



FIGURE 1.7 In 1838, German botanist and professor of natural sciences (Jena) Mathias Jacob Schleiden announced that the cell was the fundamental unit in plants. (From Robinson, V. 1912. *Pathfinders in Medicine*. Illustration courtesy of Lloyd Library, Cincinnati, OH.)

species. In addition to its utility in determining plant part identity, botanical microscopy was widely used to identify adulterating species, detect the presence of contaminants, and even assess the relative quality of a plant drug—for example, determining whether a plant material had previously been subjected to extraction.

As an analytical technique, the value of botanical microscopy was underscored by Kraemer and Sindall (1908):

The microscope furnishes the surest means of determining the identity of a powdered drug at our command...the microscope also furnishes the most reliable means for detecting and determining adulterants in powdered drugs...[and] detecting the presence of worm-eaten drugs or powders of certain classes of drugs which have been exhausted in whole or in part...

Kraemer went so far as to say that even the time of gathering, method of drying, and length of time for which a

botanical drug had been stored could “be judged in many instances by the use of the microscope.” Although such a claim may be exaggerated, it shows the confidence that a leading proponent of botanical microscopy had in the technique at the height of its use.

From this historical review it is clear that the descriptive aspects of medicinal plant evaluation, with an emphasis on botanical microscopy, were central to the work of the pharmacognosist. Like the early *materia medica*, pharmacognosy additionally encompassed many aspects of the medicinal plant trade, including a detailed accounting of the supply chain of plant drugs and, in some cases, rudimentary color reaction tests, some of which have utility today. Early works on pharmacognosy also included an accounting of the therapeutic uses and actions, or *pharmacodynamics*, of plant drugs (Shellard 1983) along with an increasing emphasis on chemistry.