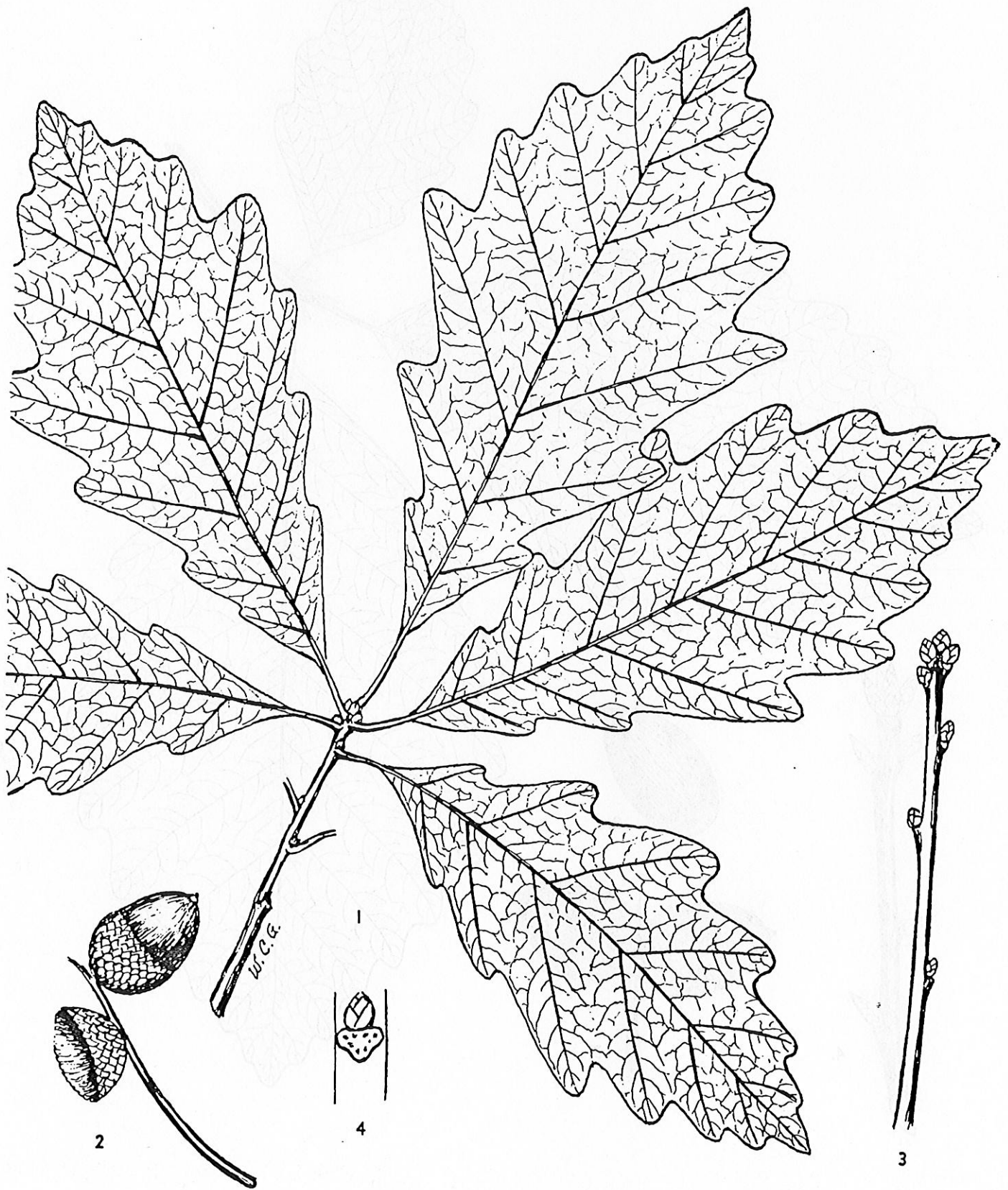
2. Winter twig.



WHITE OAK

1. Branch with mature leaves.
2-3. Acorns.

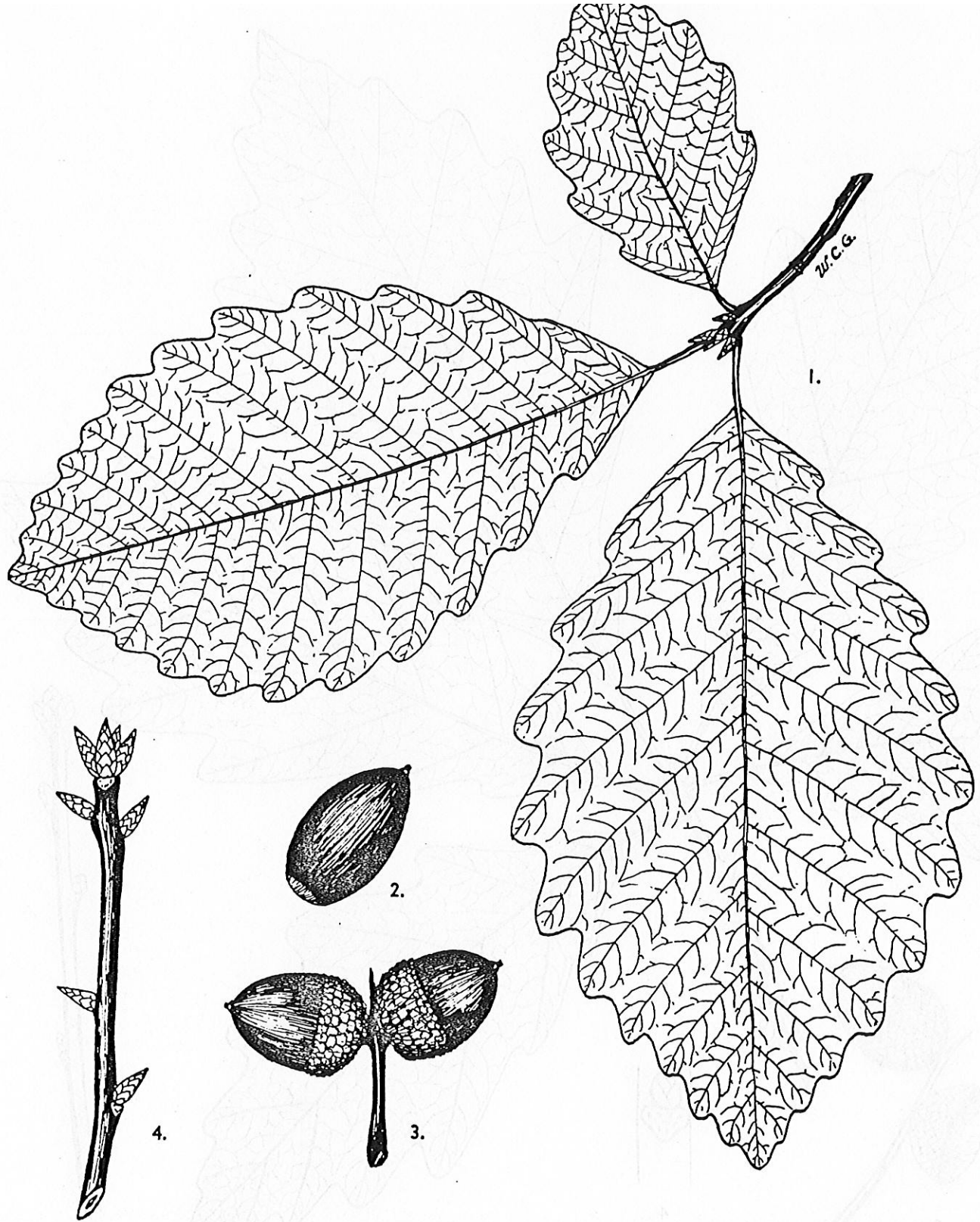
4. Winter twig.
5. Details of bud and leaf scar.



SWAMP WHITE OAK

1. Branch with mature leaves.
2. Acorn.

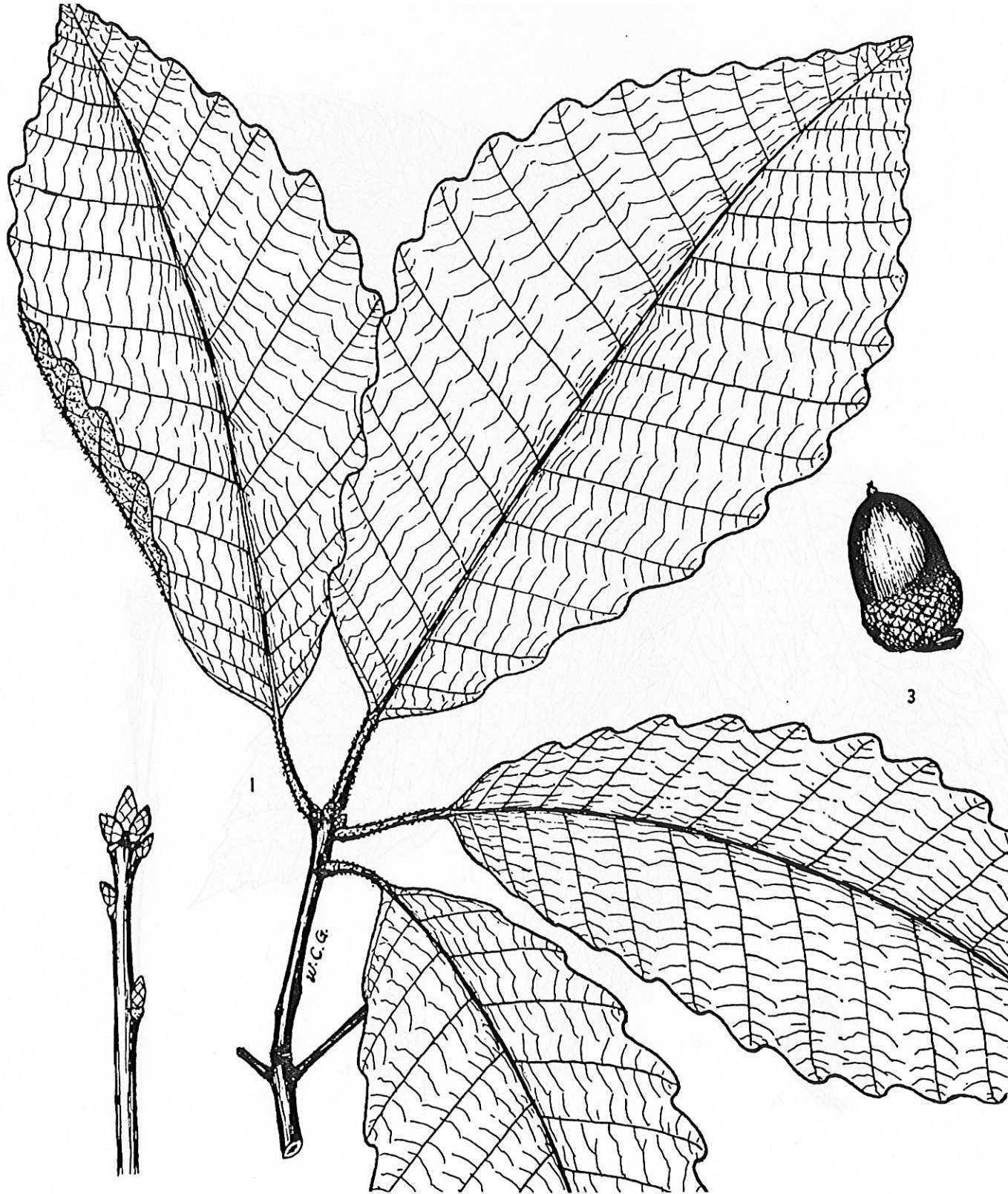
3. Winter twig.
4. Detail of bud and leaf-scar.



CHESTNUT OAK

1. Branch with mature leaves.
2-3. Acorns.

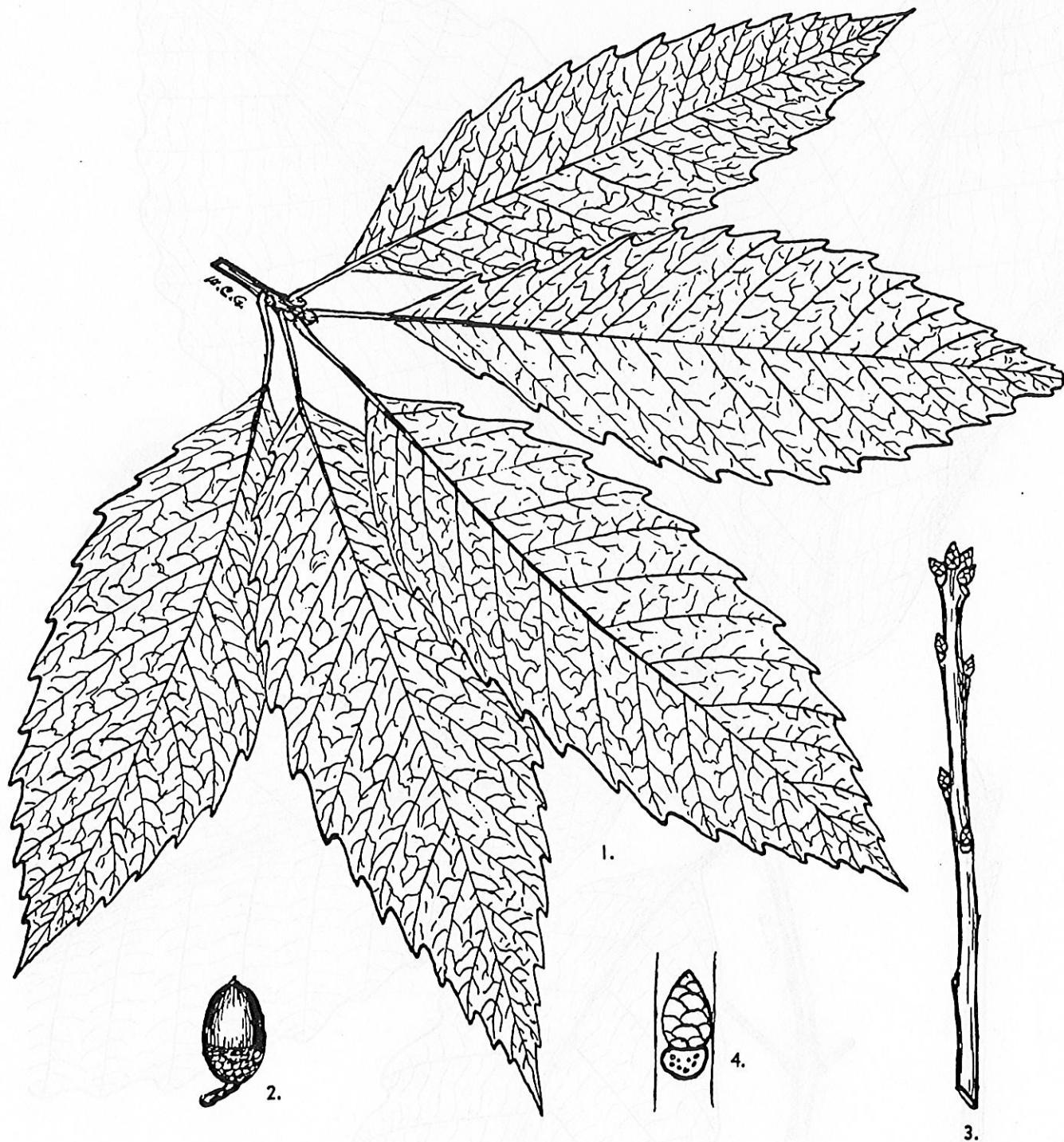
4. Winter twig.



