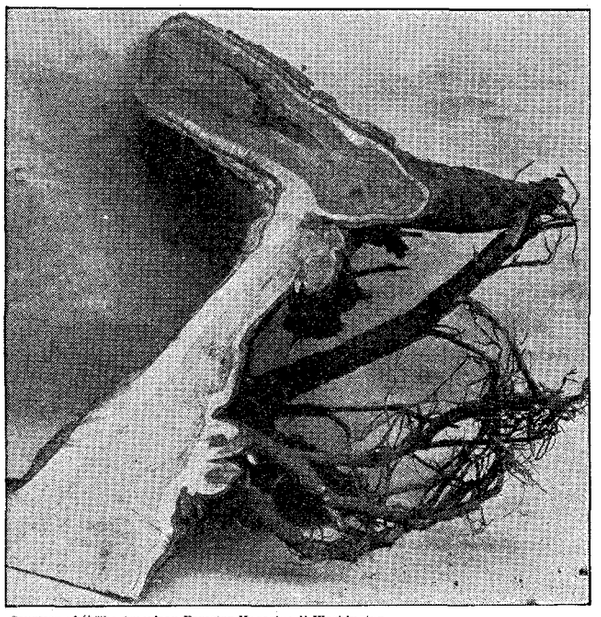
LIVING TREE-STUMPS

CAN A TREE LIVE WITHOUT FOLIAGE? No more, one would think, than a man without lungs, since a tree breathes through its leaf-pores. Yet we are assured by C. C. Pemberton, who contributes an article on the subject to *American Forestry* (Washington), that roots and stumps, bearing absolutely no foliage at all, may both live and grow. This has been recognized in England for over a century, altho denied by certain French botanists, and it has now been too often noted to admit of controversy. Mr. Pemberton, however, believes that altho these stumps have no leaves of their own, they do in fact live by the aid of foliage, and that their vitality is due to their ability to unite their roots, by a kind of automatic grafting,



Courtesy of "The American Forestry Magazine," Washington.

ONE ROOT GIVING LIFE TO ANOTHER.

An example of a natural root graft between two Douglas fir-trees. To the left is part of the tree which retained its foliage and to the right the stump. The center of the stump is decayed, but the live wood around the edge is plainly to be seen.

with those of adjoining trees that have plenty of growing leaves. Writes Mr. Pemberton:

"When a tree is cut down it ordinarily dies or sends up sprouts from the stump or roots. Only a few conifers can sprout from the stump. In others the stumps usually die. In some species, however, instances are found of stumps which do not sprout, but, nevertheless, do not die. On the contrary, they retain their vitality to a surprizing extent and apparently without the aid of foliage. There has been much controversy as to the cause of this remarkable state of affairs. Some aver that union of roots of the stumps with those of adjacent standing trees accounts for the phenomenon. Others contend that it is due solely to the reserve material in the stump, and in support of their contention point to instances of stumps apparently isolated and remote from other trees which, nevertheless, can make bulky formations of new annual rings."

Mr. Pemberton himself states that, tho he has made a number of such excavations, he has never been able to find an instance in which uncovering all the roots did not disclose root unions, direct or indirect. One example of the latter was particularly noteworthy. On Langford Plains, near Victoria, there were a number of scattered Douglas fir-trees, of large size and well branched through growth in the open. About fifty feet away from one of the largest stood a group of nine small Douglas fir-stumps completely capped over. No indication of root graft between the stumps and the big tree was to be seen. Chinese felling timber in the vicinity for firewood cut down the big tree, and as soon as they did so the vitality in the stumps ceased. He continues:

"I employed the Chinese to dig up the intervening ground between the tree and stumps, and then the fact was disclosed that the spreading roots of the big tree, at a depth of two feet below the surface of the ground and at a distance from the tree of fifty feet, had formed a union with the tap roots of one or two of the group of stumps. These stumps, so united with the underlying root from the big tree, were in turn root-grafted with the others of the group farther away. It was, therefore, apparent that the wood-forming material from the foliage of the big tree was transmitted by means of the root graft directly to some of the stumps, that they passed it on to others more remote, and that as soon as the foliage-possessing tree was killed the source of the vitality of the stumps was gone, and they, too, died.

"This power to pass on by a series of successive and indirect root-grafts the vitality and wood-forming material from the growing tree is in my belief the solution of the problem of how very remote stumps are able to show healthy overgrowth especially as there are cases in which the major part of the stumps decay and the roots only remain alive. Not all species possess this power; and those which do not are unable to support living stumps no matter how closely the roots of the stumps may be intermingled with those of adjacent standing trees. The practical value of the characteristic still lies within the realm of speculation. Is it possible that some day we shall make use of it for the production of living fence-posts or telegraph-poles?"

