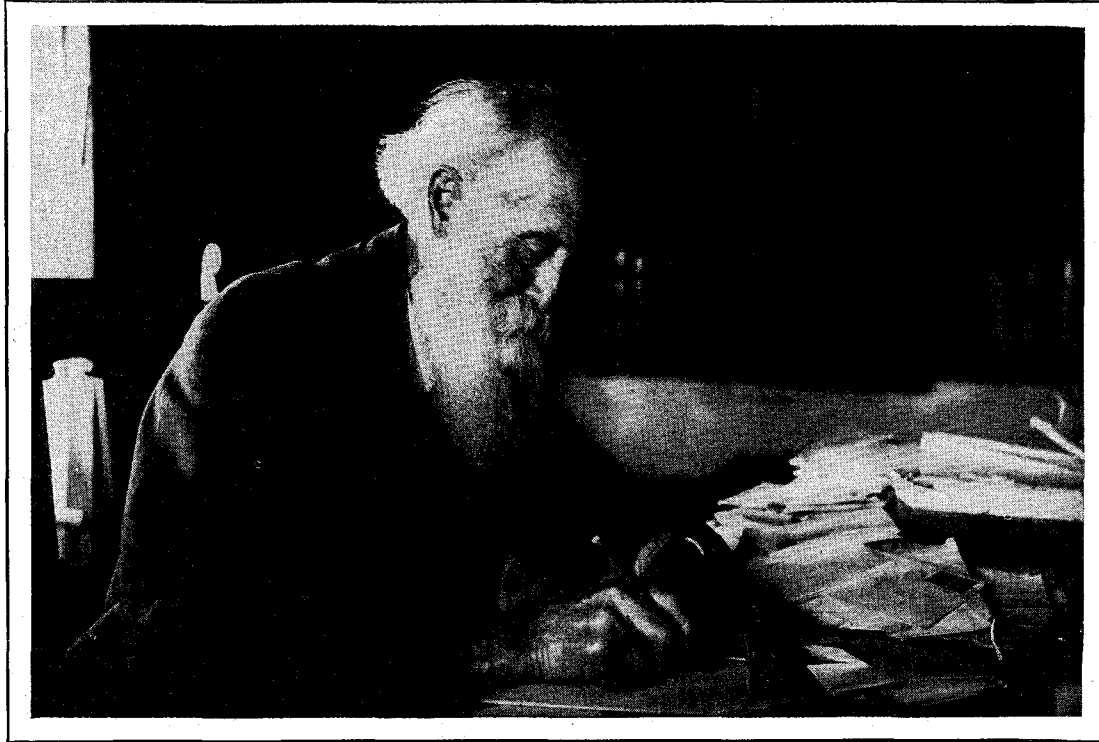


THE FALLING LEAVES

BY JOHN BURROUGHS



A CHARACTERISTIC STUDY OF THE LATE JOHN BURROUGHS

THE time of the falling of leaves has come again. Once more in our morning walk we tread upon carpets of gold and crimson, of brown and bronze, woven by the winds or the rains out of these delicate textures while we slept.

How beautifully the leaves grow old! How full of light and color are their last days! There are exceptions, of course. The leaves of most of the fruit trees fade and wither and fall ingloriously. They bequeath their heritage of color to their fruit. Upon it they lavish the hues which other trees lavish upon their leaves. The pear tree is often an exception. I have seen pear orchards in October painting a hillside in hues of mingled bronze and gold. And well may the pear tree do this, it is so chary of color upon its fruit.

But in October what a feast to the eye our woods and groves present! The whole body of the air seems enriched by their calm, slow radiance. They are giving back the light they have been absorbing from the sun all summer.

