insecticide as a colloidal suspension in air. The nontoxic and nonflammable nature of the gas is responsible for the success of this method.

Germicidal aerosols have been given considerable attention in recent years, and colloidally dispersed propylene glycol, hexylresorcinol and other compounds[4,5,6] have been found effective when applied in this form. The aerosols were produced by heat,[7] by some mechanical means such as the "Phantomyst"[8] machine developed in England or by some special atomizer.

An adaptation of the liquefied-gas method to the production of germicidal aerosols is logical. A few preliminary tests have been made to show the applicability of this method. The following solutions were tested: (1) Propylene glycol 5, ethanol 20, and dichlorodifluoromethane 75 per cent.; and (2) hexylresorcinol 0.15, olive oil 9.85, and dichlorodifluoromethane 90 per cent.

Since propylene glycol is not very soluble in dichlorodifluoromethane, a mutual solvent, such as ethanol, was necessary. In the second solution a commercial preparation consisting of 2.5 per cent. of hexylresorcinol in olive oil was used as the germicide.

A 216 cubic foot chamber was sprayed with a water suspension of nonpathogenic bacteria. After 10 minutes agar plates were exposed for 1 minute. Ten grams of the germicidal aerosol was then sprayed into the chamber and other agar plates were exposed. About 95 per cent. reduction in the bacterial growth on the plates was obtained with solution 1 and a considerable reduction with solution 2.

From these preliminary tests it would appear that this method of producing germicidal aerosols might be practical. These results are presented merely to call attention to the possibility of using a nontoxic, nonflammable liquefied gas as a self-propelling vehicle for dispersing germicidal aerosols. Since the study of germicides is outside the field of research of the Bureau of Entomology and Plant Quarantine, the writers plan no further tests of this method and hope that others will be interested in exploring its possibilities.

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[4] O. H. Robertson, E. Bigg, B. F. Miller, Z. Baker and T. T. Puck, Science, 93: 213–4, 1941.

[5] O. H. Robertson, E. Biggs, T. T. Puck, B. F. Miller and E. A. Appell, *Jour. Expt. Med.*, 75: 593, 1942.

[6] T. N. Harris and J. Stokes, *Am. Jour. Med. Sci.*, 204: 430–6, 1942.

[7] The Personnel of Naval Laboratory Research Unit No. 1, Science, 97: 208, 1943.

[8] J. V. Pulvertaft and J. W. Walker, *Jour. Hyg.* [London], 39: 696–704, 1939.

THE PREPARATION OF ISOLATED CELL NUCLEI OF RAT LIVER[1]

In a recent volume on cytochemistry,[2] Hoerr in a chapter on liver cells (page 185) has referred several times to my work on the isolation of cell nuclei of rat liver.[3] Two of his comments in particular convey erroneous impressions.

One of the points is that Hoerr doubts the final pH of the original mixture of M/475 citric acid and liver (pages 226–227), and states that the dissociation constants of citric acid make it difficult to understand how the liver can buffer the suspension to a pH as high as 6.0–6.2. Apart from considering that the dissociation constants of the citric acid constitute only one factor in determining the final pH, the other factor being the ratio of the amount of citric acid to the amount of liver employed, it is useless to theorize about this point, since our final pH values were checked carefully on repeated preparations with the glass electrode. Of course the livers must not be allowed to stand at room temperature after removal from the animals, or glycolysis will cause a rapid accumulation of lactic acid.

Another point by Hoerr requiring comment is his statement on page 213 that "It is possible that the nuclei obtained by Dounce's method have gelled to a certain extent because of the beating they receive in the Waring blendor; nucleoproteins are probably thixotropic, and the ease with which nuclear substances may undergo gelation is evident, if the work of Chambers over many years is considered."

Usually one considers a thixotropic material as one which is in the state of a gel when quiescent but whose gel state breaks up on agitation. Aside from this, the amount of "beating" the nuclei receive while in the blendor is to a considerable extent dependent upon the total amount of suspension in the blendor. When the nuclei are first liberated by stirring 100 gm of liver with 500 cc of M/475 citric acid, a relatively small percentage is damaged, while on the other hand isolated nuclei can be torn completely to fine fragments if they are suspended in 100 cc of water or less and stirred in the blendor for sufficient time.[4] Moreover, nuclei have been prepared which one might with considerable justification call gelled nuclei,[4] and these show quite different properties from the nuclei prepared at pH 6.0–6.2.

Hoerr also makes the following statement on page

[1] From the Department of Biochemistry and Pharmacology, the University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

[2] "Biological Symposia," Volume X. Edited by Jaques Cattell. The Jaques Cattell Press, Lancaster, Pa.

[3] A. L. Dounce, *Jour. Biol. Chem.*, 147: 685, 1943.

