FOSSILIZED BLOOD

IT WOULD SEEM IMPROBABLE to the verge of absurdity that such a perishable substance as blood may leave traces behind it recognizable after the lapse of geologic ages, yet several geologists report that they have found fossilized blood-corpuscles. Traces of blood about six thousand years old have been found in mummies, and the remains of it were recognized in the frozen mammoths of northern Siberia, whose flesh was fresh enough to be eagerly eaten by dogs after some 175,000 years of icy entombment—the longest and most effective cold storage on record. Yet the fossilized corpuscles reported on by Roy L. Moodie, of the University of Illinois, in *The American Naturalist* (Lancaster, Pa., No. 634), are surely the most remarkable instances of preservation on record. Fossilization was once believed to take place only in the case of hard animal structures, such as the bones or teeth, but softer tissues have now been frequently found fossilized. Writes Mr. Moodie in substance:

"Recently, while studying a series of microscopic preparations of fossil material, I observed in sections of a dinosaur bone which I had collected in the Como beds of Wyoming in 1906 some ovoid bodies which looked remarkably like blood-corpuscles. Close scrutiny of the available material, however, did not satisfy me that the objects might not be the products or by-products of incomplete crystallization. Only the outward form of the corpuscle was to be seen. Other bodies, apparently similar, were irregular in shape and hard to distinguish structurally from the regular bodies. These latter, however, may be masses composed of several corpuscles which had become agglutinated.

"Not being satisfied with the results of my observations, I should not have published anything about it had I not seen in a memoir by Seitz a description of similar bodies in sections of normal bone from a European dinosaur from Bernissaert, Belgium. Seitz's description of the blood-corpuscles follows:

"'A larger part of the Haversian canals of *Iguanodon* is empty. A part of them however, contain small, round, biconvex bodies, apparently with flat surfaces. Not seldom a compact mass of them entirely fills the blood-vessel. Professor Solereder, of Erlangen, declares that the bodies are not of plant origin (spores), and by polarization it is determined that the bodies resemble somewhat crystalline concretions, so that we are forced to the conclusion that we have here some fossilized blood-corpuscles. The partial filling of the blood-vessel may be due to coagulation. There are also to be found frequent accumulations of reddish crystals which support the suggestion as to the nature of the material. I give these observations with some reservation.'

"The studies on Egyptian mummies have not resulted in the discovery of blood-corpuscles. Wood Jones, however, is convinced that traces of blood are readily discernible. Elliot Smith has referred to blood-stains on bandages used in the primitive surgery of Egypt. Ruffer, in his extensive studies into the histology of Egyptian mummies, did not discover any definite corpuscles.

"It may be of interest to note that Friedenthal announced to the Physiological Society of Berlin the discovery of red blood in the body of a mammoth from eastern Siberia which had been frozen in the tundra since Pleistocene times. The precipitin reaction of the blood is similar to that of the modern elephant. No record is made of the preservation of blood-corpuscles. While this is an extremely interesting discovery, it must be recalled that cold brings many chemical reactions to a halt, and there may have been little change in the blood of this mammoth during its 175,000 years of cold storage in the Siberian mud. The body had been so well frozen that the flesh was still fresh enough to satisfy the hunger of wolves and dogs.

"Under favorable conditions, the lipoids of the blood might be changed into some resistant substance and thus retain the form of the corpuscles and delay their destruction long enough for fossilization to set in, these substances being replaced later by the mineral crystals from the magma in which the body was immersed. The beautiful little ganoid fish-brains from the Coal Measures may have been preserved in a similar way. The resemblance between brain substance and blood-corpuscles is close in this respect, that each has a small amount of resistant substance, a large amount of water, and a relatively similar proportion of lipoids which may have become transformed, under proper conditions, into resistant substances which carried the part over the critical period of destruction."

HIGHER TROLLEY SPEED?

INCREASED SPEED IS ADVOCATED as a cure for street-transportation ills by an editorial writer in *The Electric Railway Journal*. He says:

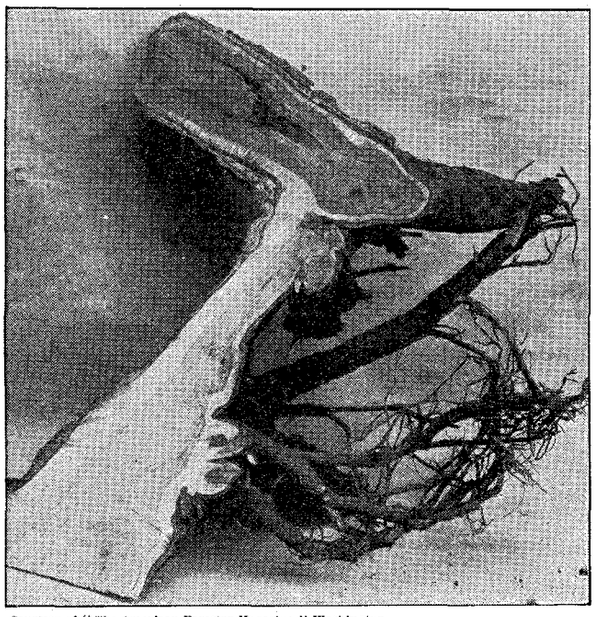
"When we read of Ralph de Palma going four hundred miles at the rate of eighty miles per hour we inevitably compare this with some speed experienced by ourselves in an automobile or train, and then there wells up in our minds an envious desire to emulate de Palma and experience his sensations as we conceive them. The American, thank heavens, likes speed. Why not capitalize more on this? Speed is a panacea for many railway ills. Earnings depend on the car-miles, but expenses, on the other hand, depend on the car-hours. If each car-hour can produce more car-miles than now, expenses are relatively reduced. High schedule speed possibilities are at the base of the street-railway structure. To increase schedule speeds involves such factors as rerouting, better track and rolling-stock maintenance, double berthing, improved loading methods, use of skip-stops, signals, traffic regulation at street intersections, etc. It is not idle to predict that the transportation agency that offers the highest speed service will predominate in the future, and we believe that the possibilities of higher schedule speeds are not fully realized in the street-railway industry. Inherently the street-car is capable of a schedule speed comparable to that of a private automobile due to its quick acceleration and the ease with which it is controlled, and it ought to be possible for the street-car to attain the same average speed in city traffic. It is up to the traffic experts to give the vehicle opportunity to realize its speed possibilities. There is no fundamental reason opposing the speed increase, and we venture to say the present rate of speed is due only to the fact that transportation, like *Topsy*, 'just growed' without any determined or intelligent effort to shape its growth as a coordinated unit that involves city planning, pedestrians, automobiles, street-cars, and everything that makes for congestion of traffic on the surface of streets. We heard a railway manager say the other day, 'With just a reasonable degree of effort and at but little expense we increased our schedule speed in the congested districts from two to six miles per hour.' The point is, higher speed is possible. Furthermore, it is a practical means of meeting jitney competition. Finally, it pays."

FOSSILIZED BLOOD OF A DINOSAUR.

A vascular space in a metatarsal bone of some dinosaur, from the Como beds of Wyoming, showing in the rounded marginal bodies the preservation of supposed blood-corpuscles. Magnified 200 diameters.

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