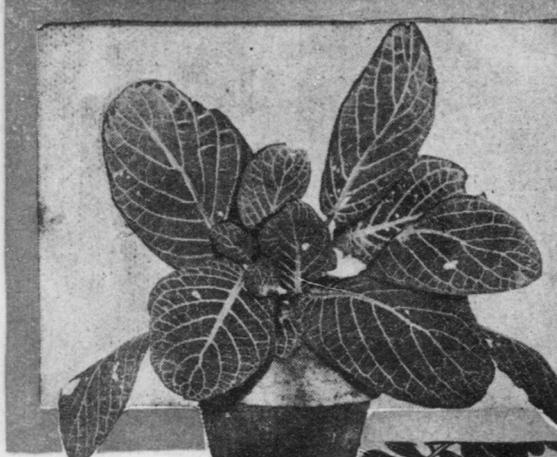


PLANTS WITH ALL THE HUMAN SENSES

They See
Feel, Hear,
Taste
and Smell.



The Pittonia Sees with its Maculiginous Eyes

DO PLANTS see, feel, hear, taste, smell? In all seriousness, do they?

Toss the question aside with disdain if you will, but leading botanical authorities of the United States, chiefs of botanical departments in great institutions of learning, have concluded that the subject is well worth devoting attention to. In Baltimore, Chicago, Philadelphia, Los Angeles, simultaneously, experiments are being made by men who promise most interesting results from this study.

And they have already learned some startling things.

Of course, they don't attempt to prove that plants have eyes, ears, nostrils, palates, fingers, but they do say that they exhibit characteristics corresponding to the five human senses.

A Baltimore authority balks at one sense—hearing—but a Philadelphia botanist, Professor John Muirhead Macfarland, D. Sc., declares that even this may be granted, since a revolver shot in a greenhouse will cause a collapse of all the sensitive plants. At least, they respond to sound waves.

A number of plants, it is found, are equipped with elongated hairs, or else spots, which catch the light about as does the human eye. Certain plants turn up their leaves to gather in the life-giving rays of the sun; others travel to seek food and light; still others find their way through air to a stick upon which to twine.

Hop and sweet potato vines go through rotary motions, controlled by the movements of the earth and sun. The Venus fly-trap catches insects whose flavor it likes. Hence taste. Similarly, a root will find its way to a favorite material in the soil—will smell it out, so to speak.

Even such emotions as joy and sadness are, so some investigators say, experienced by plants; they are thankful for moisture in the air; they sleep every night.

ALL plants do not, it is believed, contain the phenomena corresponding to senses. At least, in some plants the faculties are more pronounced than in others, and so they are grouped under the head of "sensitive" plants.

Some of them have been found in the tropics, others in various portions of America, and not a few of them—some of the most important, in fact—are among common American domestic plants; for instance, the hop.

Students in botany at the University of Pennsylvania have lately been making some interesting experiments to determine just to what extent the hop and sweet potato vines are endowed with motion resembling the animal kind.

There is nothing strange about any plant moving with the wind or in the natural process of growth, but these motions are not of the sort.

The end of a vine usually hangs free, its leaves loitering gracefully in the air. Yet every one of them, unless its course be impeded by some object, will every day make a complete revolution, or will describe an arc of half a circle, then slowly go back to its starting point.

This, it is believed, is no accident, but is the direct effect of the sun's influence opposed to the diurnal motion of the earth, with, perhaps, something of the earth's gravity mixed in.

Botanists do not say that it is done consciously, but they do contend that the motion of the vine is the result of centuries, aeons, of constant attempt to adjust itself to the mighty forces operating upon it.

As an illustration of how the sense of touch is developed in plant life, a botanist the other day gave a demonstration with a plant of the mimosa pudica species. This is a plant which grows (in pots) to the height of about a foot. From its centre stalk extend stems, each stem containing four leaves. The leaf is composed of many little segments, sticking out from the vein.

The segments in the plant exhibited were beautifully unrolled; the stems stood out from the stalk either horizontally or at an upward angle. Carefully seizing two segments at the very end of a leaf, the professor said: "Now watch." He pinched the green matter slightly—not enough to bruise it.

Immediately the next pair of segments on either side of the vein fell down flat, utterly collapsed. An instant later the next pair dropped.



Mimosa Leaf Shrivels at Pencil Touch

was passed on, by some mysterious agency within the vein, to the next leaf; the stimulation passed through the joint at the terminus of the leaf and went on to the end.

Next came the third leaf, then the fourth, the motion becoming more rapid as it progressed. And when the four leaves were down, suddenly, as if chopped by an axe, the entire stem collapsed and hung apparently lifeless against the stalk.

Again, the botanist gave a slight stroke to the stalk below the stem, and every stem, every leaf, every segment, collapsed.

You might have thought from the appearance, that the plant was dead, but in ten minutes it had gradually regained its normal shape.

Just why the plant exhibits such characteristics is not known. Even those who say that plants have no sense of touch are unable to offer any explanation more plausible.

But one very important experiment has shown, or tended to show, that the phenomena are actually controlled, or to be accounted for, by a sense.

