nel drained off after a period of 6 to 10 hours. The second was a modification of Baerman's[2] method to permit the isolation of larvae at any stage of their development. In this procedure a heavy wire was bent into a circle of such diameter as to fit into a large funnel and rest on the sides about two inches from the top. Four layers of cheese-cloth were stretched over the wire ring with the edges of the cloth raised so as to form a crude flat bottomed bag. The watch glasses containing the fecal material were inverted on the bottom of the bag; it was then fitted into the funnel which contained enough water to cover the watch glasses. The funnel was equipped with rubber tubing and a stopcock at the lower end and was mounted on a suitable stand. This arrangement of the funnel was the same as that referred to in the first method of isolation.

The larvae that collected over night in the stem of the funnel were drawn off through the stopcock into vials about one inch in diameter and two or more inches deep. The larvae rapidly settled to the bottom and could be obtained in large numbers for classroom study or for mounting. The writers, using a single drop of material, have observed more than forty individuals in the same field of a 100-magnification compound microscope.

Vials of living larvae were kept in the laboratory for about three weeks; they could be kept for longer periods. It was necessary, however, to pipette most of the water off and replace it with fresh water daily to prevent the larvae from dying.

MOUNTING

In preparing larvae for mounting, alcohol was used as a killing and hardening agent. Most of the water was drawn out of the vial and the vial filled with 5 per cent. alcohol. After standing fifteen minutes, the 5 per cent. alcohol was replaced with 70 per cent. alcohol. The larvae were hardened within two hours and remained in this solution, in good condition, for more than two weeks.

The larvae were mounted by transferring a drop of material from the bottom of the vial to a slide. The alcohol on the slide was immediately ignited and allowed to burn off, thereby affixing the larvae. The mount was then placed under a pair of binoculars and any large pieces of débris were removed with a needle, after which the larvae were covered with Delafield's Haematoxylin. After staining 10 to 15 minutes, the excess haematoxylin was flushed off with water running slowly from the tap; only a few seconds were required for the washing. The slide was again placed under the binoculars to see that the desired depth of color had been obtained, and was allowed to dry thoroughly. The larvae were then mounted under balsam in the usual manner.

Congo red, Orange G and alum cochineal were also used successfully as stains, but the larval structures were more distinct when haematoxylin was used.

F. S. ARANT
ROGER KNAPP
DEPARTMENT OF ZOOLOGY-ENTOMOLOGY,
ALABAMA POLYTECHNIC INSTITUTE

SPECIAL ARTICLES

STIMULATIVE EFFECTS OF ILLUMINATING GAS ON TREES

IN an investigation to determine significant symptoms of illuminating gas poisoning of shade trees a series of stimulation phenomena have been observed and recorded during February and March, 1932. The general features of these responses will be described briefly at this time since they may have application during the early spring in the detection of shade trees undergoing the incipient stages of illuminating gas injury.

In the investigation so far, no attempt has been made to determine how small an amount of illuminating gas will give responses in the plant material used. Entire potted trees, tree buds, tree roots, cuttings of shrubs and tree seeds have been subjected to complete atmospheres of illuminating gas and to atmospheres containing 10 per cent. to 40 per cent. of this gas by volume. The commercial product of the New Haven Gas Light Company was used throughout. This gas is a mixture of coke-oven gas and water gas.

When small potted dormant black oak, red oak and catalpa trees were subjected in a closed ash can to an atmosphere containing approximately 20 per cent. of illuminating gas for 24 and 48 hours, respectively, and then placed in a greenhouse, the buds of the gassed trees began to swell and the leaves to unfold weeks before similar control trees showed any bud activity. The exact gain in time cannot be stated as yet because the control trees at this time (a period of 4 weeks) are still dormant.

When test-tubes filled with illuminating gas were sealed over the dormant terminal buds of potted red and black oak trees for one and two days, respectively, active bud development and foliage production was observed weeks in advance of these responses in control trees. The buds of the control trees were en-

[2] G. Baerman, "Über Ankylostomiasis deren Ausbreitungsbedingungen durch die Bodeninfection und deren Bekaempfung." Geneeskundig Tijdschrift voor Nederlandsch-Indie, 57, 579–673, 1917.

cased in test-tubes in an atmosphere of air. Buds encased for 4 and 8 days, respectively, in illuminating gas were inhibited in their development or killed.