[4] A. L. Dounce, *Jour. Biol. Chem.*, 151: 221, 1943.

226: "The formation of intracellular or intranuclear gels, in other words, would not interfere in the least with enzyme activity." This statement probably is not true.[4, 5]

It should be pointed out that nuclei prepared by my method at pH 6.0–6.2 are not in the same state as they were in the living cell. It is doubtful whether any isolated nuclei could be in exactly the same state unless they were suspended in undamaged cytoplasm itself. The lowering of the pH from cell pH to 6.0–6.2 causes a shrinking of the nuclei and very possibly some coagulation and dehydration of nucleo-protein, which results in a microscopic appearance similar, as Hoerr states on page 226, to that of fixed tissue. Moreover, it should be remembered that the object of the preparation of nuclei at pH 6.0–6.2 was to obtain nuclei which would be satisfactory for enzyme studies, and this was accomplished.

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[5] A. L. Dounce and D. Seibel, *Proc. Soc. Exp. Biol. Med.*, 54: 22, 1943.

DIURNAL BEHAVIOR CYCLE IN SPIDERS

IN connection with Dr. Haseman's and Dr. Craig's notes on twilight behavior patterns in horseflies and birds,[1] the following field observations are offered concerning allied characteristics in orb-weaving spiders.

In general, evening brings transition to a phase of greater activity, dawn to a lesser. This may be related to the lesser nocturnal activity of their principal enemies, the wasps and birds. Among locally common species the variation of day-night behavior is especially marked in *E. strix,* relatively slight in *A. aurantia* and *A. trifasciata.* The writer's observations on this point have been mostly with *C. conica* and *E. cavatica.*

If a vibrating tuning fork is opposed to the dorsum of *C. conica,* resting as normally at orb-center, during the daytime, the creature drops a distance not commonly less than three nor more than eighteen inches, and after a few seconds returns. If the fork is presented at night, the fork is instead attacked. The transition from the escape to the attack pattern, which is gradual, and its reverse, may be observed with relative precision by making rounds among a series of nests about sunset and sunrise.

E. cavatica may be similarly observed and more conveniently, as it is the most nearly "social" of locally common species. Dozens of them, in all stages of maturity, with webs intimately interconnected, have been observed on this point in old outbuildings, mostly in central New Hampshire. Till the individual is about one-fifth adult size, it behaves in this respect substantially like *C. conica.* The adult does not exhibit the dropping response, rather a form of "spreading," as elsewhere described,[2] and is generally more aggressive. The dropping response seems to be a function of the size of an individual rather than its species. Small individuals show it in the daytime irrespective of maturity; large ones do not. To the tuning-fork, the dropping response is notably absent in the young *Argiopes.* This dropping response is not an avoidance of the fork as such; small *E. cavaticas* have repeatedly been observed to drop through the tines, held slightly below the resting place in the orb. Also I have observed *C. conica* to drop to the human voice. A farmer once told me of a barnful of young *cavaticas* responding similarly to the blast of a toy horn.

In observations with *E. strix* and *E. insularis* it has been possible in some sort to restore the daytime pattern of behavior by crude artificial illumination (electric or acetylene handlamps). *Strix* goes back, after minutes, to its daytime retreat. In *insularis,* the main change recalled is the replacement of "seizing" the fork, by the less aggressive "spreading" pattern, though retreat may be expected to ensue with protracted illumination.

In *E. insularis* and *E. trifolium,* around sunrise and sunset, response threshold changes have been observed. These species, practically identical in their behavior, spend the daytime in a retreat not usually more than eighteen inches from orb-center, and directly connected to it by a stout thread. If during the daytime the orb is touched with a vibrating tuning-fork, they do not ordinarily emerge. At dusk they emerge of themselves, and they emerge to the tuning-fork more and more readily as dusk approaches. Shortly after they have as normally retreated about sunrise, they can be brought out again by the tuning-fork, but less and less readily as daylight increases. Such observations can easily be made to a desired degree of control with species that frequent buildings, such as *cavatica* or *strix.*

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[1] SCIENCE, 97: 285, 1943; *ibid.*, 99: 125, 1944.

[2] *Psyche*, 43: 11, 1936.

MORE ABOUT WHITE BLACKBERRIES

A YEAR or so ago I sent you a note about some wild white-fruited blackberries I discovered near Gainesville, Fla., and named the variety *albifructus.* I planted the seed of these berries and in two years had 104 fine bushes in bearing. When the fruit ripened every single berry on all the bushes was black. Near the wild plants from which the white berries were taken there was a patch of normal black-fruited plants. The pollen of these plants was carried to flowers of the white-fruited plants by insects and, black being dominant, the seed produced black-fruited