44 THE DICHOTOMOUS KEY

How can you identify an organism that you find in your back yard or in the park? One method of identification that is used by professional and amateur biologists alike is the *dichotomous key*. In Part 1 of this investigation you will use such a key. In Part 2, you will construct a key of your own.

OBJECTIVE

- **To learn the use of a dichotomous key in identifying organisms.**

MATERIALS

local organisms and single keys to identify them

PROCEDURE

Part 1 Using a Dichotomous Key

A dichotomous key is a means of identifying objects or organisms through a series of paired, contradictory statements. Only one of each pair of statements applies to the object or organism you are trying to identify. The statement that applies directs the user to the next pair of statements. This continues until you are directed to the name of the object or organism.

1. To identify insect A in Fig. 1, begin with paired descriptions 1a and 1b in Table 1. One and only one of the descriptions should apply. If you find a number at the end of the description, it guides you to the next pair of descriptions. If you find a name at the end of the description, that should identify your insect. Of course, this key applies only to these specific kinds of insects. It will not identify any organisms not included in its construction.

2. After you have identified all of the insects in Fig. 1, check your answers with your instructor.

3. Your instructor may have live or preserved organisms and keys for you to use in identifying them.

Part 2 Constructing a Dichotomous Key

The dichotomous key in Part 1 was constructed from the characteristics chart shown in Fig. 2. The 13 insects were first divided into two groups on the basis of an easily seen characteristic, the presence or absence of wings. Then the nine insects with wings were divided according to transparency of wings. The five insects with fully transparent wings were then divided on the basis of number of pairs of wings. This procedure was followed until each final description applied to only a single insect. The final step was to translate the chart in Fig. 2 into the key used in Part 1.

4. Now you will construct an identification chart for leaves, similar to the one for insects. Divide the 10 leaves shown in Fig. 3 into two approximately equal groups according to easily seen contrasting characteristics. You may distinguish leaf shape, edge, length of leaf stalk, division into leaflets, vein pattern, etc. Draw Fig. 4 in your notebook and complete the chart.

5. Repeat the process with one of the two groups of leaves. Continue dividing and subdividing until repeat with the other of the two original groups of leaves. You will not use all of the blank spaces in the right-hand column. If one of the leaves is separated from all the rest by the time you reach column 3 or 4, the remaining blanks in that branch are left vacant. Include the plant name in the last space that you use.

6. Go through your chart with each leaf individually. If there are errors, correct them.

7. Exchange your chart with another team. Check their chart in the same way you checked your own. Discuss any problems they find with your chart.

8. Your instructor may ask your team to translate the information on your chart into a key. Compare Fig.2 with the key in Part 1 as an example.

Table 1 A Dichotomous Key for the Identification of Certain Insects

1a.	Insect with wings.....2
1b.	Insect without wings.....7
2a.	Wings all fully transparent with wings clearly visible 3
2b.	Wings not all fully transperant 10
3a.	Hind wings absent .....Housefly
4a.	Hind wings about the same size as front wings.....Dragonfly
4b.	Hind wings smaller than front wings.....5
5a.	Two or three long slender tails .....Mayfly
5b.	No long slender tails 6
6a.	Wings at rest held like roof over body .....Cicada
6b.	Wings at rest not held like roof over body .....Bee
7a.	Three long slender tails .....Silverfish
7b.	No long slender tails 8
8a.	Head almost as wide as body .....Termite
8b.	Head much narrower than body 9
9a.	Head connected to body by a narrow neck..... Louse
9b.	Neck not especially narrow .....Flea
10a.	Wings held against body when at rest.....11
10b.	Wings not held against body when at rest .....Butterfly
11a.	Hind legs enlarged for jumping .....grasshopper
11b.	Hind legs not enlarged for jumping 12
12a.	Front wings partly leathery; tip transparant.....Stinkbug
12b.	Front wings fully shell-like .....Potato Beetle

DISCUSSION QUESTIONS

1. Is presence of wings the only characteristic that could be used initially to divide the 13 insects into two groups? What other characteristics in Fig. 2 could be used initially?