SWAMP CHESTNUT OAK

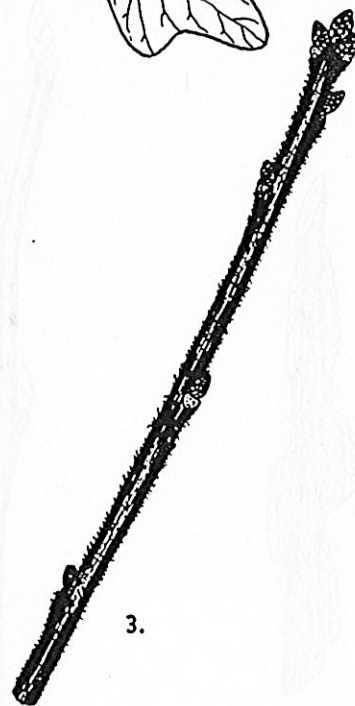
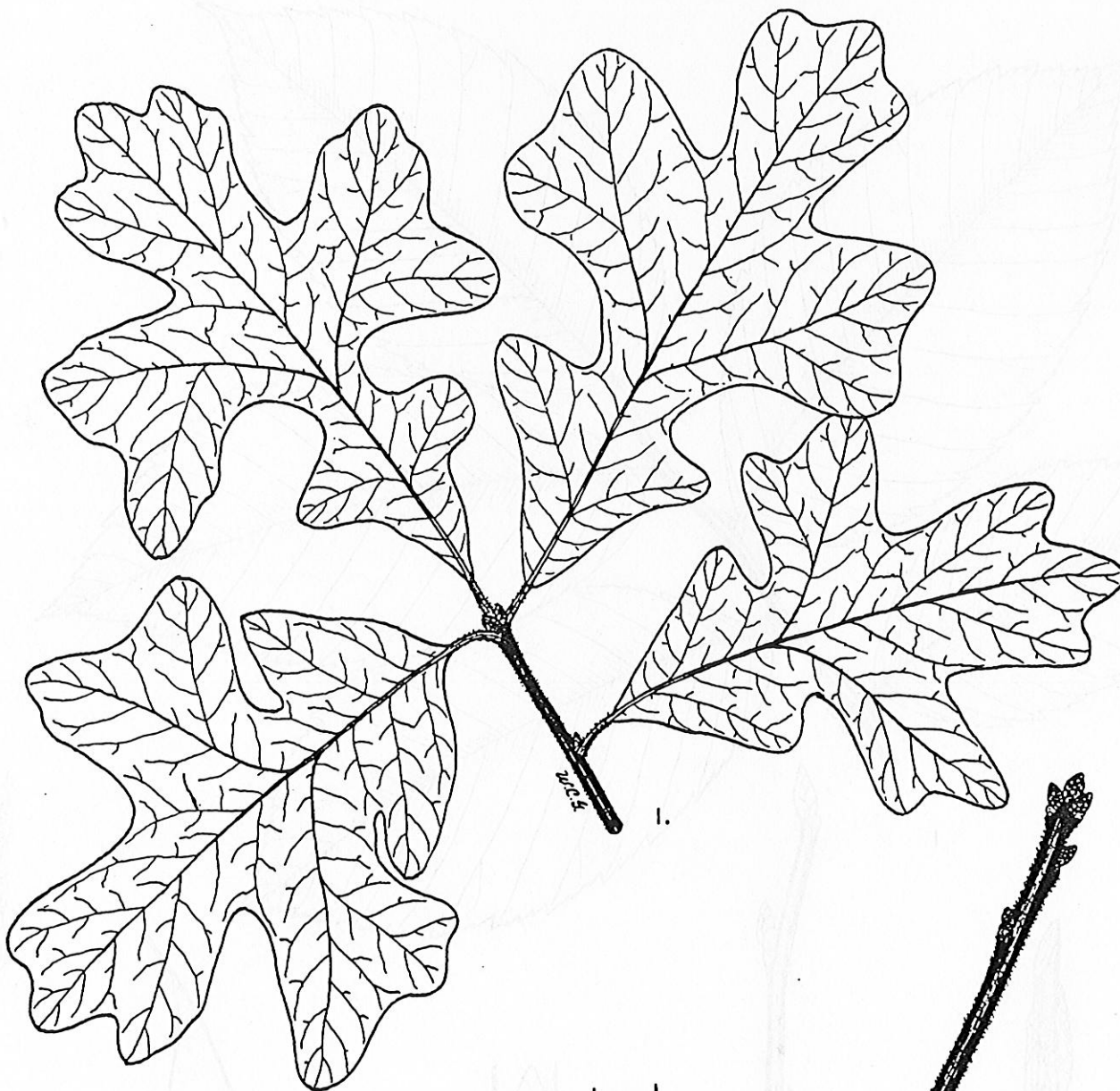
1. Mature branch with leaves.
2. Winter twig.

3. Acorn.



CHINQUAPIN OAK

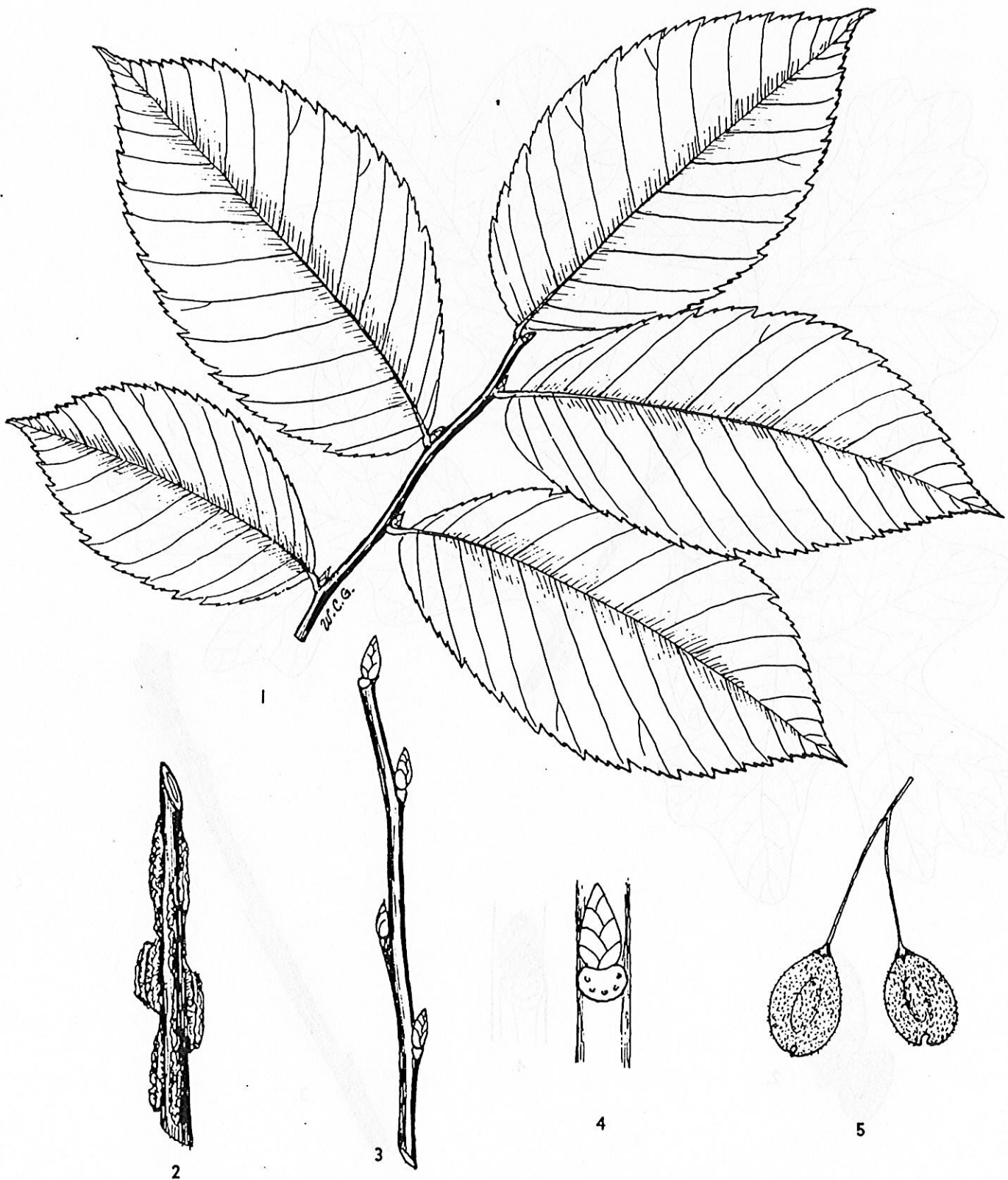
1. Branch with mature leaves.
2. Acorn.
3. Winter twig.
4. Detail of bud and leaf scar.



POST OAK

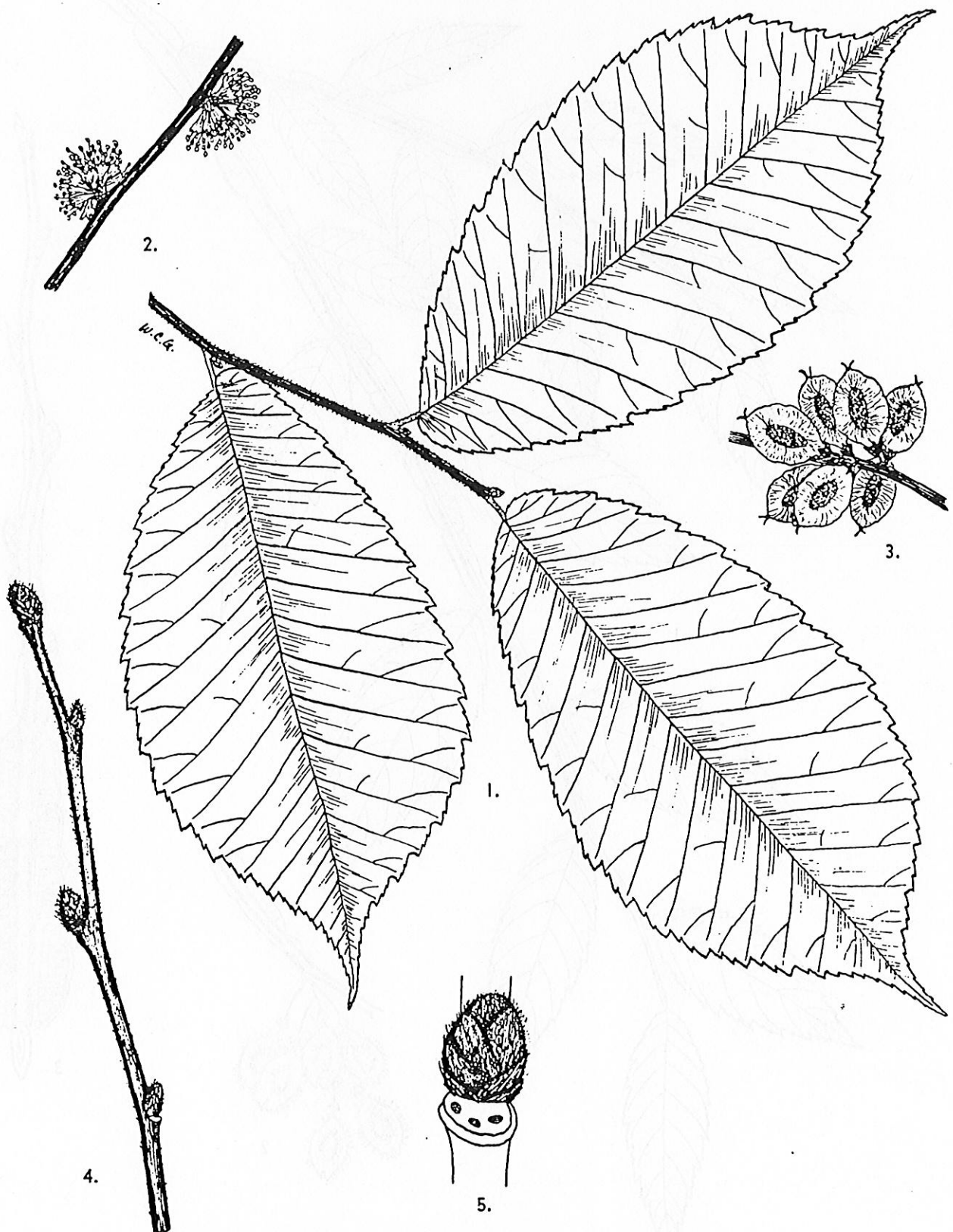
- 1. Branch with mature leaves.
- 2. Acorn.

- 3. Winter twig.
- 4. Detail of bud and leaf scar.



ROCK ELM

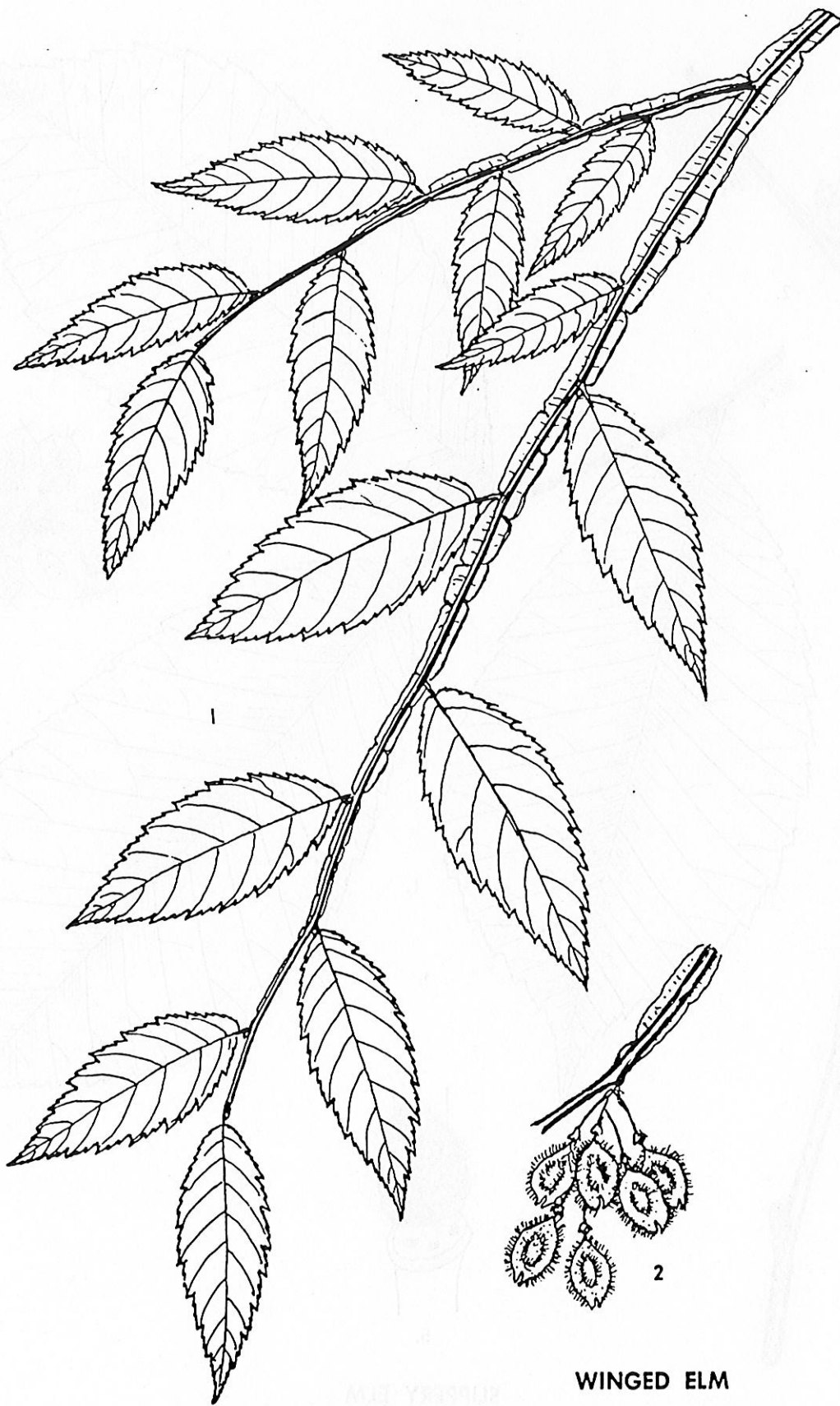
1. Branch with mature leaves.
2. Second year twig showing corky excrescences.
3. Winter twig.
4. Detail of winter bud and leaf-scar.
5. Fruits.