The carpet of the newly fallen leaves looks so clean and delicate when it first covers the paths and the highways that one almost hesitates to walk upon it. Was it the gallant Raleigh who threw down his cloak for Queen Elizabeth to walk upon? See what a robe the maples have thrown down for you and me to walk upon! How one hesitates to soil it! The summer robes of the groves and the forests—more than robes, a vital part of themselves, the myriad living

nets with which they have captured, and through which they have absorbed, the energy of the solar rays. What a change when the leaves are gone, and what a change when they come again! A naked tree may be a dead tree. The dry, inert bark, the rough, wirelike twigs change but little from summer to winter. When the leaves come, what a transformation, what mobility, what sensitiveness, what expression! Ten thousand delicate veined hands reaching forth and waving a greeting to the air and light, making a union and compact with them, like a wedding ceremony. How young the old trees suddenly become, what suppleness and grace invest their branches! The leaves are a touch of immortal youth. As the cambium layer beneath the bark is the girdle of perennial youth, so the leaves are the facial expression of the same quality. The leaves have their day and die, but the last leaf that comes to the branch is as young as the first. The leaves and the blossom and the fruit of the tree come and go, yet they age not; under the magic touch of spring the miracle is repeated over and over.

The maples perhaps undergo the most complete transformation of all the forest trees. Their leaves fairly become luminous, as if they glowed with inward light. In October a maple tree before your window lights up your room like a great lamp. Even on cloudy days its presence helps to dispel the gloom. The elm, the oak, the beech, possess in a much less degree that quality of lumi-

nosity, though certain species of oak at times are rich in shades of red and bronze. The leaves of the trees just named for the most part turn brown before they fall. The great leaves of the sycamore assume a rich tan color like fine leather.

The spider weaves a net out of her own vitals with which to capture her prey, but the net is not a part of herself as the leaf is a part of the tree. The spider repairs her damaged net, but the tree never repairs its leaves. It may put forth new leaves, but it never essays to patch up the old ones. Every tree has such a superabundance of leaves that a few more or less or a few torn and bruised ones do not seem to matter. When the leaf surface is seriously curtailed, as it often is by some insect pest, or some form of leaf blight, or by the ravages of a hail-storm, the growth of the tree and the maturing of its fruit are seriously checked. To denude a tree of its foliage three years in succession usually proves fatal. The vitality of the tree declines year by year till death ensues.

To me nothing else about a tree is so remarkable as the extreme delicacy of the mechanism by which it grows and lives, the fine hairlike rootlets at the bottom and the microscopical cells of the leaves at the top. The rootlets absorb the water charged with mineral salts from the soil, and the leaves absorb the sunbeams from the air. So it looks as if the tree were almost made of matter and spirit, like man; the ether

with its vibrations, on the one hand, and the earth with its inorganic compounds, on the other—earth salts and sunlight. The sturdy oak, the gigantic sequoias, are each equally finely organized in these parts that take hold upon nature. We call certain plants gross feeders, and in a sense they are; but all are delicate feeders in their mechanism of absorption from the earth and air.

The tree touches the inorganic world at the two finest points of its structure—at the rootlets and the leaves. These attack the great crude world of inorganic matter with weapons so fine that only the microscope can fully reveal them to us. The animal world seizes its food in masses little and big, and often gorges itself with it, but the vegetable, through the agency of the solvent power of water, absorbs its nourishment molecule by molecule.

A tree does not live by its big roots—these are mainly for strength and to hold it to the ground. How they grip the rocks, fitting themselves to them, as Lowell says, like molten metal! The tree's life is in the fine hair-like rootlets that spring from the roots. Darwin says those rootlets behave as if they had minute brains in their extremities. They feel their way into the soil, they know the elements the plant wants; some select more lime, others more potash, others more magnesia. The wheat rootlets select more silica to make the stalk, the pea rootlets select more lime; the pea does not need the silica. The individuality of plants and trees in this respect is most remarkable. The cells of each seem to know what particular elements they want from the soil, as of course they do.

The vital activity of the tree goes on at three points—in the leaves, in the rootlets, and in the cambium layer. The activity of leaf and rootlet furnishes the starchy deposit which forms this generative layer—the milky, mucilaginous girdle of matter between the outer bark and the wood through which the tree grows and increases in size. Generation and regeneration take place through this layer. I have called it the girdle of perpetual youth. It never grows old. It is annually renewed. The heart of the old apple tree may decay and disappear, indeed the tree may be reduced to a mere shell and many of its branches may die and fall, but the few apples which it still bears attest the fact that its cambium layer, at least over a part of its surface, is still youthful and doing its work. It is this layer that the yellow-bellied woodpecker, known as the sap-sucker, drills into and devours, thus drawing directly upon the vitality of the tree. But his ravages are rarely serious. Only in two instances have I seen dead branches on an apple tree that appeared to be the result of his drilling.