2. How many different characteristics were used by your class initially to divide the ten leaves into two groups? Is any key produced by your class more useful than others produced by your class? Explain.

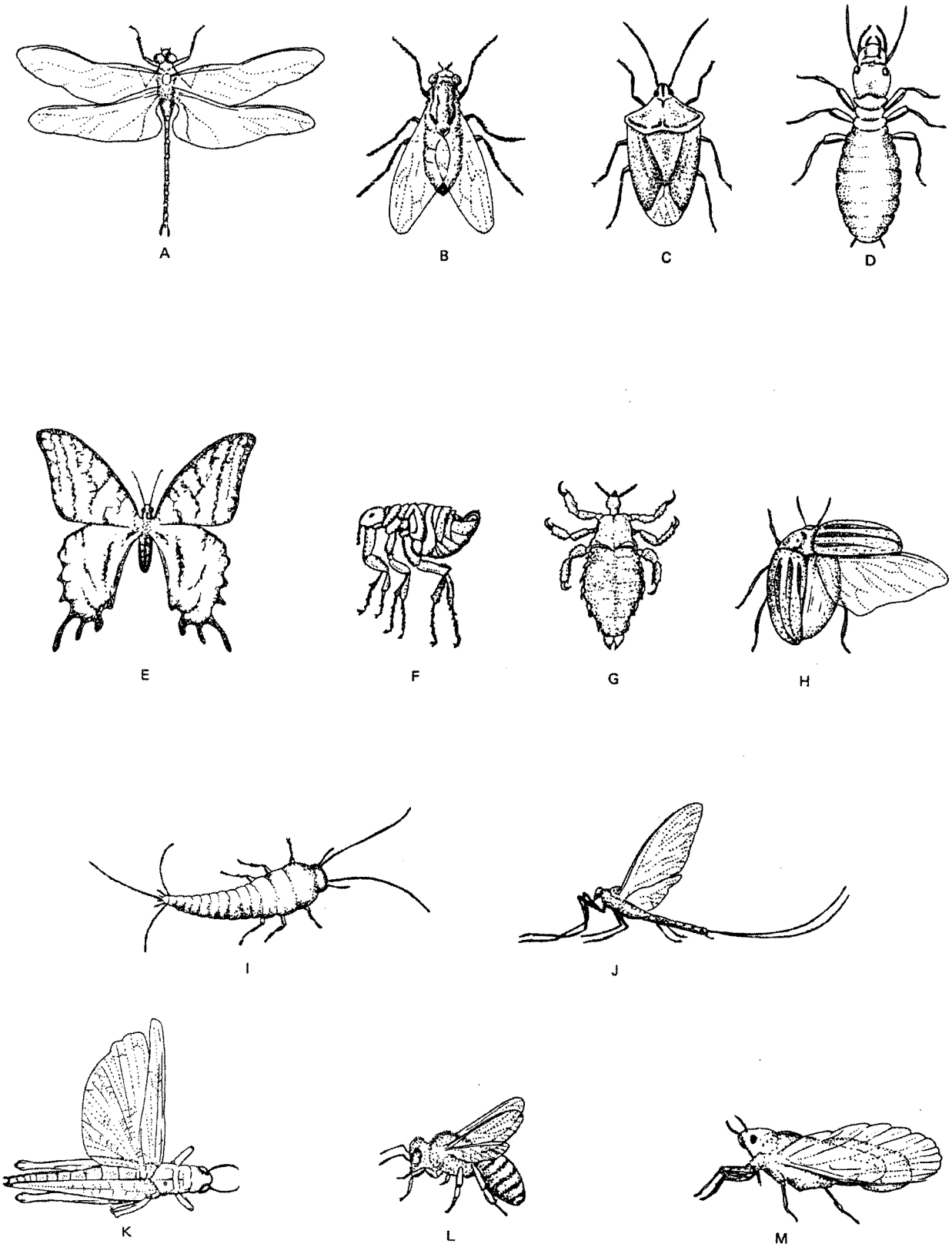

Fig. 1. Selected insects.