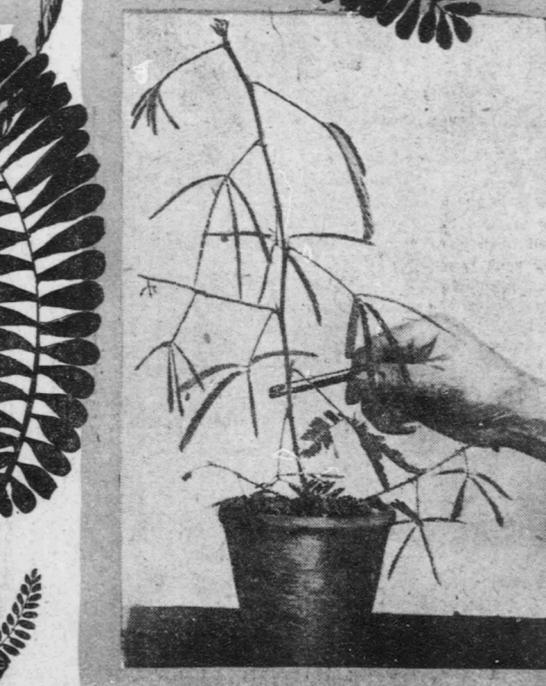
A mimosa plant was etherized—the anæsthetic was applied to it in much the same manner as it would have been given to a human being in a dentist's chair, or on an operating table.

Pinch a person who is under ether, and there is no response; he doesn't feel it.

Now, thought the botanist, if the mimosa be not affected by ether, it will show that it has no sense, but merely mechanical action; if it be affected by the drug, the leaves will not collapse when you pinch them.

So they pinched and pinched, and not a bit did the plant mind it. There was no falling of segments or leaves. And after awhile, when the plant "came out of ether," it acted just as before, that is, assumed its normal "senses."

To compare still further, plants of the mimosa pudica order have been experimented with under the same conditions as a human muscle. Strike or pinch a muscle repeatedly, and it responds to each stimulus, remaining contracted in a condition of tetanus.



Mimosa Plant Collapses at Tap on Stalk

For example, apply a slight electric shock to a man, and the epidermis is tickled, do the same to a tendril plant, and it undergoes gyrations which botanists say are nothing less than indications of being tickled.

And if one were to admit a solar plexus, one must perforce admit some of the senses.

That certain highly sensitive plants respond to sudden variations in the atmospheric pressure has long been known.



Plants Reverse Change Course Toward the Sun

If Nature has fitted these plants with a sense of touch, or feeling, she surely must have had a purpose.

In the case of the mimosa, this reason is believed to be that the collapse at a slight touch aids in keeping off large browsing animals, also attacks of injurious insects.

A goat, seeing his prospective meal dwindle, leaves it for more favorable pasture; a fly is scared away by the collapse of leaves. The closing leaves is also protection against rain or hail.

In one class of plants the utility evidently lies in insuring the transference or reception of pollen; in another, the capture and digestion of insects. Why the oxalis leaves collapse when touched is not known.

A visitor who called at an experiment greenhouse at twilight to see the sensitive plants was surprised to be told by the attendant: "I fear you will see very little of them, for they're all asleep."

He meant it. They go to sleep when the sun goes down, closing up their leaves; after the same fashion as when stimulated.

It was suggested that, perhaps, this was a purely mechanical act, and that it meant that the plants were equipped with faculties corresponding to the human senses, which needed rest.

"Still," responded the botanist, "you will admit it strange that no amount of artificial light or electrical current or other treatment can arouse them from sleep." It was, indeed, a odd observation.

In that greenhouse there was a sort of divine calm which seized hold upon the visitor. One felt that the plants were really asleep, not simply closed up mechanically, and that they breathed forth some of their peace.

And speaking of breathing, it is well established that plants inhale and exhale atmosphere just as animals do, with some slight variation; for, whereas the animal inhales oxygen and exhales carbon dioxide, the plant thrives on carbon dioxide and gives out oxygen. A sort of poetic reciprocity.

Do plants really see?

Of course, to speak of a plant seeing, one must presume eyes. No one has been bold enough to say that plants have eyes in the same sense as animals, but, say the botanists, there are several kinds of organisms that serve the same purpose.

In at least two instances—in the cases of the peritonia and beconia—there stick up from the surface of the leaves innumerable little elongated hairs with slight swellings on the ends.

These hairs, say the botanists, correspond to the retina of the eye; they collect stray rays of light and pass them downward—as light rays are carried by the optic nerve for the human eye—into the leaf, where they mean nourishment, life.

In another case—the fitonia plant—maculiginous spots all over the surface of the leaf are somewhat poetically held to serve the purpose of eyes.

Turn a Japanese bean vine upside down—placing wren wire over the mouth of the pot so the dirt will not spill out—and watch it.

The leaves which at first hang downward so evenly will soon curl upward—first the leaves, then the entire stalk—until they assume their final position.

This means sight. The leaves are looking for the light—the sun—and when they find it, stop and look serenely at it.

"Have you done anything to prove that plants possess the sense of smell?" one of the investigators was asked.

"Yes," he replied, "if you place dirt in a box with glass sides and plant a seed so you can watch its growth through the glass, you may note a curious thing.

"Suppose there are in that dirt—out of line with the vertical direction at first taken by the seed root—certain substances, such as arsenic and starch. You will see, every time, the root turn its course toward the substance it likes—first this instance, the starch. If that isn't smell what is it?"

That plants grow from protoplasm, as animals do, is generally accepted. That they are but a lower form of animal life is a natural conclusion. That they contain in essence those characteristics which, in a more highly developed life, become known as senses—who can prove that this is not the next logical step?