SLIPPERY ELM

1. Branch with mature leaves.
2. Flowering branch.
3. Fruiting branch.

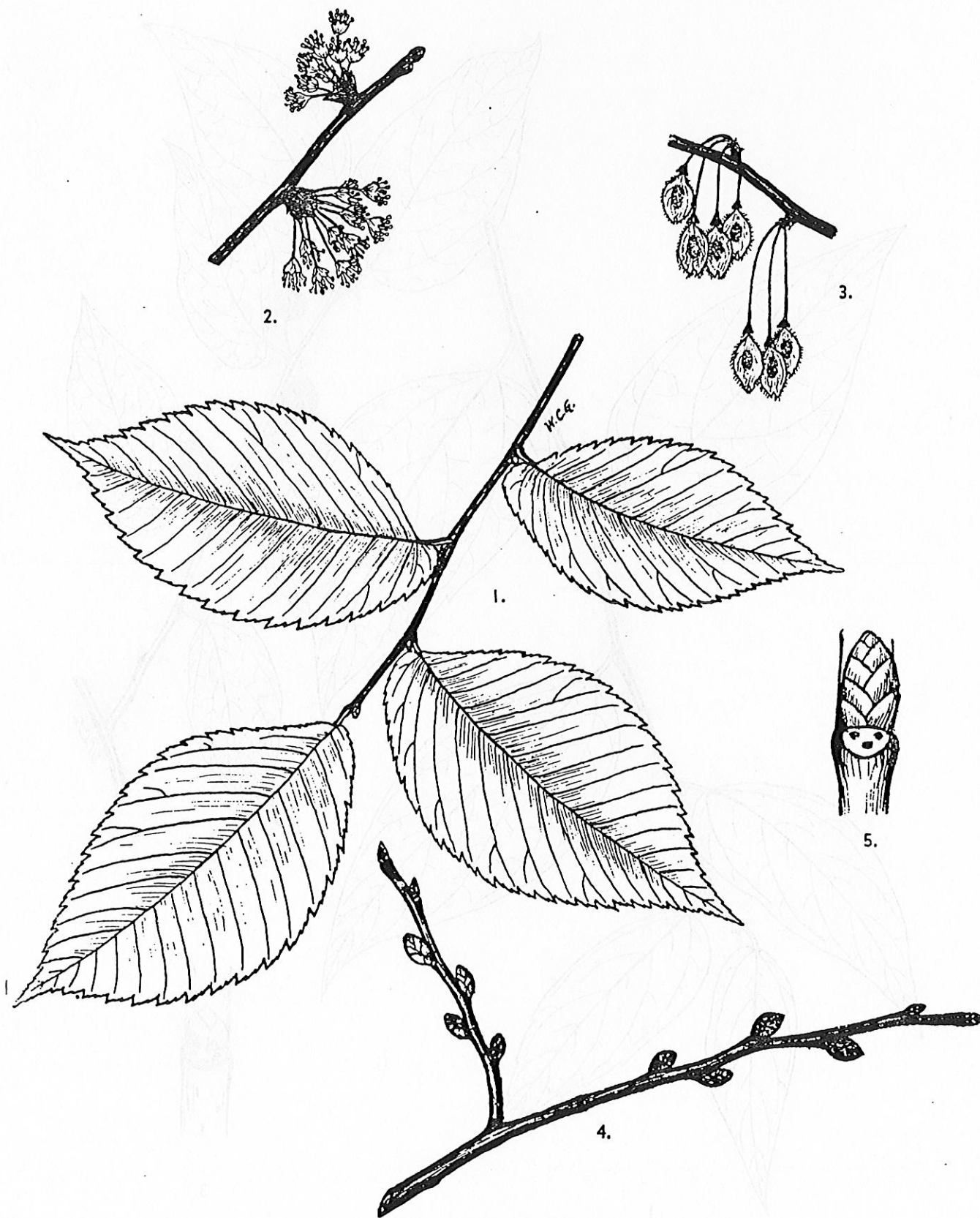
4. Winter twig.
5. Detail of bud and leaf scar.



WINGED ELM

1. Branch with mature leaves.
2. Fruits.

3. Winter twig.



AMERICAN ELM

1. Branch with mature leaves.
2. Flowering branch.
3. Fruiting branch.

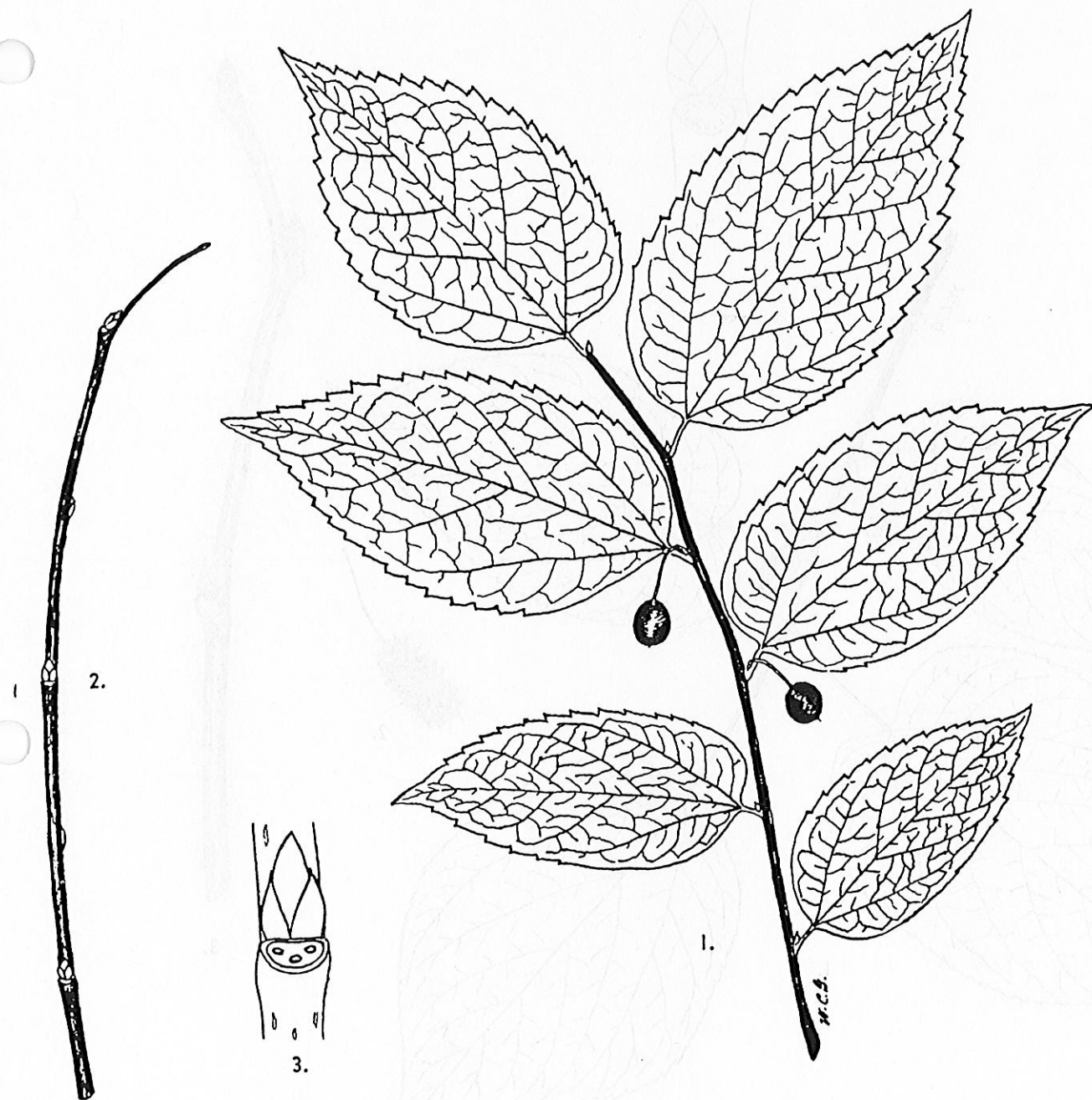
4. Winter twig.
5. Details of bud and leaf scar.



SUGARBERRY

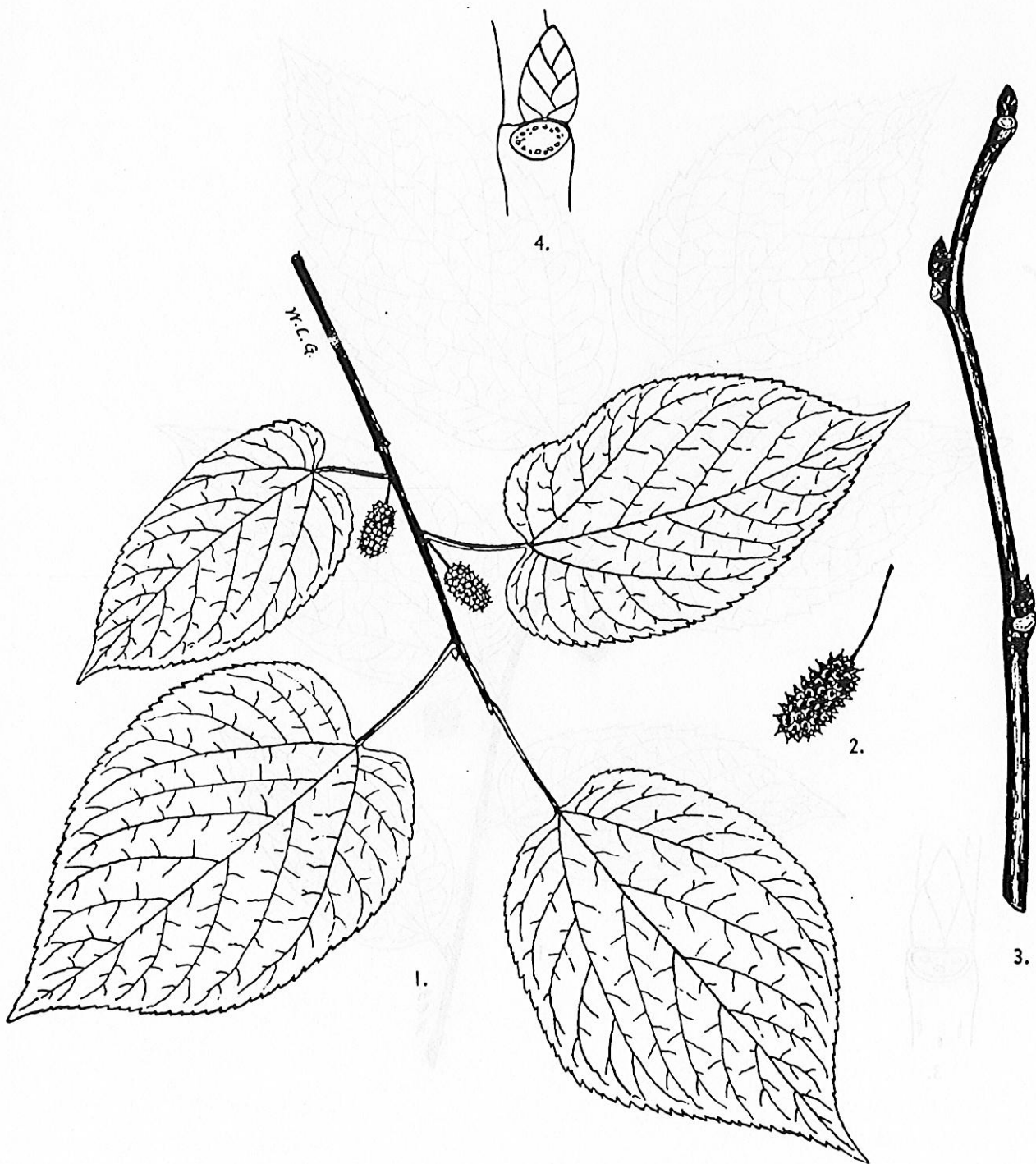
1. Branch with mature leaves.
2. Fruiting branch.