COMPULSORY MOTHERHOOD

THE INJUNCTION "thou shalt not," backed up with courts and jails, having been reasonably successful, reformers are now talking of supplementing it with "thou shalt," similarly bolstered. This time it is the French who are debating the expediency of combating decrease of population by compelling their women to become mothers. Every effort is already being made to encourage large families. Bounties are promised, with awards and inducements of every kind. And now a savant comes forward with the sensational suggestion noted above. We read in *American Medicine* (New York):

"Just as military service is obligatory for men, maternal service as a duty toward the state should be obligatory for women. In France men are compelled to do military service for three years. A maternal service of three years being inadequate, it is suggested that women be inscribed on the rôle of motherhood from eighteen to forty years—twenty-two years of service. During these years they will be compelled to make their maximum contribution to the state.

"This suggestion could be dismissed with the complete indifference (one is ready almost to say contempt) which it deserves, were it not for the fact that it is looked upon very favorably by those in whose hands the destiny of the country reposes. To them it seems an admirable suggestion, a necessary course. And once more we revert to the primitive notion that a couple's contribution to the welfare of the state is measured by the number of their offspring. Nothing could be more misleading, more erroneous. And the Frenchwoman certainly will not be misled by such sophistry.

"The passions and the enthusiasms of the war are dead, but one conviction remains with the woman of France—she will no longer sacrifice herself to her family only to see it destroyed for dynastic or financial ambitions. She will not contribute sons to the armies of the world. The unanimity of opinion and determination in this respect is extraordinary. Ask a childless woman why she has no children. 'Why should I spend twenty years raising a son,' she will respond, 'and then see his life snapt out at the whim of his rulers? I will have children when I am sure I can keep them.'

"But there is another aspect of this fatuous and futile mania for repopulating the world. Why? If the world were twice as thickly populated as it is, who would be the happier? Numbers achieve nothing. It is the old tribal instinct, the instinct of

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self-preservation aroused by fear of one's neighbors. More children mean merely more soldiers, greater security. There should be an easier way of insuring this security. The world is overpopulated rather than underpopulated. We are not sure but that if the population of the entire world were cut in half the remaining half would be the better off for it. The encouragement to breed prolifically comes from the upper classes, who do not breed at all, and is meant to affect the lower classes, who breed too much. It is no wonder that these lower classes suspect the propaganda is meant merely to provide the owning classes with more workers, so that competition will make labor cheap. The intelligent middle class is wise in remaining deaf to these influences. What the world needs now is quality rather than quantity. Better babies rather than more babies is the crying need of the time. If a couple reproduce themselves and reproduce with the advance a generation requires, they have done their duty amply by the state, and they have done their duty amply by themselves, which is just as important. The sooner fallacy of numbers is abandoned, the better for the universe."

HOW TO FIND LOST RADIUM

SIX THOUSAND DOLLARS' worth of radium, lost in the ashes of a furnace, was located and recovered by the use of an electroscope. If a lost object continually emitted a sound the searcher's ears would enable him to place it and lay his hands on it at once. The electroscope is a device for detecting electrification, and radium, tho it makes no sound, emits constantly particles that aid the air to discharge electrified bodies. By instantly signaling this loss of electricity, the electroscope indicates the presence of radium in its vicinity, and it was thus that the radium was found in the ashes just as easily and surely as if it had been calling out continually, "Here I am! Come and get me!" In *The Popular Science Monthly* (New York), Raymond Francis Yates tells how the radium in question was lost, and how it was found again. He writes:

