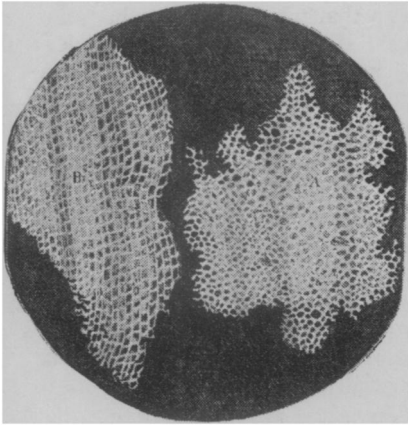


Classics of Science

The News-Letter begins in this issue to re-print some of the classic experiments and observations of science. They will as a rule be those which can be repeated today with the simplest apparatus. Hooke's discovery of the cellular structure of plants, which appears below, requires only a piece of cork, a razor blade, and a school microscope.

Discovery of Plant Cells



MICROGRAPHIA, by Robert Hooke, London, MDCLXV. *Observ. XVIII. Of the Schematisme or Texture of Cork, and of the Cells and Pores of some other such frothy Bodies.*

I took a good clear piece of Cork, and with a Pen-knife sharpen'd as keen as a Razor, I cut a piece of it off, and thereby left the surface of it exceeding smooth, then examining it very dilligently with a *Microscope*, me thought I could perceive it to appear a little porous; but I could not so plainly distinguish them, as to be sure that they were pores, much less what Figure they were of: But judging from the lightness and yielding quality of the Cork, that certainly the texture could not be so curious, but that possibly, if I could use some further diligence, I might find it to be discernable with a *Micrscope*, I with the same sharp pen-knife, cut off from the former smooth surface an exceeding thin piece of it, and placing it on a black object Plate, because it was it self a white body, and casting the light on it with a deep *plano-convex Glass*, I could exceeding plainly perceive it to be all perforated and porous, much like a Honey-comb, but that the pores of it were not regular; yet it was not unlike a Honey-comb in these particulars.

The Schematisme of Cork

First, in that it had a very little solid substance, in comparison of the empty cavity that was contain'd between, as does more mani-

festly appear by the Figure A and B of the XI. *Scheme*, for the *Interstitia*, or walls (as I may call them) or partitions of those pores were neer as thin in proportion to their pores, as those thin films of Wax in a Honey-comb (which enclose and constitute the *sexangular cells*) are to theirs.

Next, in that these pores, or cells, were not very deep, but consisted of a great many little Boxes, separated out of one continued long pore, by certain *Diaphragms*, as is visible by the Figure B, which represents a sight of those pores split the long-ways.

Pores First Discern'd

I no sooner discern'd these (which were indeed the first *microscopical* pores I ever saw, and perhaps, that were ever seen, for I had not met with any Writer or Person, that had made any mention of them before this) but me thought I had with the discovery of them, presently hinted to me the true and intelligible reason of all the *Phaenomena* of Cork; As,

First, if I enquir'd why it was so exceeding light a body? my *Microscope* could presently inform me that there was the same reason evident that there is found for the lightness of froth, an empty Honey-comb, Wool, a Sponge, a Pumice-stone, or the like; namely, a very small quantity of a solid body, extended into exceeding large dimensions.

Next, it seem'd nothing more difficult to give an intelligible reason, why Cork is a body so very unapt to suck and drink in Water, and consequently preserves it self, floating on the top of Water, though left on it never so long: and why it is able to stop and hold air in a Bottle, though it be there very much condens'd and consequently presses very strongly to get a passage out, without suffering the least bubble to pass through its substance. For, as to the first, since our *Microscope* informs us that the substance of Cork is altogether fill'd with Air, and that that Air is perfectly enclosed in little Boxes or Cells distinct from one another. It seems very plain, why neither the Water, nor any other Air can easily insinuate it self into them, since there is already within them an *intus existens*, and consequently, why the pieces of Cork become so good floats for Nets, and stopples for Viols, or other close Vessels.