3. Detail of winter bud and leaf-scar.



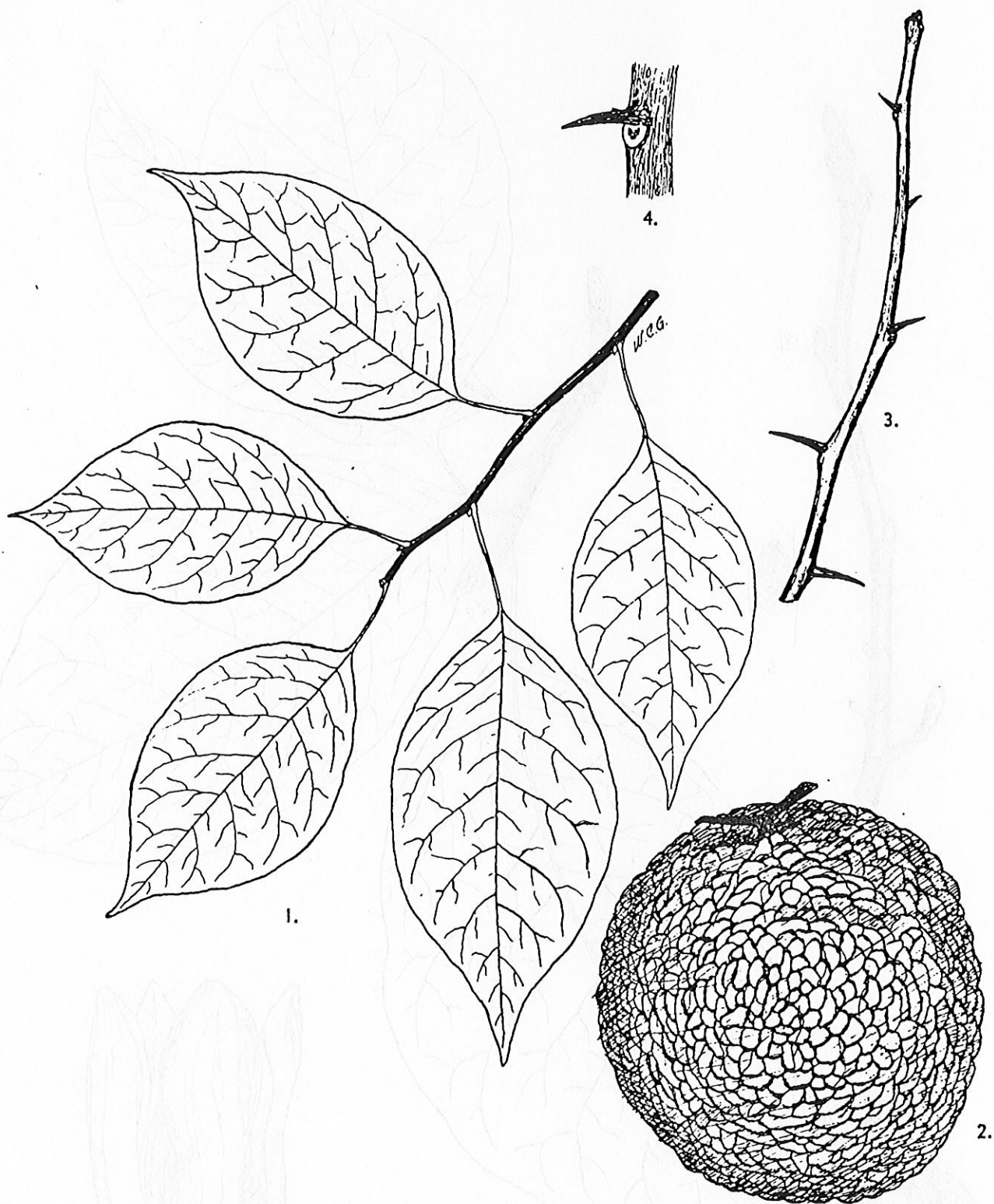
HACKBERRY

1. Branch with mature leaves and fruits.
2. Winter twig.
3. Details of bud and leaf scar.



RED MULBERRY

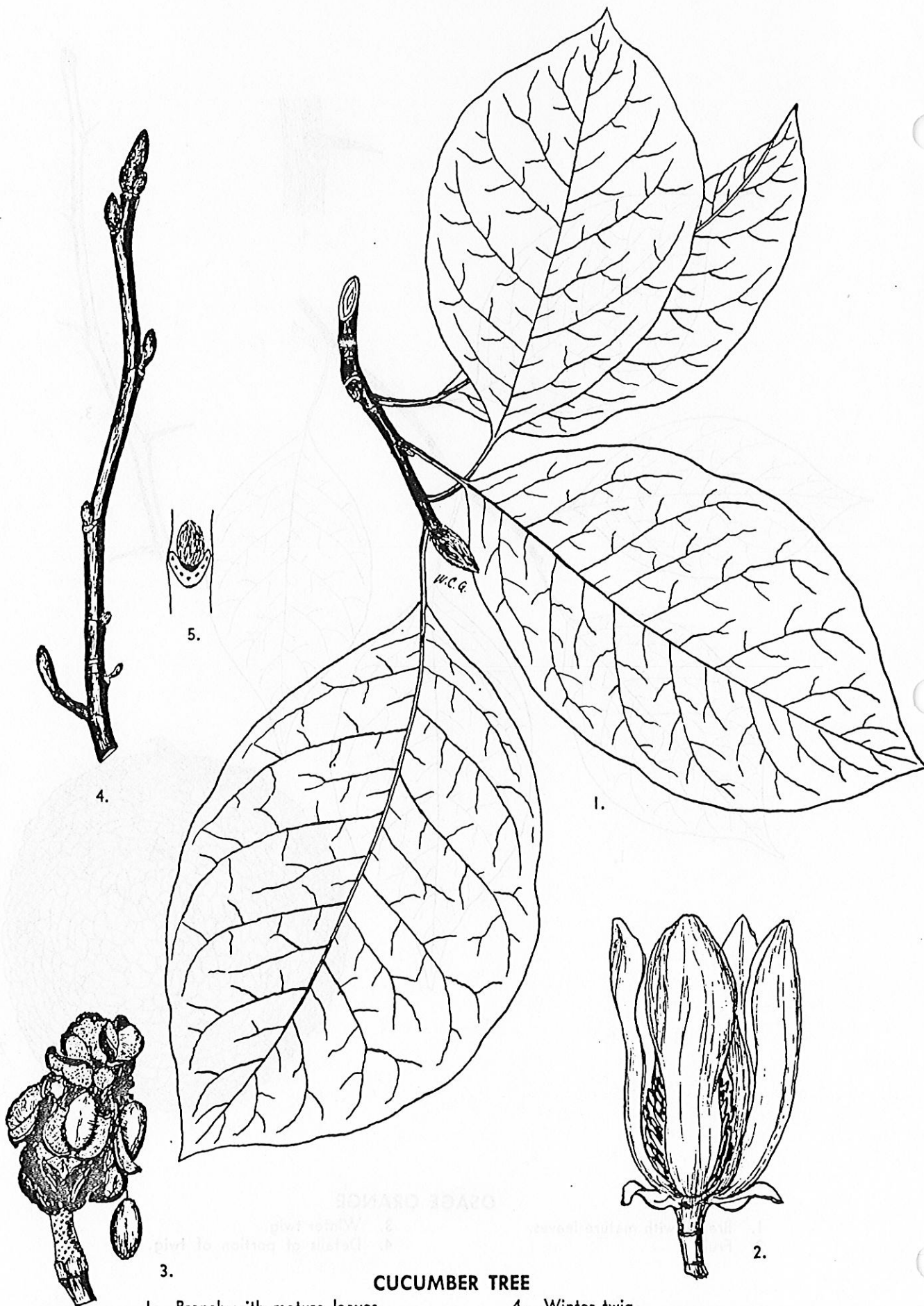
1. Branch with mature leaves and fruits.
2. Fruit.
3. Winter twig.
4. Details of bud and leaf scar.



OSAGE ORANGE

1. Branch with mature leaves.
2. Fruit.

3. Winter twig.
4. Details of portion of twig.



CUCUMBER TREE

1. Branch with mature leaves.
2. Flower.
3. Fruit.

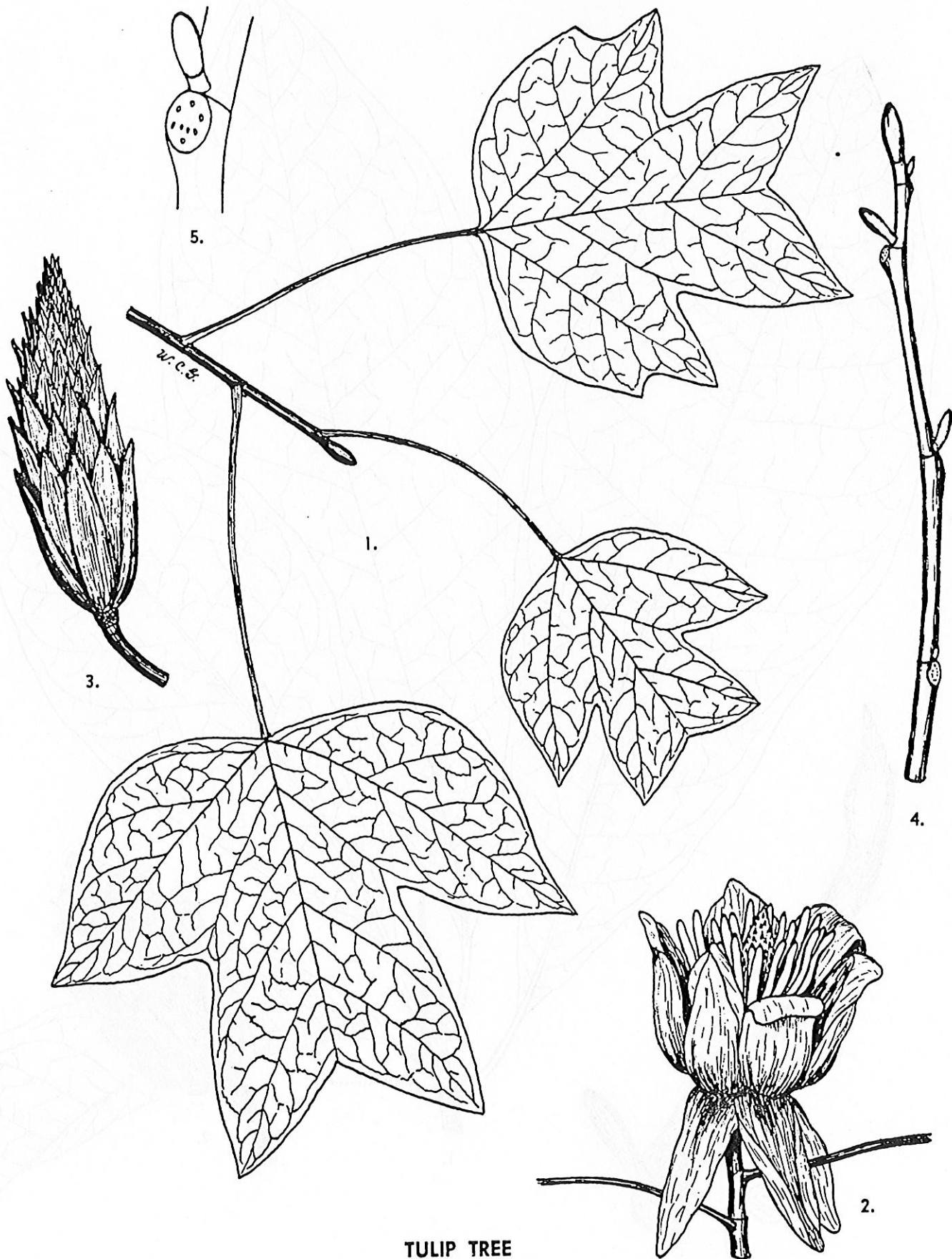
4. Winter twig.
5. Detail of bud and leaf scar.



UMBRELLA MAGNOLIA

1. Branch with mature leaves.
2. Fruit.

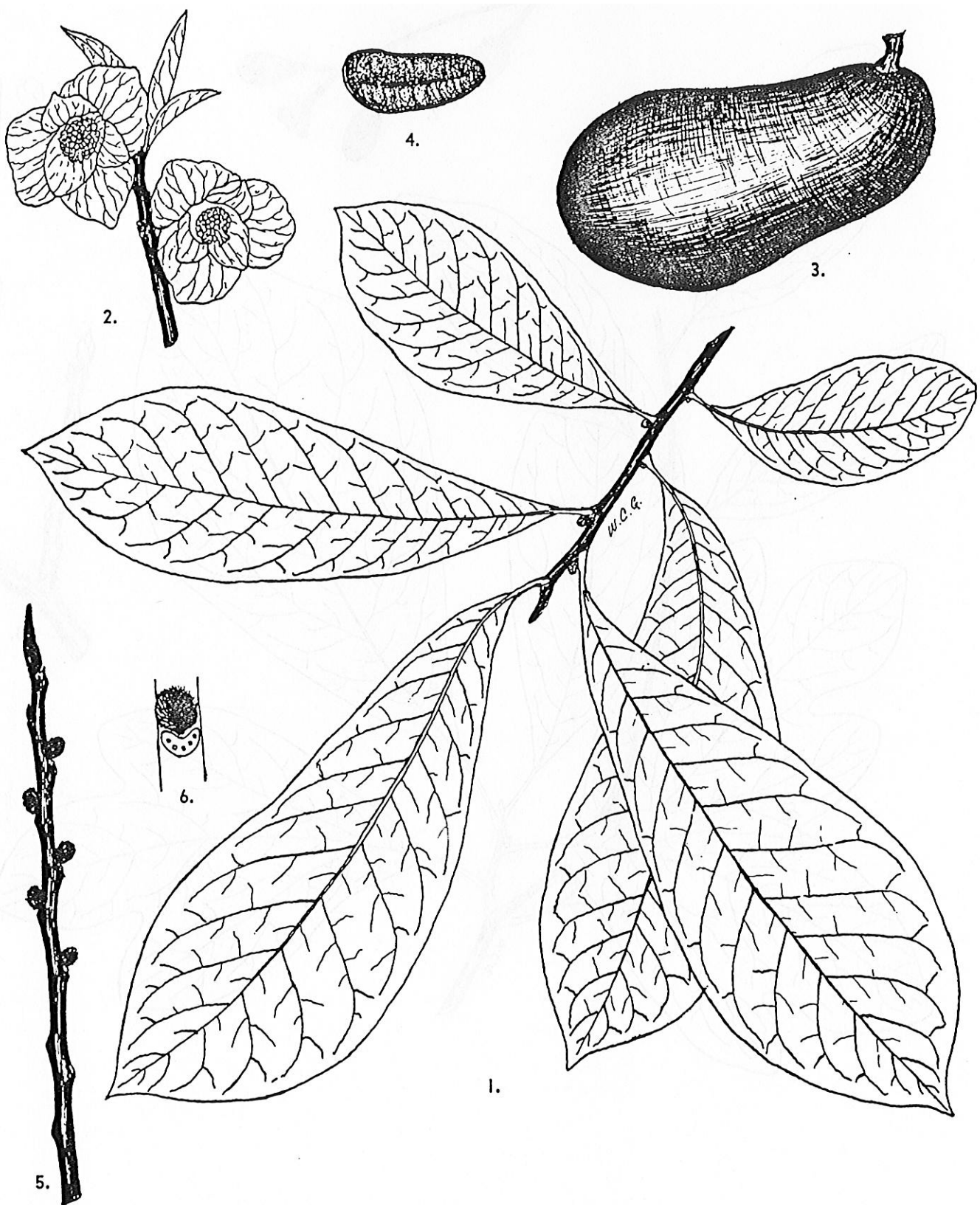
3. Winter twig.
4. Leaf scar.



TULIP TREE

1. Branch with mature leaves.
2. Flower.
3. Fruit.

4. Winter twig.
5. Detail of bud and leaf scar.



COMMON PAWPAW

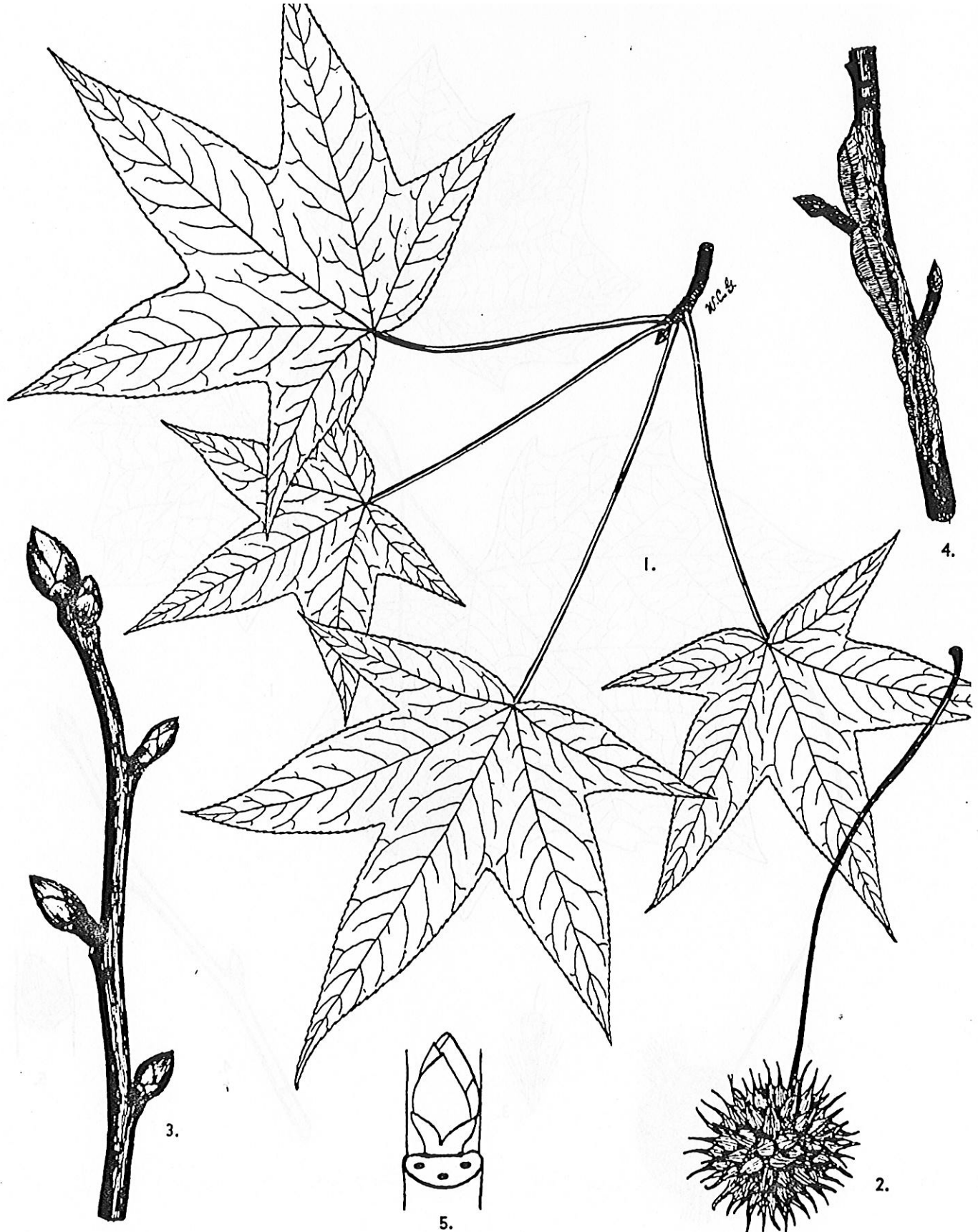
- | | |
|-------------------------------|----------------------------------|
| 1. Branch with mature leaves. | 4. Seed. |
| 2. Flowering branch. | 5. Winter twig. |
| 3. Fruit. | 6. Details of bud and leaf scar. |



SASSAFRAS

- 1. Branch with mature leaves.
- 2. Fruits.