What we call the heart of a tree is in no sense the heart; it has no vital function, but only the mechanical one of strength and support. It adds to the tree's inertia and power to resist storms.

The trunk of a tree is like a community when only one generation at a time is engaged in active business, the great mass of the population being retired and adding solidity and permanence to the social organism. The rootlets of a plant or a tree are like the laborers in the field that produce for us the raw material of our food, while the leaves are like our many devices for rendering it edible and nourishing. The rootlets continue their activity in the fall, after the leaves have fallen, and thus gorge the tree with fluid against the needs of the spring. In the growing tree or vine the sap, charged with nourishment, flows down from the top to the roots. In the spring it evidently flows upward, seeking the air through the leaves. Or rather, we may say that the crude sap always flows upward, while the nutritive sap flows downward, thus giving the tree a kind of double circulation.

A tree may be no more beautiful and wonderful when we have come to a knowledge of all its hidden processes, but it certainly is no less so. We do not think of the function of the leaves, or of the bark, or of the roots and rootlets, when we gaze upon a noble oak or an elm; we admire it for its form, its sturdiness, or its grace; it is akin to ourselves; it is the work of a vast community of cells like those that build up our own bodies; it is a fountain of living matter rising up out of the earth and splitting up and spreading out at its top in a spray of leaves and flowers; and if we could see its hidden processes we should realize how truly like a fountain it is. While in full leaf a current of water is constantly flowing through it, and flowing upward against gravity. This stream of water is truly its life current; it enters at the rootlets under the ground and escapes at the top through the leaves by a process called transpiration. All the mineral salts with which the tree builds up its woody tissues—its osseous system, so to speak—the instruments with which it imprisons and consolidates the carbon which it obtains from the air, are borne in solution in this stream of water. Its function is analogous to that of the rivers which bring the produce and other material to the great cities situated upon their banks. A cloud of invisible vapor rises from the top of every tree and a thousand invisible rills enter it through its myriad hairlike rootlets. The trees are thus conduits in the circuit of the waters from the earth to the clouds. Our own bodies and the bodies of all living things perform a similar function. Life cannot go on without water, but water is not a food; it makes the processes of metabolism possible; assimilation and elimination go on through its agency. Water and air are the two ties between the organic and the inorganic. The function of the one is mainly mechanical, that of the other is mainly chemical.

As the water is drawn in at the roots, it flows out at the top, to which point it rises by capillary attraction and a proc-

ess called osmosis. Neither of them are strictly vital processes, since they are found in the inorganic world; but they are in the service of what we call a vital principle. Some physicists and biochemists laugh at the idea of a vital principle. Huxley thought we might as well talk about the principle of aqueosity in water. We are the victims of words. The sun does not shoot out beams or rays, though the eye reports such; but it certainly sends forth energy; and it is as certain that there is a new activity in matter—some matter—that we call vital.

Matter behaves in a new manner, builds up new compounds and begets myriads of new forms not found in the inorganic world, till it finally builds up the body and mind of man. Death puts an end to this activity alike in man and tree, and a new kind of activity sets in—a disorganizing activity, still with the aid of water and air and living organisms. It is like the compositor distributing his type after the book is printed. What stands for the compositor is these micro-organisms, but of a different kind from those which build up the body in the first instance. But the living body as a whole, with its complex of co-ordinating organs and functions—what attended to that? The cells build the parts, but what builds the whole?

How many things we have in common with the trees! The same mysterious gift of life, to begin with; the same primary elements—carbon, nitrogen, oxygen, and so on—in our bodies; and many of the same vital functions—respiration, circulation, absorption, assimilation, reproduction. Protoplasm is the basis of life in both, and the cell is the architect that builds up the bodies of both. Trees are rooted men and men are walking trees. The tree absorbs its earth materials through the minute hairs on its rootlets, called fibrillæ, and the animal body absorbs its nutriment through analogous organs in the intestines, called lacteals.