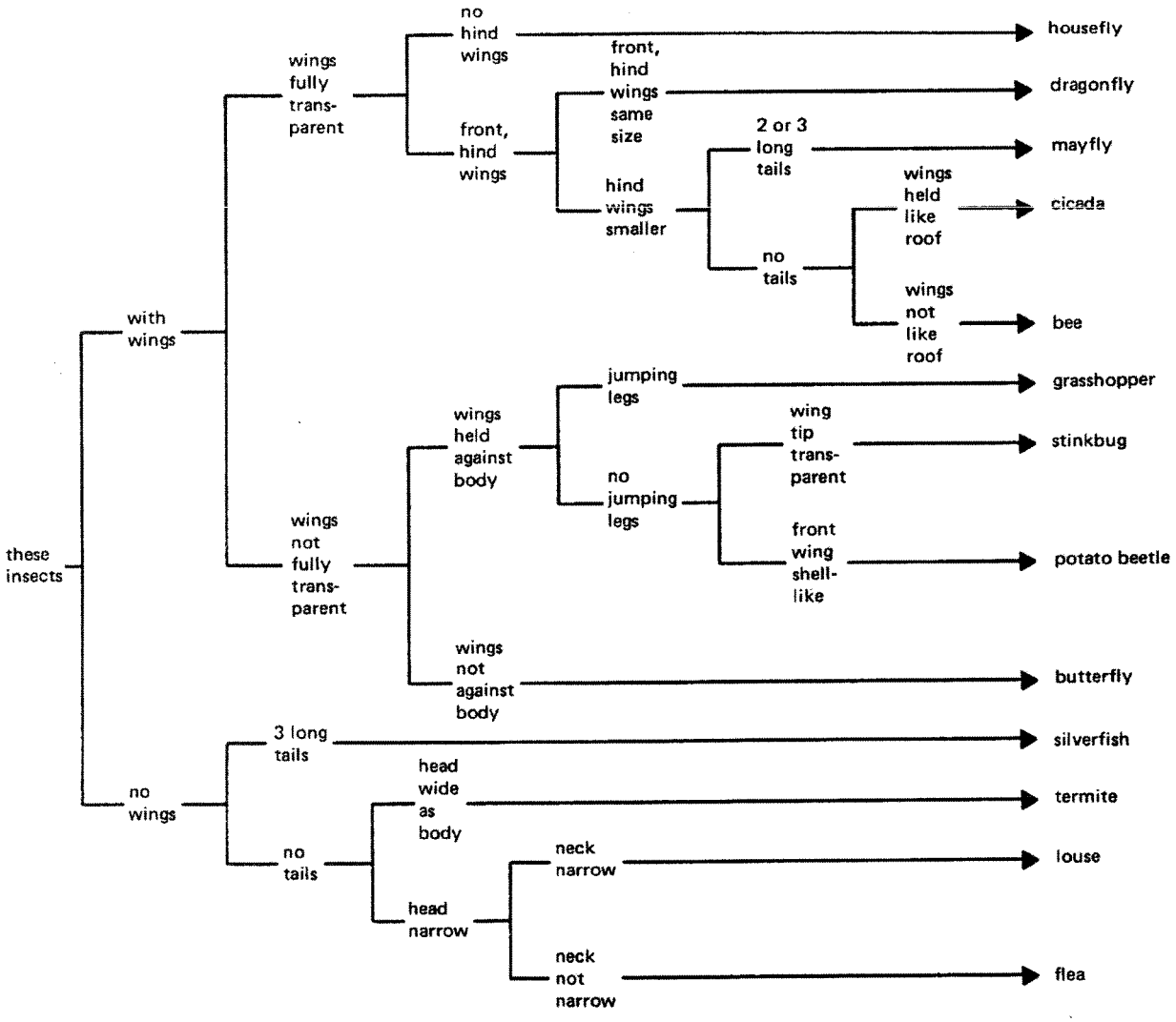

Fig. 2. Constructing a dichotomous key.