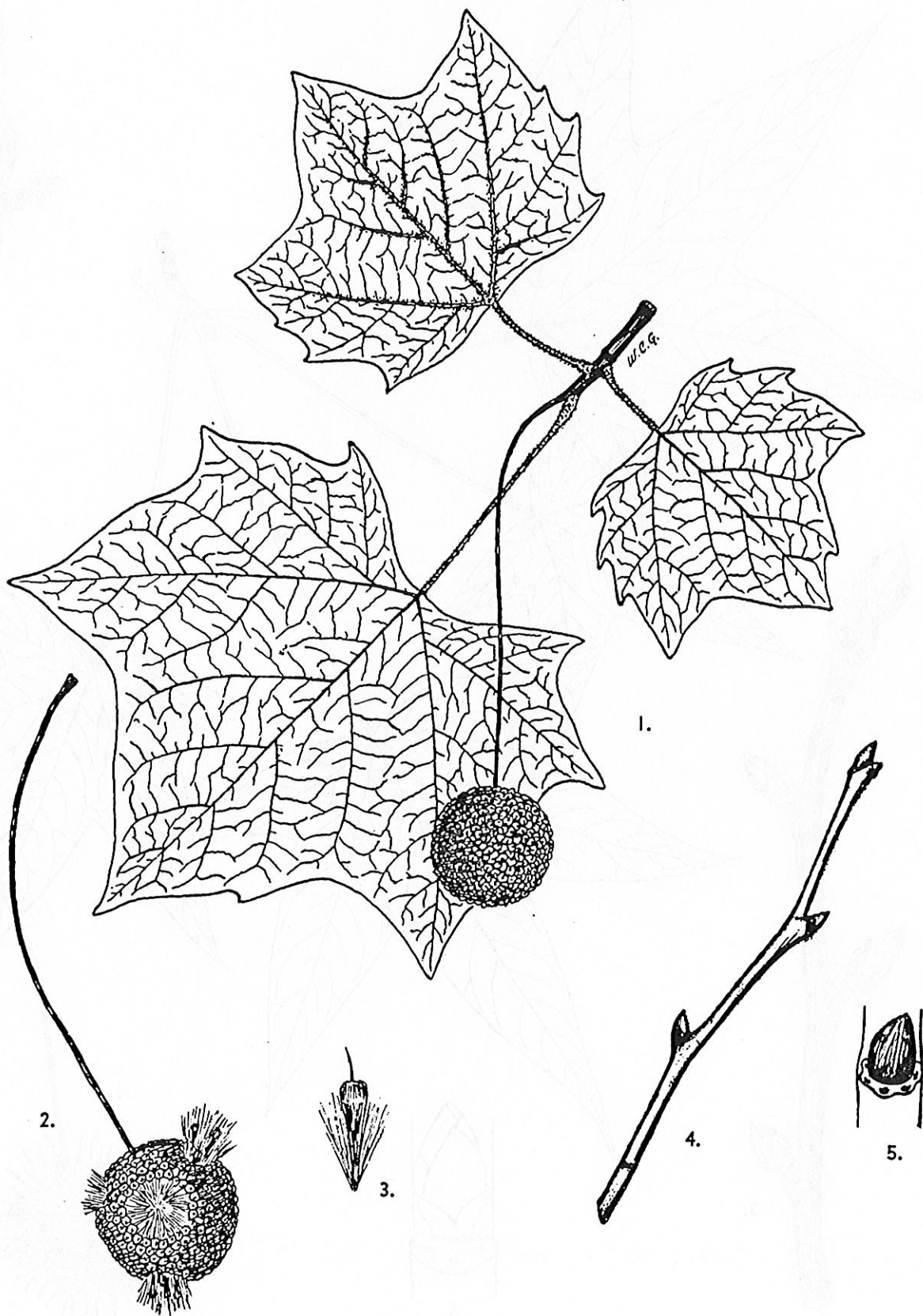
- 3. Winter twig.
- 4. Details of bud and leaf scar.



SWEETGUM

1. Branch with mature leaves.
2. Fruit.
3. Winter twig.

4. Second year winter twig with corky ridges.
5. Details of bud and leaf scar.



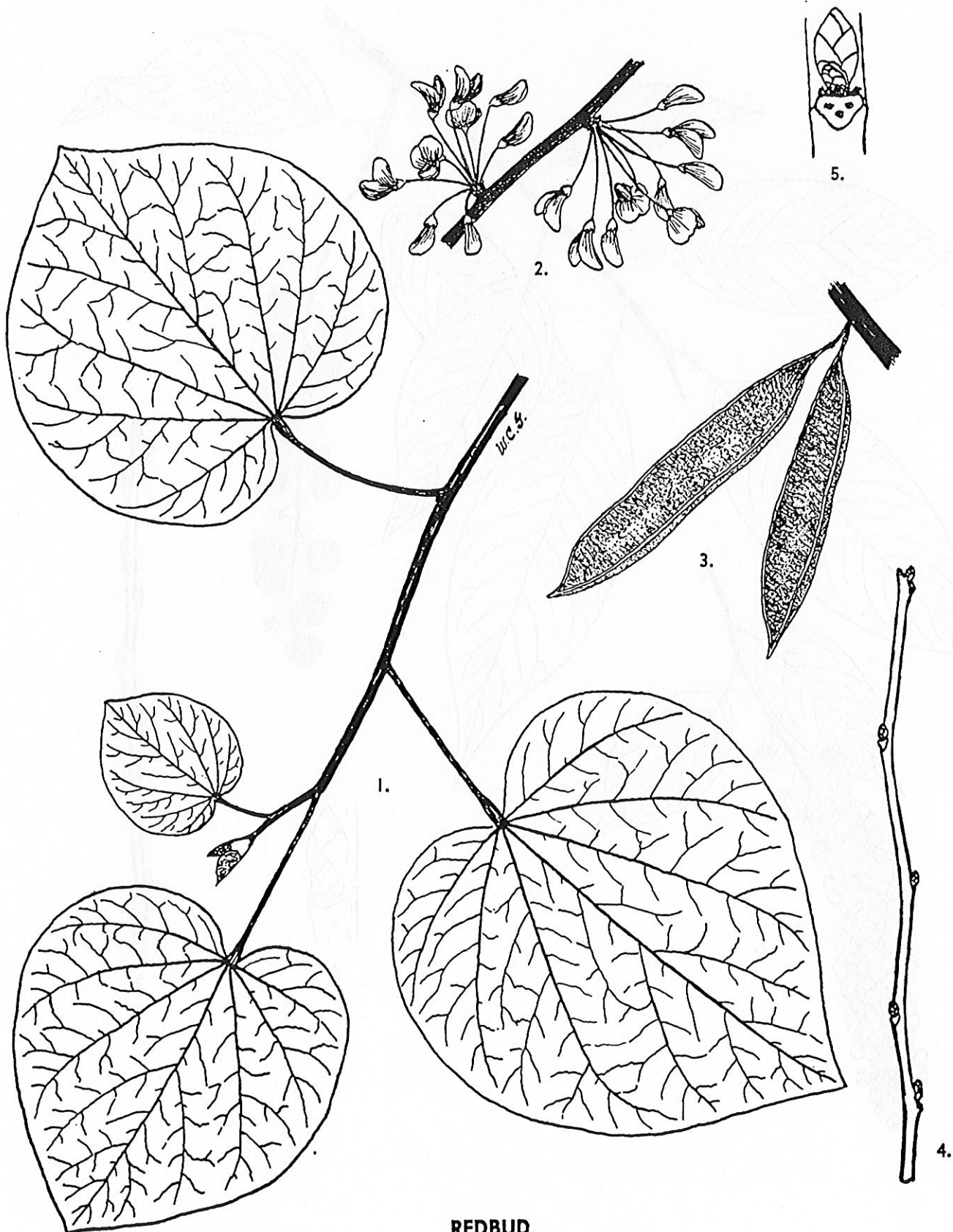
SYCAMORE

1. Branch with mature leaves and fruit.
2. Ball-like head of fruits.
3. An individual fruit (achene).
4. Winter twig.
5. Details of bud and leaf scar.



WILD BLACK CHERRY

1. Branch with mature leaves and fruits.
2. Flowering branch.
3. Winter twig.
4. Details of bud and leaf scar.



REDBUD

1. Branch with mature leaves.
2. Flowering branch.
3. Fruits.

4. Winter twig.
5. Details of bud and leaf scar.



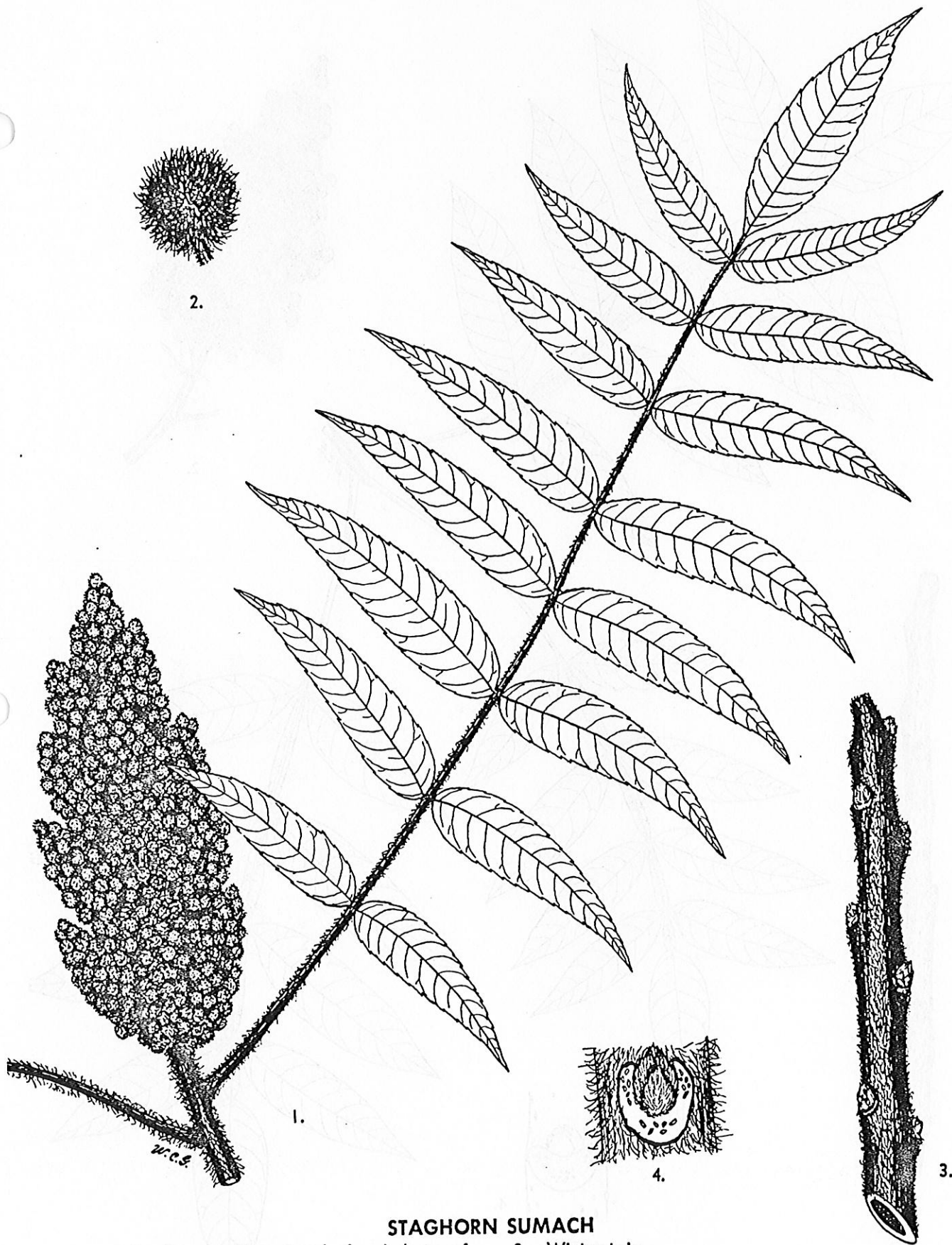
HONEY LOCUST

1. Branch with mature leaves.
2. Branched thorn from trunk.
3. Fruit.
4. Section of fruit showing seeds.
5. Winter twig.
6. Details of winter twig.



COMMON LOCUST

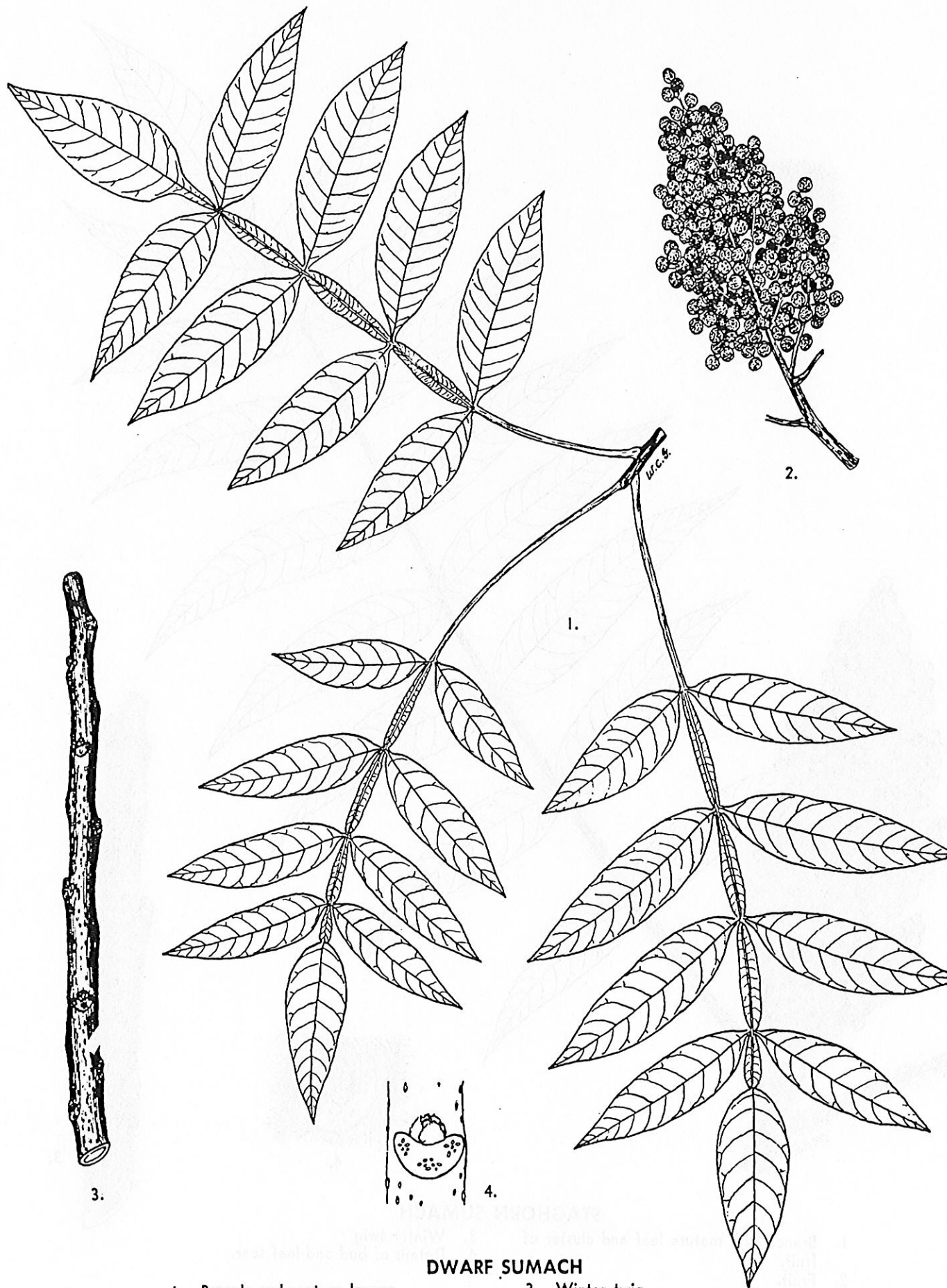
1. Branch with mature leaves.
2. Cluster of flowers.
3. Fruits.
4. Winter twig.
5. Details of leaf scar and imbedded buds.



