sterilization. Any tight container could have been used in place of such a chamber. The treatment was given during the first two weeks in June, and by the first of July all the treated trees were in partial or full leaf, while the untreated trees remained dormant. Although a number of the latter slowly came into activity a month later, indicating that they were not dead, their foliage was not fully developed in September.

By a similar treatment a number of chestnut seedlings were made to break their rest period three months in advance of the normal season. The concentration of ethylene chlorhydrin was the same as that used for the sugar maples above, but the time period was four instead of three days. This treatment, while successfully breaking their dormancy, killed back the ends of the upper branches to four inches from their tips, and evidently a shorter time period or a lower concentration of the chemical is to be recommended in order to avoid injury. These seedlings were treated during the second week of January, and by the first of February their buds were breaking into activity.

The results of the treatments indicate that the vapors of ethylene chlorhydrin may be successfully used to break the dormancy of some tree seedlings. The chemical seems to be toxic to young branches at higher concentrations, but when properly regulated it has proven to be very useful for breaking the rest period of both sugar maple and chestnut seedlings.

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DUST PARTICLES

THE mongrel mixture of detritus called "dust" in the household, is commonly found precipitated on walls (*e.g.*, where radiators or leaks in window casings or door jambs produce air currents), or on protected areas of floors (*e.g.*, under beds or other furniture). The phenomenon is something quite apart from the quiet settling of fine particles according to Stokes's law, which causes the ordinary layer of "dust." It seems to involve an electrical precipitation and/or aggregation, whereby particles which have specific surface charges or which have become charged by adsorption of atmospheric charges (electrons, ions or smaller particles), attach themselves to wall areas or to other particles having opposite specific or net charges.

It would be an interesting research to see to what extent (if any) dust becomes charged by metal or other radiating surfaces, by friction due to air currents, and by sunlight. That horror of efficient housewives, known in New England as "house-moss," appears to consist of a fluffy mat of adventitious fibers (cotton, wool, linen, silk), whose electrostatically active surfaces aid in holding them together and in fixing on them other kinds of dust particles.

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THE NERVOUS CONTROL OF HEMATOPOIESIS

SINCE the theories of hematopoietic control are still widely at variance, a series of tests was carried out to attempt to determine the rôle of the nervous system in the liberation of erythrocytes.

Periarterial sympathectomy was performed on the left femoral artery of each of three dogs, while the unoperated right leg was left as a control. The dogs were killed with chloroform, nineteen, fourteen, and twelve days after operation, respectively. The femora were dissected free, split lengthwise, and marrow from similar levels was fixed in formalin for subsequent histological section.

In each of five dogs, the sciatic nerve on the left side was injected with 5 cc. of freshly distilled alcohol. This was followed in each case by a subsequent unilateral paralysis. These dogs were killed one week later and the femoral marrow was prepared for examination.

Neither in the cases of periarterial sympathectomy, nor sciatic injection, were observable differences present between the marrows of the operated and the control sides.

These results are in keeping with the observations of Drinker, Drinker and Kreutzmann[1] (1917) who report that they found no outpouring of normoblasts after the complete section of sciatic and brachial plexuses.

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POSITION OF WOOD IN BEAVER DAMS

MR. CHARLES MACNAMARA brings up an interesting question in SCIENCE for December 18, 1931, with regard to the position of wood in beaver dams. At one time I did think that the most usual way for beavers to begin a dam was to lay the first sticks with the butt ends upstream. However, the more I study the construction of beaver dams the more evident is it to me that the animals have no set rules about it. I have seen dams that were just started where the butt ends of the sticks were laid upstream, and I have seen them where they were laid downstream. I have a photograph showing the latter condition where a dam was built across a stream and the beavers were extending it on to the gravelly shore or bank. Here it was plain that the willows were laid with the butt ends downstream.