(Just turn the page)

NATURE RAMBLINGS

By FRANK THONE



Fringed Gentian

Most fall flowers are of necessity hardy and therefore somewhat tough; they must be, to withstand the heat and drought of late summer days and the chill of the early frosts by night. The gentian, however, has somehow managed to be hardy without looking it, and to carry into the thinning woods of autumn the surprising delicacy and brightness of spring. It is like some women, who are middle-aged in their twenties and suddenly blossom into youth in their thirties.

Always a favorite with poets, the fringed gentian has had to suffer for being celebrated. It has never been a very abundant flower, and hosts of people have read poems about the fringed gentian without ever having seen one. Naturally then, when a fringed gentian is found by a flower lover of the type who shows his appreciation of flowers by tearing them from their roots and carrying them home to die, it is almost certain to be pounced on. Fortunately a better spirit is coming to prevail, the few gentians we have left are getting a better chance for their lives, and here and there one finds movements on foot to establish wild flower refuges. A remnant may yet be spared.

Though the eastern species of fringed gentian is rare, there is a form in the Rocky Mountains that is very abundant. One of the sights that repays a trip to Yellowstone Park almost as much as the geysers and canyons and waterfalls, is the miraculous blue of field on field of gentians.

Science News-Letter, September 17, 1927

According to a Toltec legend, a god, indignant because the moon was as bright as the sun, flung a rabbit in its face and dimmed its radiance.

The delicate coloring of the famous hot springs terraces in Yellowstone National Park is due to the presence of minute hot-water plants.

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Classics of Science

(Continued from page 187)

And thirdly, if we enquire why Cork has such a springiness and swelling nature when compress'd? and how it comes to suffer so great a compression, or seeming penetration of dimensions, so as to be made a substance as heavie again and more, bulk for bulk, as it was before compression, and yet suffer'd to return, is found to extend it self again into the same space? Our *Microscope* will easily inform us, that the whole mass consists of an infinite company of small Boxes or Bladders of Air, which is a substance of a springy nature, and that will suffer a considerable condensation. - - -

But, to return to our Observation. I told several lines of these pores, and found that there were usually about threescore of these small Cells placed end-ways in the eighteenth part of an Inch in length, whence I concluded there must be neer eleven hundred of them, or somewhat more then a thousand in the length of an Inch, and therefore in a square Inch above a Million, or 1166400. and in a Cubick Inch, above twelve hundred Millions, or 1259712000. a thing almost incredible, did not our *Microscope* assure us of it by ocular demonstration. - - -

Pores in Other Vegetables

Nor is this kind of Texture peculiar to Cork onely; for upon examination with my *Microscope*, I have found that the pith of an Elder, or almost any other Tree, the inner pulp or pith of the Cany hollow stalks of several other Vegetables: as of Fennel, Carrets, Daucus, Bur-docks, Teasels, Fearn, some kinds of Reeds, &c. have much such a kind of *Schematisme*, as I have lately shewn that of Cork, save onely that here the pores are rang'd the long-ways, or the same ways with the length of the Cane, whereas in Cork they are transverse. - - -

Now, though I have with great diligence endeavored to find whether there be any such thing in those *Microscopical* pores of Wood or Piths, as the *Valves* in the heart, veins, and other passages of animals, that open and give passage to the contain'd fluid juices one way, and shut themselves, and impede the passage of such liquors back again, yet have I not hitherto been able to say any thing positive in it; though, me thinks, it seems very

probable, that Nature has in these passages, as well as in those of Animal bodies, very many appropriated Instruments and contrivances, whereby to bring her designs and ends to pass, which 'tis not improbable, but that some dilligent Observer, if help'd with better *Microscopes*, may in time detect.

Science News-Letter, September 17, 1927

News-Letter Features

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The Chinese had a serviceable compass before the time of Columbus.

Symptoms of hookworm disease were described by physicians of ancient Egypt.