STAGHORN SUMACH

1. Branch with mature leaf and cluster of fruit.
2. Fruit.

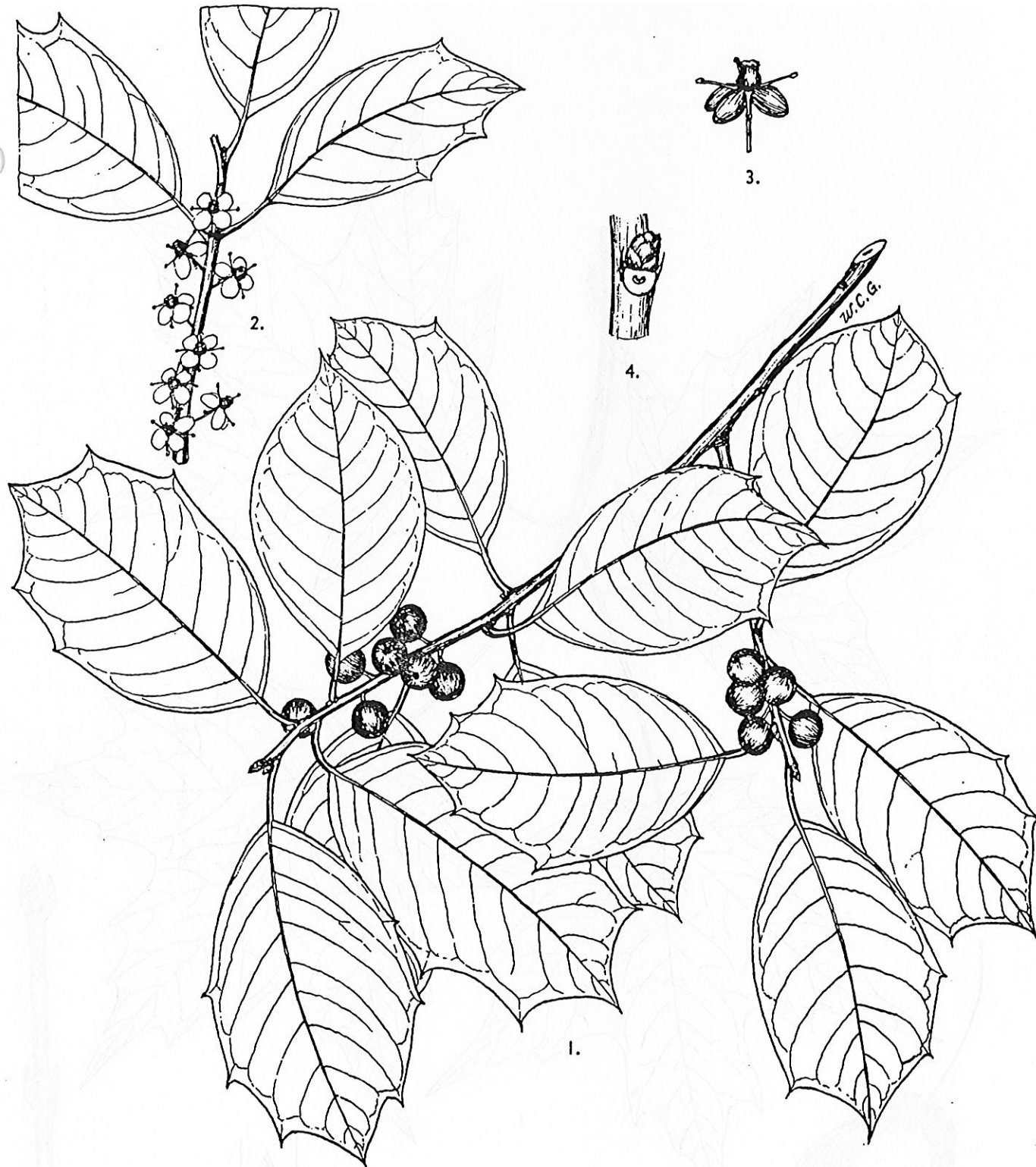
3. Winter twig.
4. Details of bud and leaf scar.



DWARF SUMACH

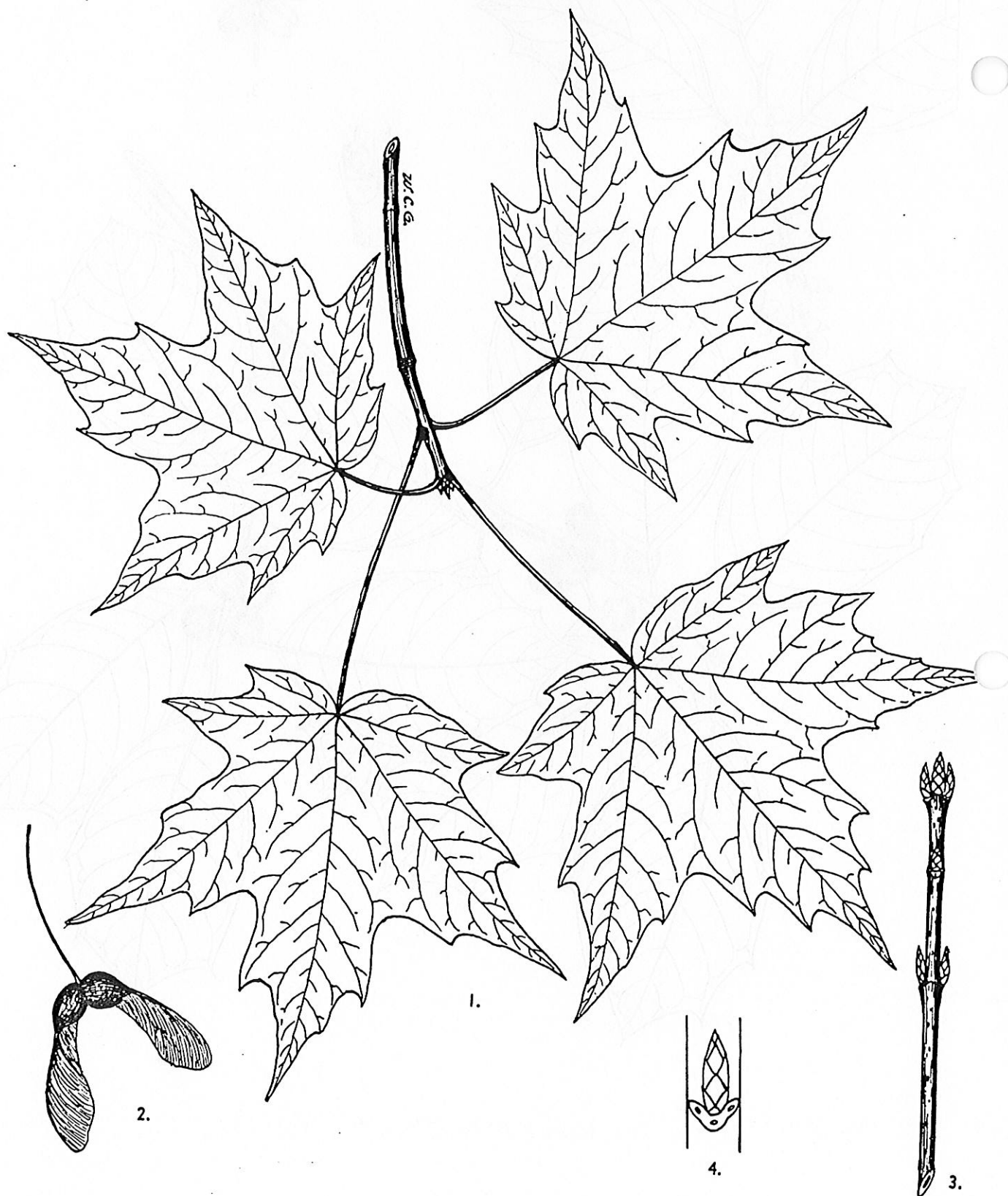
1. Branch and mature leaves.
2. Cluster of fruits.

3. Winter twig.
4. Details of bud and leaf scar.



AMERICAN HOLLY

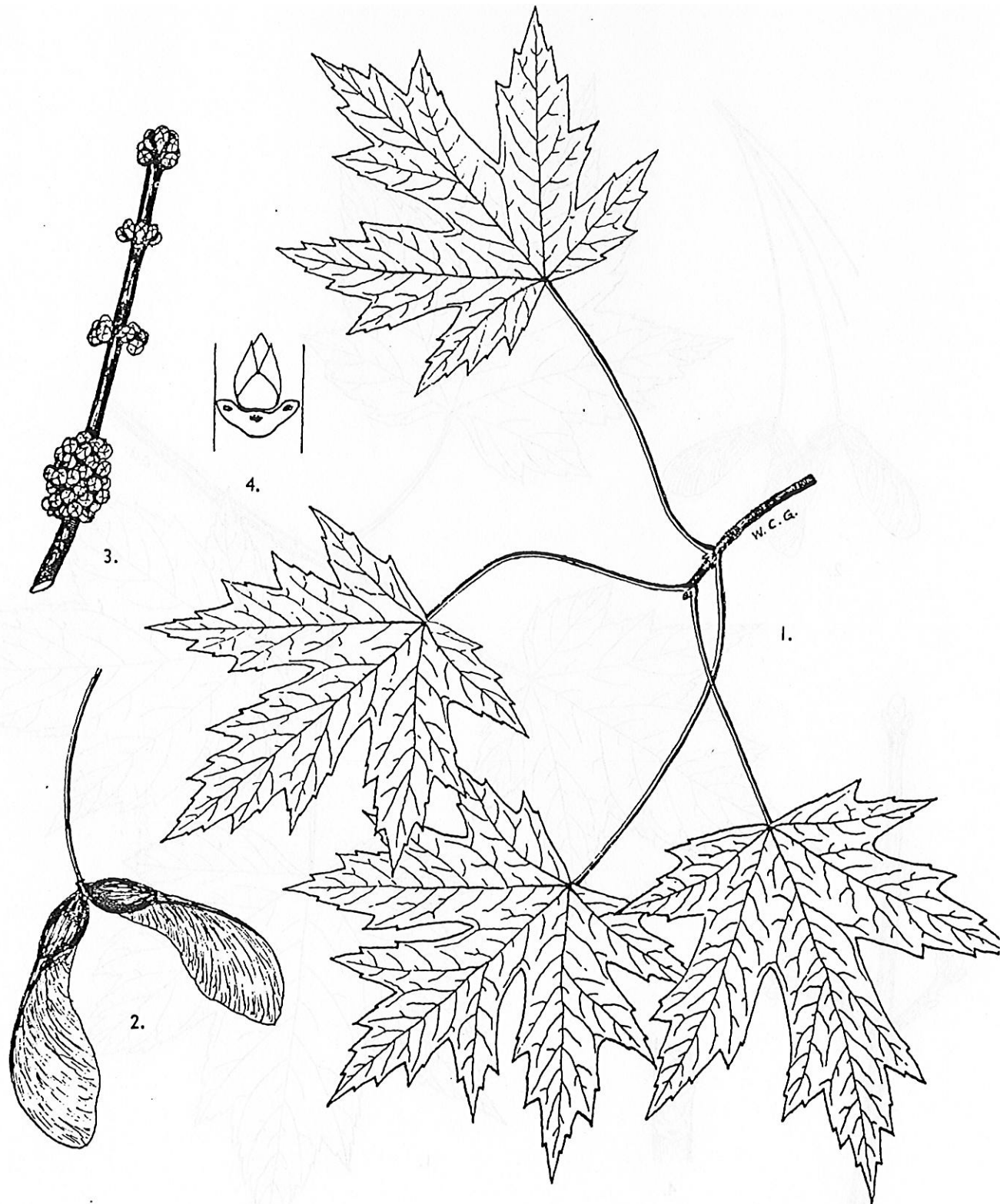
1. Branch with mature leaves and fruits.
2. Flowering branch.
3. Detail of pistillate flower.
4. Detail of bud and leaf scar.



SUGAR MAPLE

1. Branch with mature leaves.
2. Fruit.

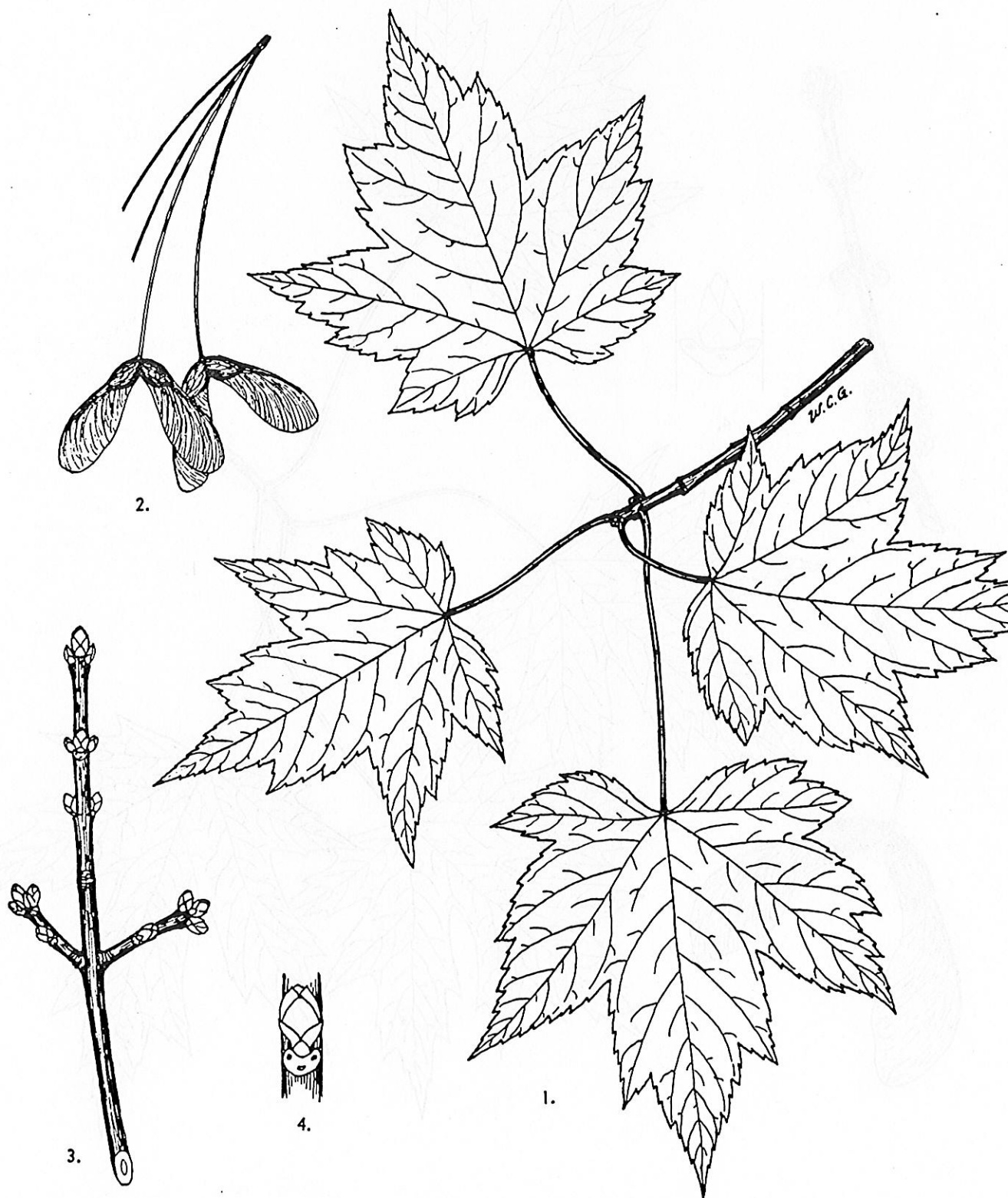
3. Winter twig.
4. Detail of bud and leaf scar.