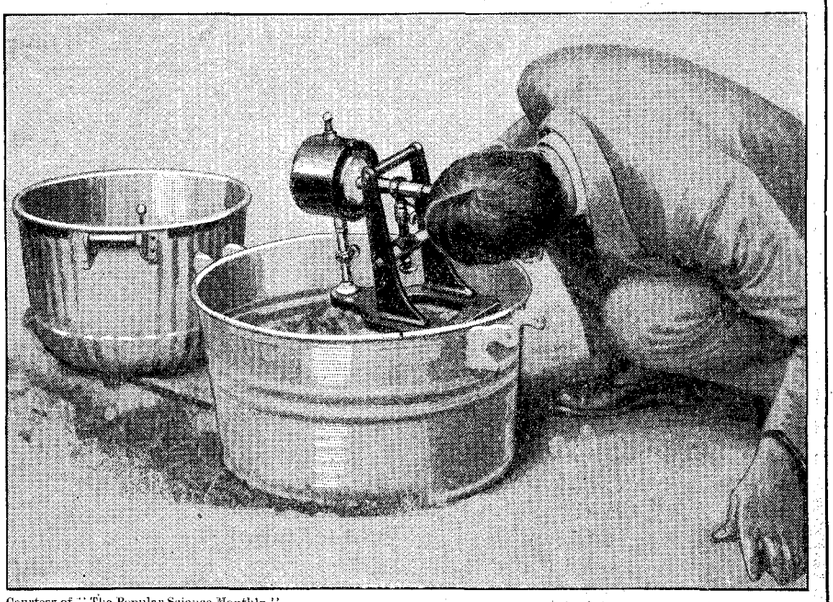
"A nurse was removing ten tubes of radium from a patient. She lost one in doing so. Six thousand dollars' worth of radium in a tube the size of your little finger! A diligent search of the room failed to reveal the presence of the little tube, and as a final effort the radium detective was called for. In this case he was Professor Lawrence, of the University of Rochester.

"The radium detective did not arrive on the scene armed to the teeth or prepared for an encounter with some bold robber. He came in with a very simple-looking instrument under his arm—an electroscope. The electroscope can detect the presence of radium in much the same fashion we would detect Limburger cheese if it were hidden away. The electroscope is sort of a 'nose' for smelling radium, and in this respect it is tremendously sensitive.

"The electroscope is really an instrument for detecting electrical charges. We learned at school that like charges of electricity repel one another. For instance, if two tiny pieces of gold-leaf both had a negative charge, they would insist on staying away from each other; they would repel each other. If one had a negative and one a positive charge, they would insist on remaining together, or, if they had no charges at all on their surfaces, they would be indifferent.

"The electroscope works on just this principle. Two tiny pieces of gold-leaf are suspended at the end of a metal rod enclosed in a glass vessel and carefully insulated, which means that it is prevented from coming in contact with anything that is a conductor of electricity.

"If a glass rod is rubbed briskly with a piece of dry silk it will become charged with positive electricity. Part of this positive charge from the glass rod can be made to flow to the surface of the gold-leaf in the electroscope by merely bringing the glass rod in contact with the projecting metal rod. At this instant the gold-leaf will fly apart and remain in this position until a conducting substance is brought in contact with the metal rod. If this is done, the charges on the gold-leaf will leak off and it will come back to its normal position. If an electroscope is allowed to stand in a charged condition the charges will gradually escape into the atmosphere. The rapidity of this leaking process will depend upon the condition of the air; whether it is dry or damp.



Courtesy of "The Popular Science Monthly."

THE SCIENTIFIC RADIUM DETECTIVE AT WORK.

The apparatus that found six thousand dollars' worth of radium in an ash-can.

"We will now set out to find the missing radium. Radium is continually shooting off tiny particles; atoms, really. Scientists call these emanations from radium *alpha*, *beta*, and *gamma* rays. Ordinarily air is a fair insulator, but when these radium rays get mixed up with it, its insulating or non-conducting properties rapidly vanish and it becomes a fairly good conductor. We can understand then that the air about a small quantity of radium—smaller than one can hope to imagine—is a poor insulator and if any charged bodies are present, their charges are sure to leak off into the atmosphere.

"If an electroscope is brought near a small amount of radium, the gold-leaf will instantly detect its presence by coming together. If the radium is some distance from the electroscope, the gold-leaf may move just a very small distance, but the radium detective has a magnifier trained on it, and if it moves he is sure to see it do it.

"When Professor Lawrence set out to find radium, he set the electroscope up in the room where it was used on the patient. The instrument failed to register. The radium had not been lost in the room. It was somewhere else. Probably the nurse got it mixed up with the bandages from the patient and it was thrown in the furnace. The ashes from the furnace were examined by the radium detective, and, sure enough, the electroscope responded instantly. Further examination revealed the fused tube which contained the radium.

"The radium was not lost. The search was continued until every possible milligram of the valuable metal was recovered. Radium will not burn.

"After Professor Lawrence found the radium in the ashes, a hurry-up call was sent out for a physicist from a large radium company. After he arrived on the scene, the valuable ashes were placed in several quart fruit-jars and taken to the laboratory and all but $210 worth of the $6,000 worth of radium was recovered."

DEPARTMENT OF SCIENCE AND INVENTION CONTINUED ON PAGE 116

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