In broken dams there are always the ends of many sticks projecting into the open gap, showing that they

[1] C. K. Drinker, K. R. Drinker and R. L. Kreutzmann, *J. Exp. Med.*, 27: 249, 1917.

are lying lengthwise of the dam, presumably intentionally placed in that position by the builders, but who can tell? The discarded food branches and other sticks drift and lodge against the upper side of the dam, and if that is raised such material would be incorporated in the dam and would lie lengthwise, just as it had lodged. I have sometimes wondered if the settling of a dam might not at times cause enough movement to twist the sticks from their original up-and-down stream positions to others at varying angles.

In one case where high water broke a dam the beavers closed the gap with sticks placed across it without any system whatever. They seemed to have just brought the material and dropped it, leaving it to adjust itself; but the opening was effectually closed and the dam as good as ever.

The strength of beaver dams is remarkable. I have seen several instances where high water has broken a dam, forced a section of it downstream and turned it to one side, leaving it still attached to the dam at one end.

Since 1913 I have kept up fairly continuous observations on the work of beaver on streams not far from my home, as well as observing the work of the animals wherever I have had an opportunity, and am continually coming upon some new thing, often something which makes one wonder why it was done. There is still plenty to be learned about beavers, or any other wild animal, for that matter.

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A NEW CONNECTION BETWEEN MAGNETISM AND ELECTRICITY

UNDER the highly technical name of "Quantised Singularities in the Electromagnetic Field" there has just appeared a paper in the current issue of the *Proceedings* of the Royal Society of London (September, 1931), that promises to be of great importance. Dr. P. A. M. Dirac, its author, is one of the most brilliant of contemporary physicists. He is a fellow of Trinity College, Cambridge, and is at present a guest of Princeton University.

According to classical theory, magnetism is a property of certain bodies—how they behave. The molecules of a substance are regarded as elementary magnets because of the existence of a system of electric currents within each molecule. This is ascribed by modern physics as due to the orbital revolutions of the electrons inside the molecules. Under ordinary conditions there is a haphazard arrangement of these molecules or elementary magnets, and consequently no resultant magnetic effect is manifested. In order that the magnetic effect of each molecule be additive, the molecules as magnets must be orientated in the same direction. If all the molecules are orientated in the same direction the substance is said to be saturated with magnetism. Thus the magnetic character of a body is said to be due to its polarization, that is, to the regular arrangement of its molecules. This view permits one to correlate magnetism with the electric current instead of regarding it as a new phenomenon. One of the most forceful arguments for not regarding magnetism as the manifestation of a separate entity instead of a property, is that no one has ever succeeded in imposing upon a body a charge of either positive or negative magnetism only, although it is a familiar fact that one can charge any body either electro-positively or electro-negatively.

In trying to discover the reason for the existence of the electron, the smallest electric charge, Dirac found that his calculations led instead to a relation between the smallest electric charge and the smallest magnetic pole. This type of connection between electricity and magnetism has never been suspected and is quite foreign to the current idea of magnetism, which was sketched very briefly in the preceding paragraph. It means that modern quantum theory allows the existence of isolated magnetic poles, the strength of which must be quantised. Just as the charge of any particle must be an integral multiple of e, the smallest electric charge, so the strength of any isolated magnetic pole must be an integral multiple of the smallest magnetic pole. The elementary quantum pole u_0 is connected with the elementary electric charge e by the relation $\frac{hc}{eu_0}=2$ or $u_0=\frac{hc}{2e}$ (where c is the velocity of light and h is Planck's constant divided by 2π). This, of course, is not a perfectly symmetrical relation between electricity and magnetism. To be perfect it would have to be $u_0=e$. It would be unusual if nature did not take advantage of the possibility of discrete magnetic poles, the existence of which is consistent with the quantum theory. Why, then, have such objects never been observed? There is a relation in physics which gives the experimental value of the smallest charge of electricity, independent of any theories, as $\frac{hc}{e^2}=137$. When this is combined with the relation