SILVER MAPLE

1. Branch with mature leaves.
2. Fruit.

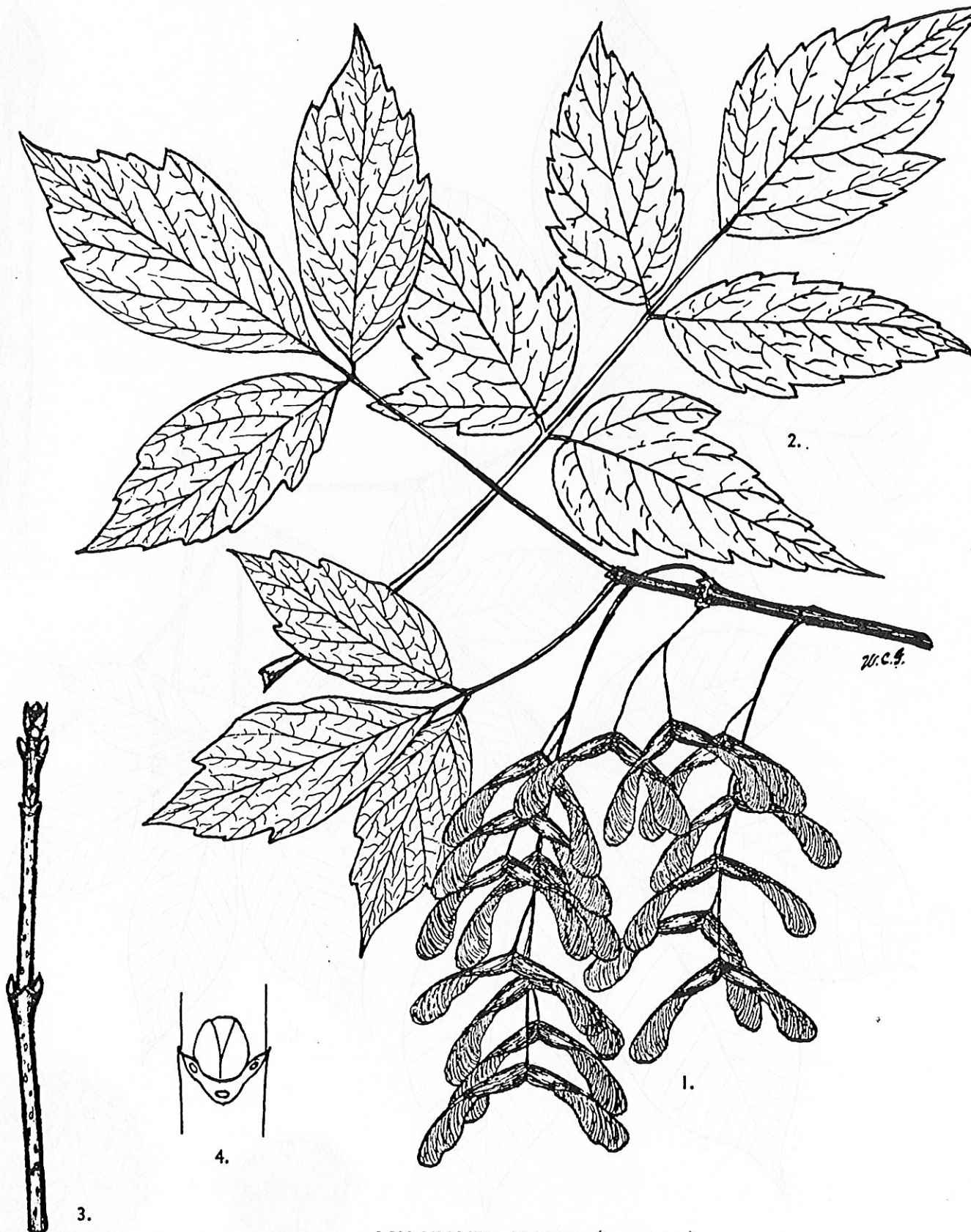
3. Winter twig with clusters of flower buds.
4. Details of bud and leaf scar.



RED MAPLE

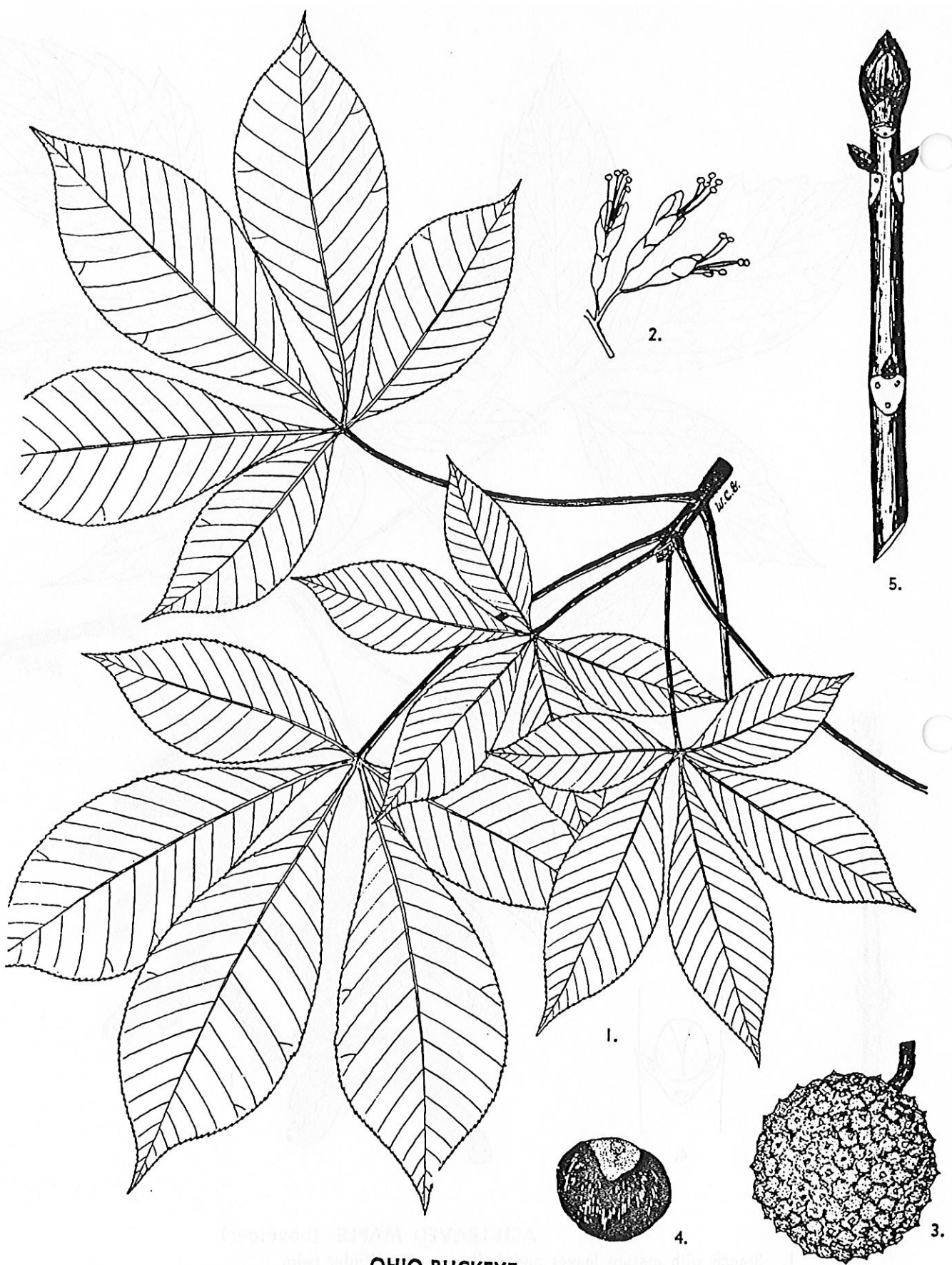
1. Branch with mature leaves.
2. Fruits.

3. Winter twig.
4. Detail of bud and leaf scar.



ASH-LEAVED MAPLE (boxelder)

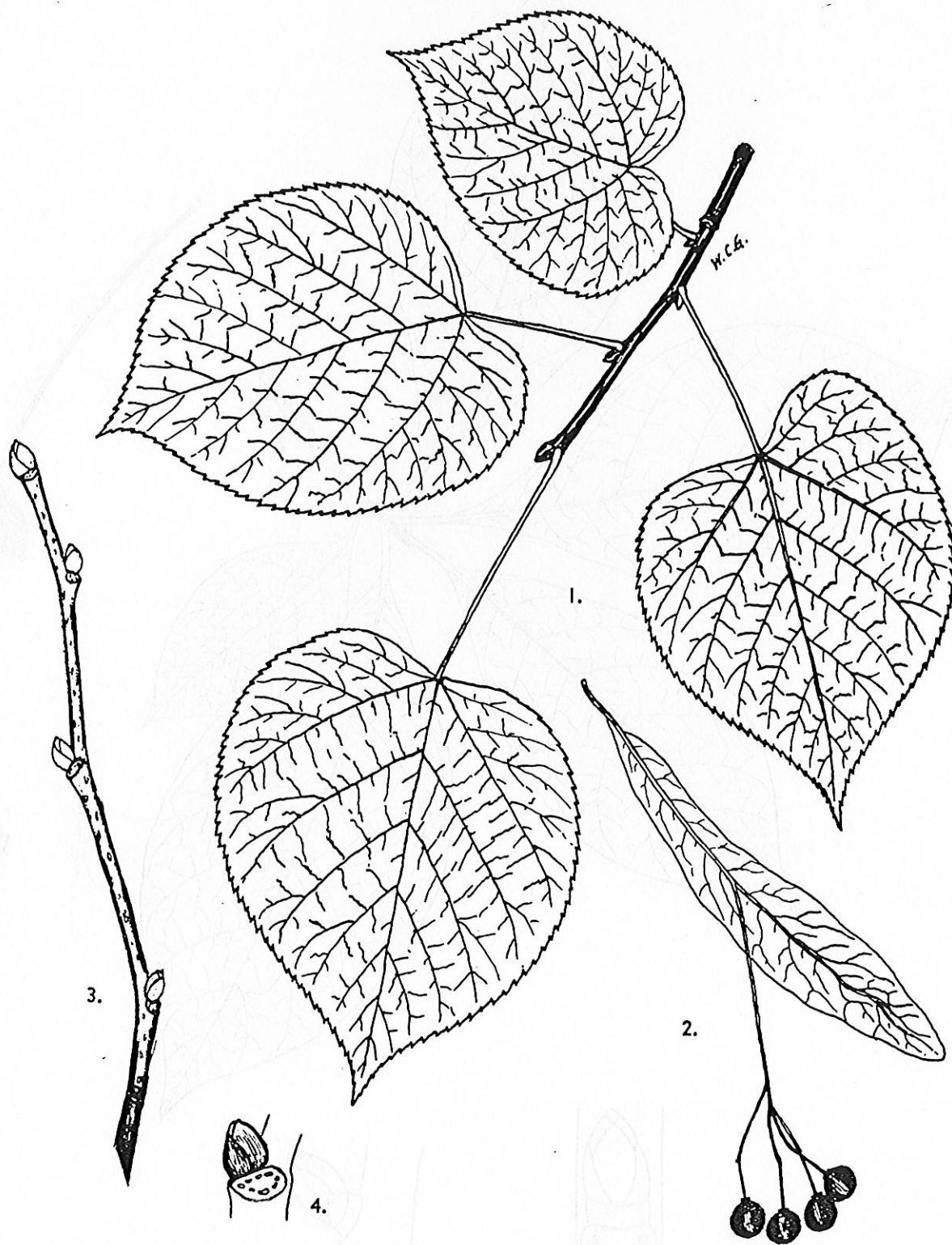
1. Branch with mature leaves and fruits.
2. Leaf.
3. Winter twig.
4. Details of bud and leaf scar.



OHIO BUCKEYE

1. Branch with mature leaves.
2. Portion of flower cluster.
3. Fruit.

4. Seed.
5. Winter twig.



AMERICAN BASSWOOD

1. Branch with mature leaves.
2. Fruit.

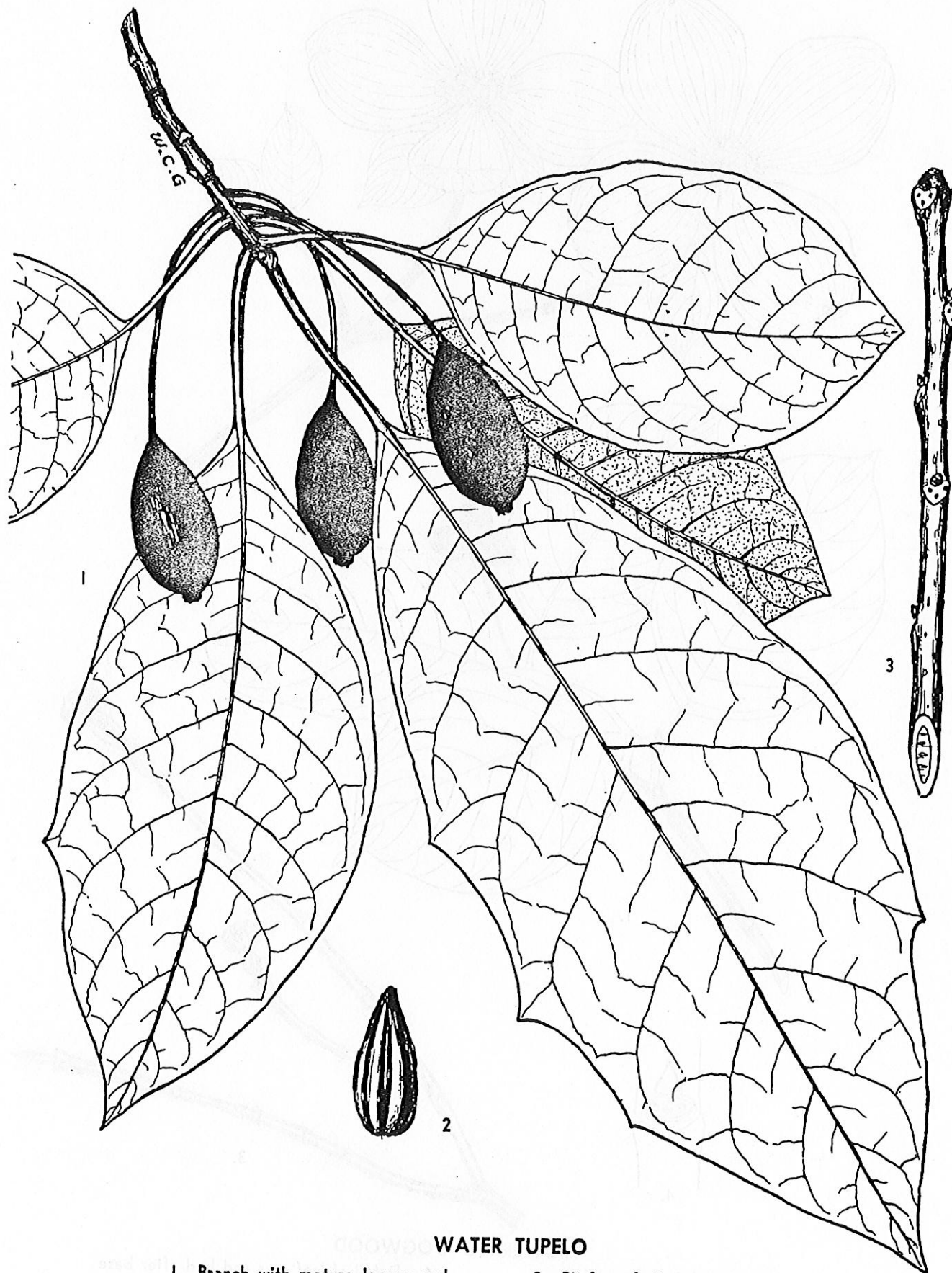
3. Winter twig.
4. Detail of bud and leaf scar.



BLACK GUM

1. Branch with mature leaves.
2. Fruits.
3. Winter twig.

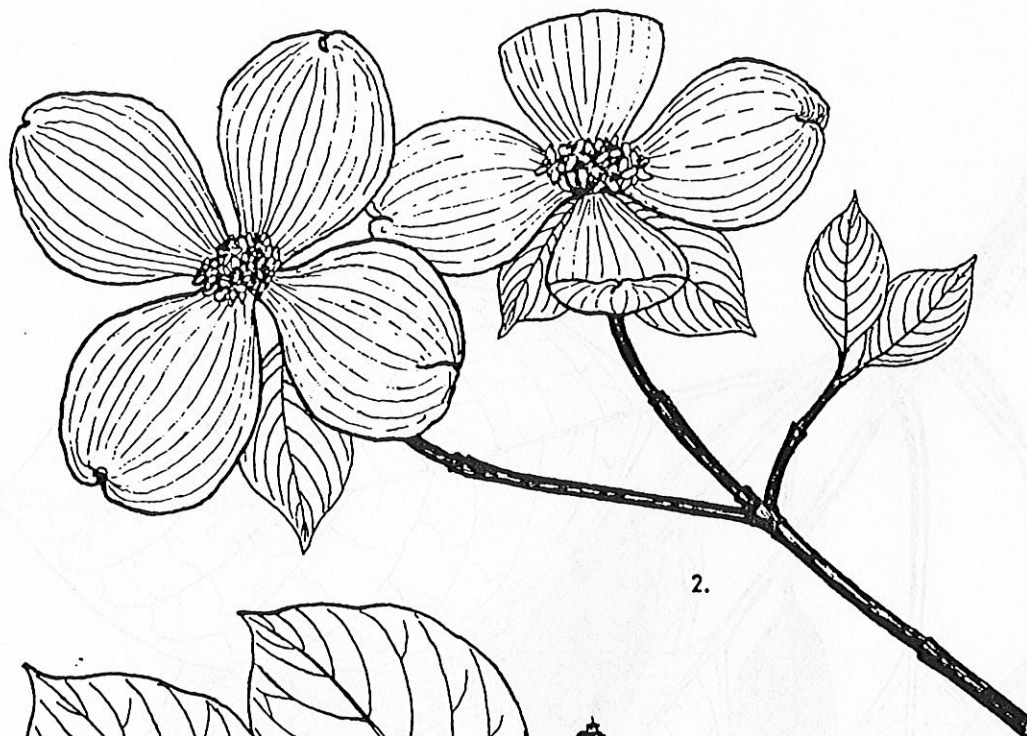
4-5. Details of winter buds and leaf scar.