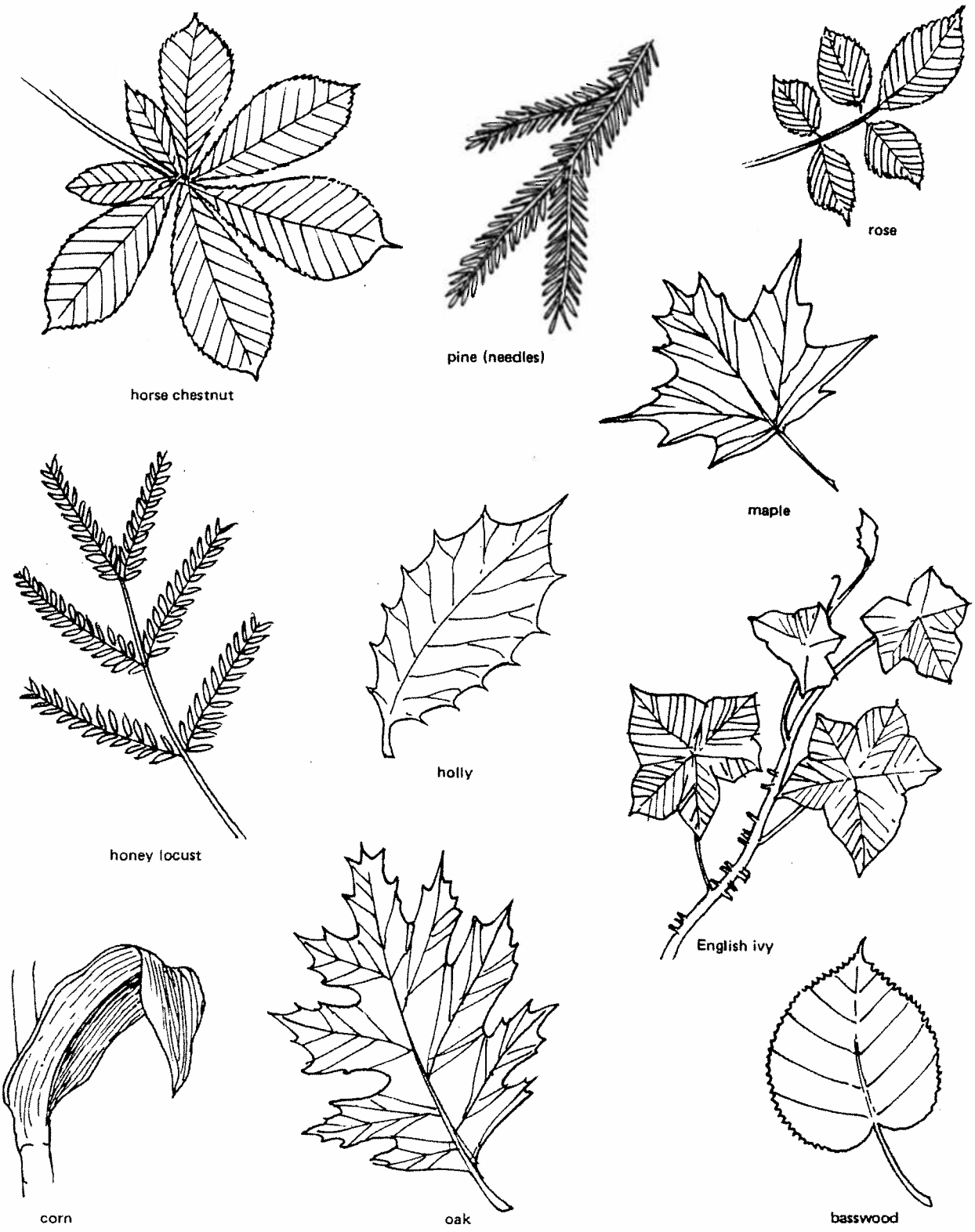
horse chestnut
pine (needles)
rose
maple
holly
honey locust
English ivy
corn
oak
basswood

Fig. 3. Leaves.