Whitman's expression—

The slumbering and liquid trees, often comes to my mind. They are the words of a poet who sees hidden relations and meanings everywhere. He knows how fluid and adaptive all animate nature is. The trees are wrapped in a kind of slumber in winter, and they are reservoirs of living currents in summer. If all living bodies came originally out of the sea, they brought a big dower of the sea with them. The human body is mainly a few pinches of earth salts held in solution by several gallons of water. The ashes of the living tree bulk small in comparison with the amount of water it holds. Yes, "the slumbering and liquid trees." They awaken from their slumber in the spring, the scales fall from their buds, the fountains within them are unsealed, and they again become streams of living energy, breaking into leaf and bloom and fruit under the magic of the sun's rays.

UNEMPLOYMENT—WHAT ONE LARGE COMPANY DID ABOUT IT

BY CHARLES R. WALKER, JR.

MR. HOOVER'S conference on unemployment has turned every one's mind to the subject, if events more personal and less interesting have not already done so.

I want to record briefly and faithfully what one company—in a major New England industry, employing in normal times five thousand—did on the basis of the facts, forced rather rudely into their averted faces. Some similar study and programme of action, locally adapted of course, must be carried out with all the daily follow-up and drudgery of it if Mr. Hoover's conference is to bear the fruit it deserves.

I had been at work some months in overalls in the rolling mill when the depression hit us. There the sub-foremen had been demoted to rollers, the rollers to stickers, and the stickers to helpers, and all the helpers stood about waiting for the knife to fall. They expected to lose their jobs, and carried about with them a kind of desperate cheerfulness. A dozen or two fell under the knife every pay day. When I got into the employment office, laying off was in full swing. Heavy reductions in working hours had already decimated the pay envelope—three days of eight hours were being worked in many places, instead of five and a half of ten. The bulk of the men lived uncomfortably near the margin of subsistence. In the employment office I found women appearing with babies in their arms and surrounded with children in order to furnish living arguments in favor of rehiring their husbands. The smaller

grocery stores and butcher shops in town failed. Great numbers of Russians and Poles in groups of twenty-five and thirty took early morning trains to New York, thence to Russia and Poland. Men had been coming every day for two or three months to stand in front of the employment office five or six hours. Credit began to be denied by landlords and provision sellers to families, and children went without bread until furnished it by the Salvation Army. District nurses began to report extensive malnutrition among school-children. One Greek with seven children found no other work for eight months than picking blueberries. Numbers of skilled mechanics, tool-makers, electricians, and a stream of ex-service men begged me to take them on as "sweepers or anything." Men hired on farms at \$10 and \$15 a month. There was an unprecedented shrinkage in the deposits made in the savings banks, and unprecedented demands were made upon the Commissioner of Public Charities and upon private and church funds by persons whose needs were desperate and unquestioned.

I got in touch with other employment offices. They were facing similar situations, and doing about as little about it as we. Here is the typical daily picture—a picture true in general, I believe, of ninety per cent of the industrial concerns in the United States which have employment offices at all.

A crowd gathers, usually in fighting mood, each man keen to reach the edge nearest the employment office. There are fifteen jobs to be given out. The em-

ployment manager has received eight requests from foremen, former employees, the superintendent, and a vice-president, for two nephews, three brothers, and three old friends. A vague atmosphere of protesting merit, penury, and drag surrounds these applications. It is sufficient, in lieu of stronger principles, to capture the first eight openings from the employment office. The employment manager then turns to the small sea of faces whose outer waves can be seen through the glass doors of the waiting-room. He "selects" two tall chaps who tower up in the eighth row. They are brothers, who worked for the company for three weeks in 1916. They are both single. One of them keeps a grocery store and is self-supporting. Of the remaining five whom he extracts from the sea by a quick jerk of the head in the candidates' direction and a staccato "You!" their records, if there were any, would show:

One, married, two children, three months' former service; record: discharged for drunkenness.

Two, single, no previous service, unfamiliar with the work of the industry.

One, married, three children, four years' previous service; record: good.

One, married, no children, no previous service, temporarily laid off by near-by concern.

Of the seven hired in the above manner, one had been hit upon whose record under the circumstances would justify a rehire. Of the 143 who turn away, to curse at the company and "move on" to the next town for a repetition of the



THIS IS WHAT HAPPENS WHEN JOB HUNTERS OUTNUMBER THE JOBS—A MUNICIPAL EFFORT TO ALLEVIATE THE PRESENT SITUATION