When the roots of dormant, potted red and black oak trees were washed free of soil and sealed in an atmosphere of illuminating gas with the stems and buds exposed to greenhouse air, the buds were hastened into active growth 3 to 4 weeks before those of control trees whose roots were sealed in an atmosphere of air. The roots of the gassed oak trees developed a large number of hypertrophied lenticels. Ailanthus trees treated in a similar manner did not show hypertrophied lenticels; the tap-roots of these trees split wide open due to the proliferation of parenchymatous cells. Information upon the behavior of the roots of American elm, Norway maple, sycamore, catalpa, white pine, red pine and bald cypress in atmospheres of illuminating gas has also been obtained.

When the soil-free roots of foliaged red and black oak trees were subjected to a sealed atmosphere of illuminating gas for one day and then repotted in soil, a slight wilting of the leaves occurred, followed by complete recovery. However, when the roots were so exposed for 2, 3, and 7 days, respectively, marked epinastic growth of the oak leaf petioles occurred and wilting of the tips and margins of the leaves took place. Within a few days, drying of the wilted tissue was observed together with a complete loss of leaf pigments proceeding from the distal ends of the leaves to the basal ends.

When dormant cuttings of Forsythia and lilac were enclosed in an atmosphere of illuminating gas for periods of 15 minutes up to 4 days, the shorter exposures hastened flower and leaf bud development and opening. The longer exposures inhibited or killed the terminal buds. In several experiments, gassed Forsythia cuttings developed few or no flowers but the leaf buds developed first and produced apparently normal leaves. At this time, a month after the exposures of the cuttings of Forsythia and lilac to gas, the cuttings exposed the longest periods are developing leaves from the lower buds and callus development is proceeding at the bases of the cuttings. The control cuttings have shriveled and died.

When dormant acorns of red, scarlet and black oaks were subjected to an atmosphere of illuminating gas for periods of 6 hours up to 4 days, respectively, a slight slowing of the rate of germination of the red oak acorns gassed the longest periods was observed. The black oak acorns, apparently the most dormant of the group, were distinctly hastened in their rate of germination by the longest exposures to illuminating gas.

The investigation is being continued with the object of determining the constituent or constituents of illuminating gas that may be responsible for the several plant stimulation responses recorded. Particular attention will be given to a study of the effects of known mixtures of oxygen, carbon dioxide and ethylene upon trees.

CARL G. DEUBER
OSBORN BOTANICAL LABORATORY,
YALE UNIVERSITY

OBSERVATIONS ON TASTE BLINDNESS

IT has been noted by Fox[1] that individuals vary to a remarkable degree with regard to their capacity to taste para-ethoxy-phenyl-thio-urea, 40 per cent. of the individuals he examined failing to find the substance bitter. These observations have been confirmed by Blakeslee[2] and Snyder.[3]

The latter two authors found that this difference in reaction to taste is inherited and that, genetically, taste deficiency is due to a single recessive gene (Snyder). In an examination of 100 families Snyder finds nine in which both parents and all the 17 children failed to perceive the bitter taste, and Blakeslee reports three matings with eight children, all of whom were non-tasters. The suggestion is also made that the test may be used in cases of disputed paternity in the same way as the blood groups (Blakeslee).

The findings quoted led to an investigation on possible racial differences as regards taste blindness. We have examined the incidence of tasters and non-tasters among American Indians at the Haskel Institute in Lawrence, Kansas. One hundred and eighty-three full-blooded Indians were tested, and of these 6 per cent. were non-tasters. Among 110 Indians with some white admixture there were 14, or 10.4 per cent., non-tasters. The incidence of non-tasters among the white population (150 individuals) in Lawrence, Kansas, was 42 per cent. The latter figure is to be compared with 32.2 per cent. non-tasters among 283 white individuals (Blakeslee), and 31.5 per cent. non-tasters among 440 white individuals (Snyder).

These results indicate another property in addition to the Landsteiner blood groups and the factors M and N which differ considerably in frequency in the American Indians, as compared to that of the white population.[4, 5, 6, 7]

[1] A. L. Fox, *Science*, 73, supplement, p. 14, April 17, 1931.
[2] A. F. Blakeslee and M. R. Salmon, *Eugenical News*, 16, 105, 1931.
[3] L. H. Snyder, *Science*, 74, 151, 1931.
[4] A. F. Coca and O. Deibert, *Jour. Immunol.*, 8, 478, 1923.
[5] L. H. Snyder, *Am. Journ. Phys. Anthropol.*, 9, 233, 1926.
[6] C. Nigg, *Jour. Immunol.*, 11, 319, 1926.
[7] K. Landsteiner and Ph. Levine, *Jour. Immunol.*, 16, 123, 1929.