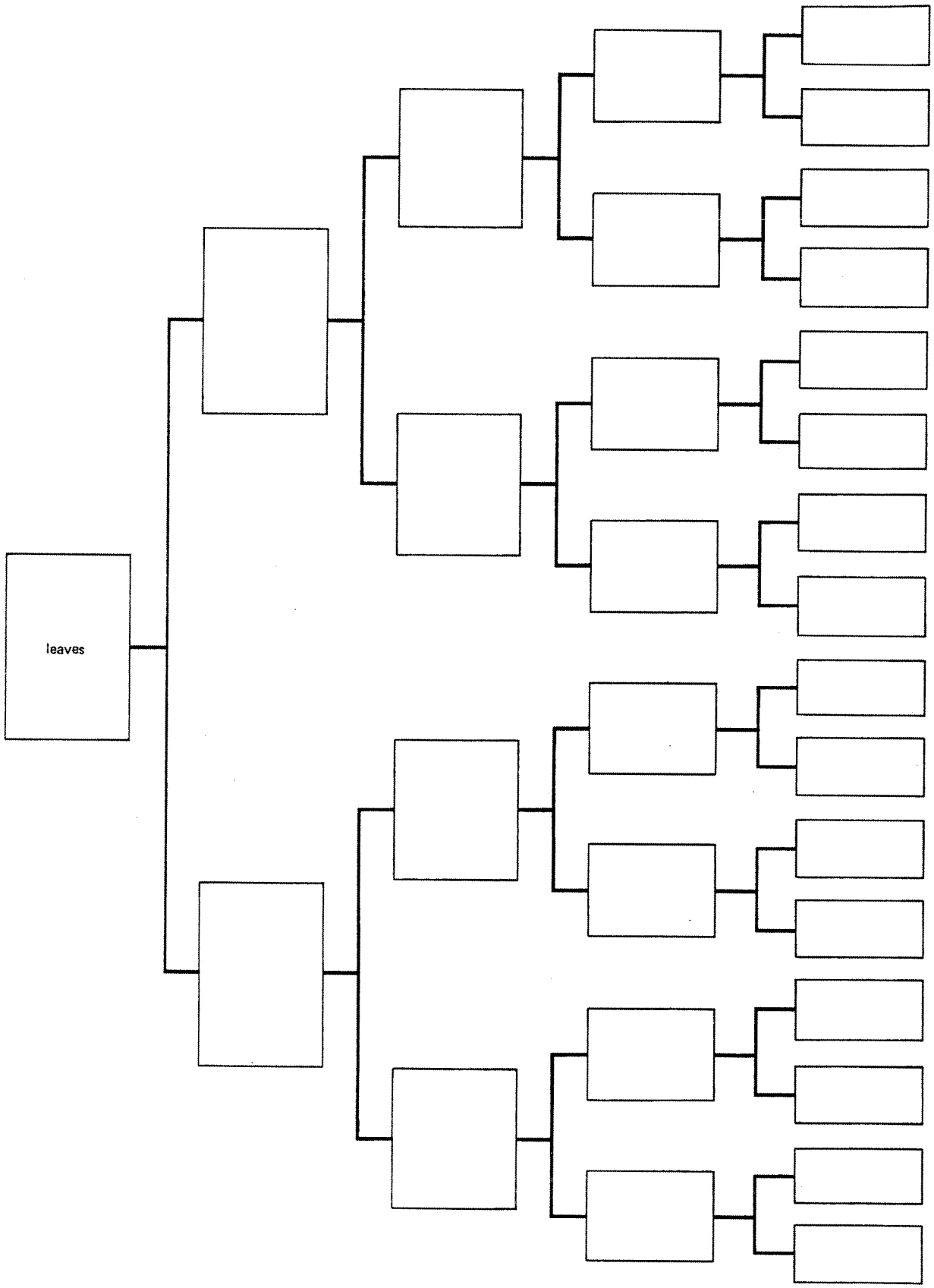

Fig. 4. A chart for identification of selected leaves.