WATER TUPELO

1. Branch with mature leaves and fruits.

2. Pit from fruit.
3. Winter twig.



2.



1.



4.



3.

FLOWERING DOGWOOD

1. Branch with leaves and fruits.
2. Flowering branch.
3. Winter twig.

4. Detail of leaf scar and bud after base of petiole is removed.



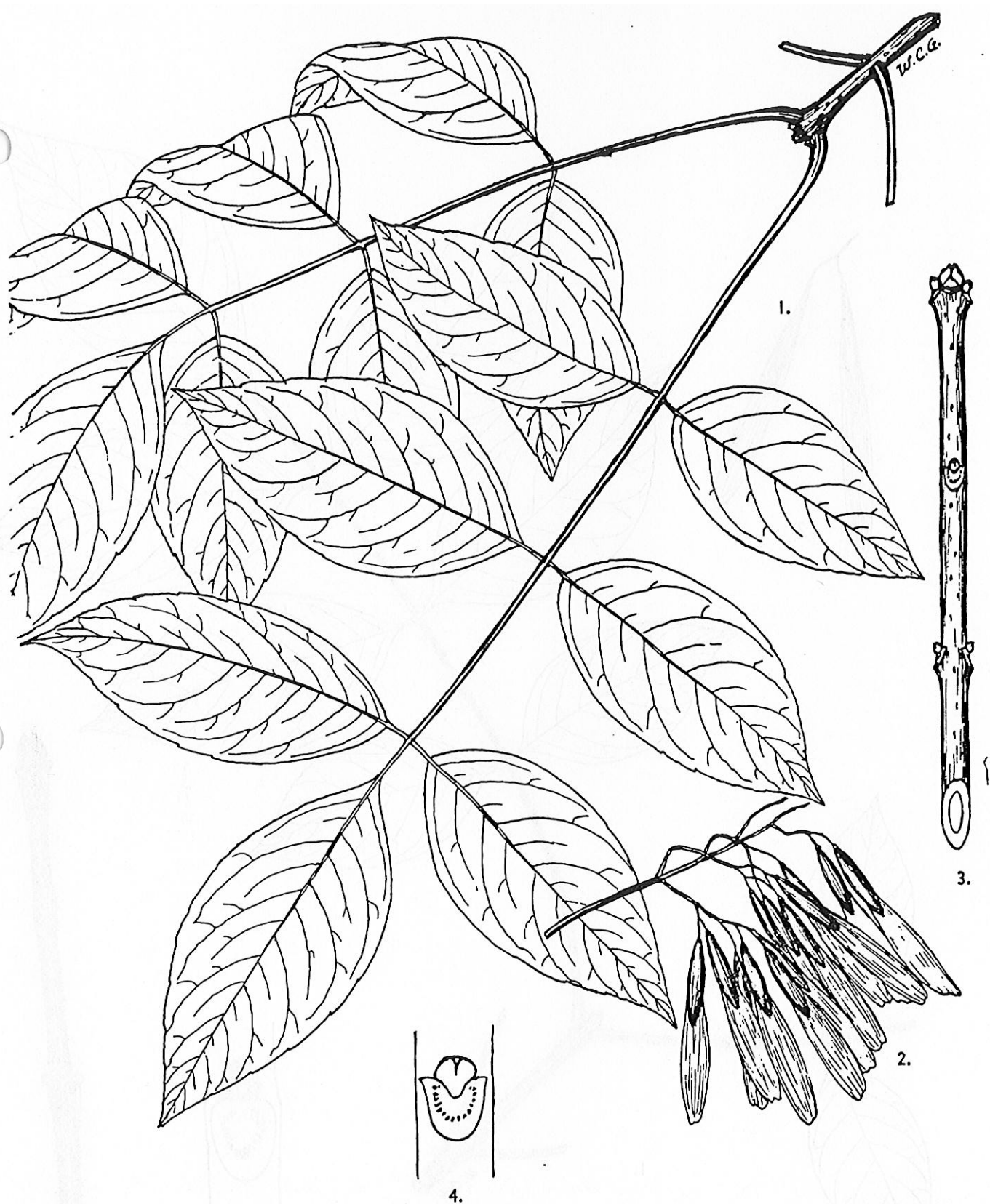
ALTERNATE-LEAVED DOGWOOD

1. Branch with mature leaves and fruits.
2. Winter twig.
3. Details of bud and leaf scar (enlarged).
4. Detail of terminal portion of twig.



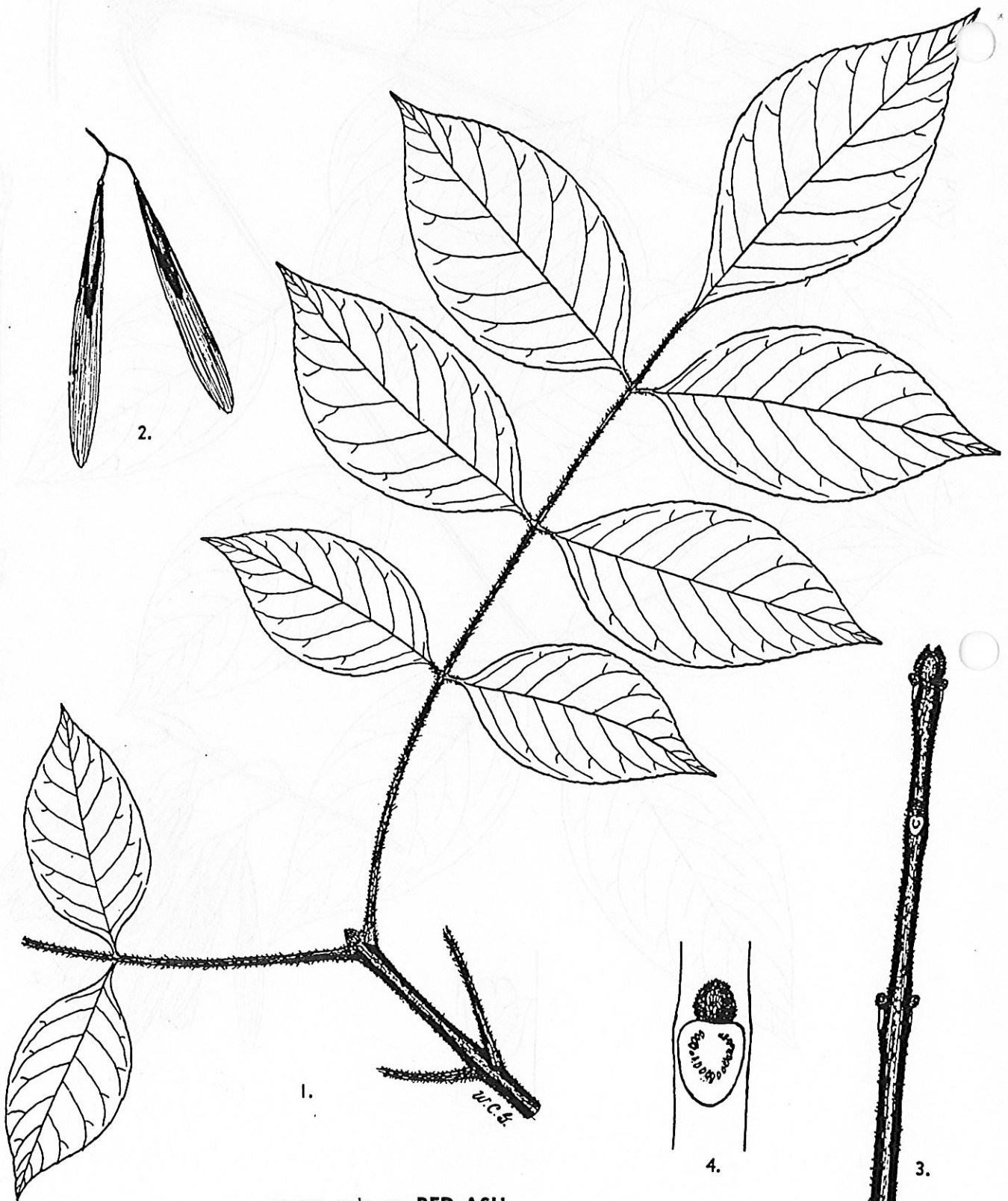
COMMON PERSIMMON

1. Branch with mature leaves and fruit.
2. Winter twig.
3. Detail of bud and leaf scar.



WHITE ASH

- | | |
|--|----------------------------------|
| 1. Portion of branch with mature leaves. | 3. Winter twig. |
| 2. Portion of fruit cluster. | 4. Details of bud and leaf scar. |



green ash or **RED ASH**

1. Branch with mature leaves.
2. Fruits.

3. Winter twig.
4. Details of bud and leaf scar.

HOW A TREE WORKS

The crown consists of the leaves and branches. The leaves should be called the tree's "chemical laboratory." They contain chlorophyll, the substance that gives the green color to the leaves. In the presence of sunlight, the leaves use the water and minerals from the roots, and the carbon dioxide from the air, to produce sugar and oxygen.

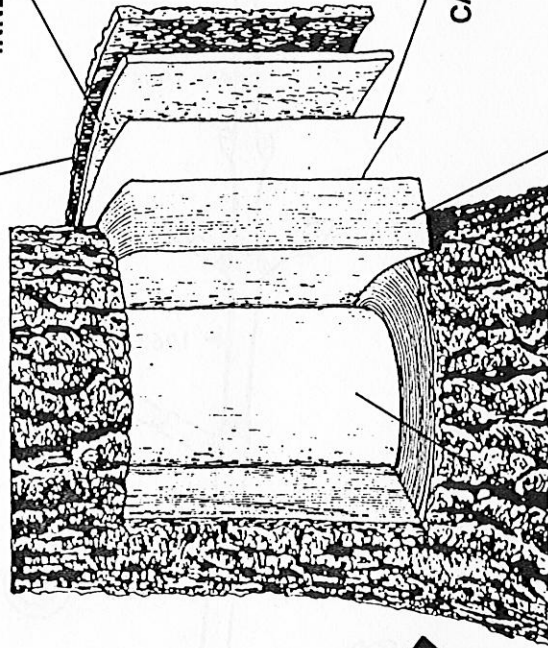
The oxygen is released to the atmosphere and the sugar is stored in the stem and roots. This process is called **photosynthesis**.



The trunk or stem of the tree supports the crown and contains the conductive vessels that run between the roots and the leaves. These vessels allow the movement of raw materials up to the leaves and the return of manufactured food to the wood and root system for growth and storage.

OUTER BARK — protects tree from injuries

INNER BARK — (phloem) conductive vessels that carry food made in the leaves down to the branches, trunk and roots



CAMBIUM — (layer of cells where growth in diameter occurs) builds tissues — wood inside and bark outside

HEARTWOOD — (inactive) gives strength

SAPWOOD — (xylem) conductive vessels that carry water and minerals absorbed by the roots to leaves

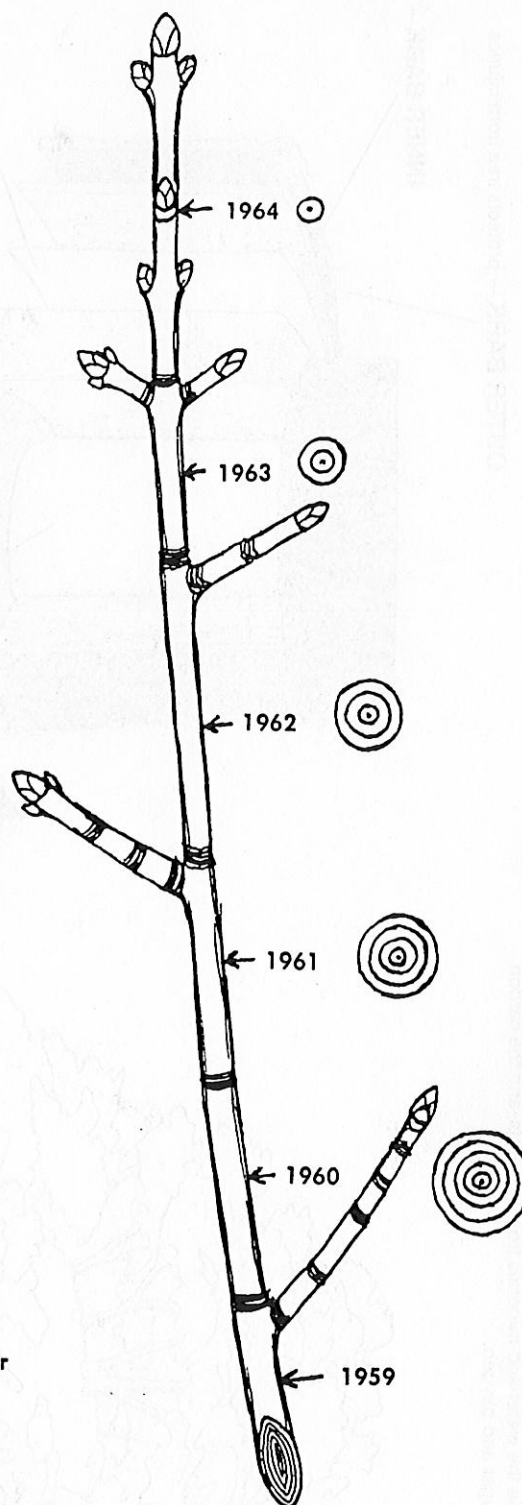
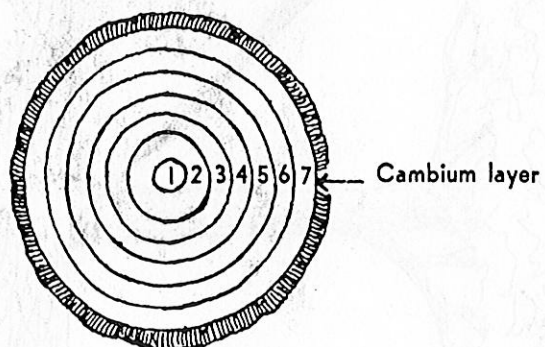
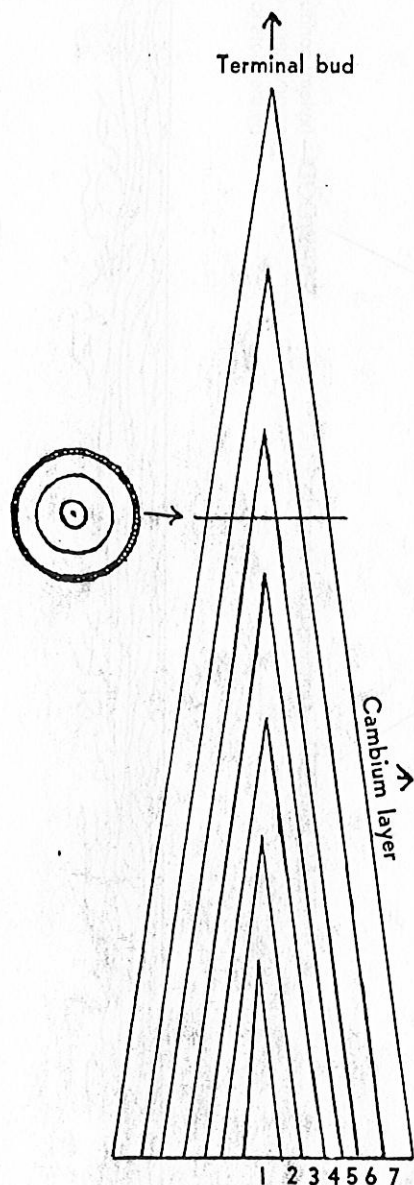


The root system is the most important part of a tree, yet is the most frequently ignored. A tree's root system usually extends horizontally beyond the branch tips.

The majority of the root system is located in the upper 12" to 18" of soil because of the high levels of oxygen which the roots require. Roots absorb minerals and water, store food, support and anchor the tree.



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HOW A TREE GROWS