The deposit is significant to geologists and archaeologists because it may provide a datum in correlating late glacial and postglacial deposits in an area along the probable migration route of ancient man into the interior of the continent.

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Attraction of Flies by Iso-Valeraldehyde

V. G. Dethier, B. E. Hackley, Jr., and T. Wagner-Jauregg

Department of Biology, The Johns Hopkins University, Baltimore, Maryland, and Biochemistry Branch, Chemical Corps Medical Laboratories, Army Chemical Center, Maryland

Sporadic reports occur in the literature of compounds which act as specific attractants for various species of insects, but the physiological and behavioral bases of these actions are clearly understood in a few isolated cases only (*1*). The attractant reported here is of interest not merely because it adds another compound to the list but principally because it focuses attention upon a homologous series some members of which have recently been shown to possess qualities of attractiveness for insects. Furthermore, this series (the aliphatic aldehydes) already shows promise of serving as a useful tool for investigating the mechanism of action of attraction in much the same manner as the aliphatic alcohols have extended our knowledge of the mechanism of repellency (*2,3*).

In the course of testing several hundred natural products and the extracts thereof as attractants for the flies *Musca domestica, Ophyra aenescens, Phormia regina,* and *Sarcophaga bullata,* it was found that of all materials tried a 10% aqueous solution of malt extract was the most attractive for the housefly and decayed casein the most attractive for *S. bullata.* The resemblance of the odor of certain fractions of these to that of iso-valeraldehyde suggested the desirability of testing that compound. Preliminary screening was accomplished by the use of Petri dish techniques (*4*). These consisted essentially of counting the numbers of caged flies attracted to various aqueous solutions of the aldehyde placed beneath the floor of the cage. Data from these experiments indicated that a 0.013*M* solution of iso-valeraldehyde was superior in its attraction of *Musca* and *Ophyra* to all other chemically defined materials heretofore tested.

This concentration is nearly equal to that which is repellent when acting as a stimulus to tarsal contact chemoreceptors. Stimulation of the tarsal receptors of the blowfly *P. regina,* for example, by a 0.028*M* solution of iso-valeraldehyde, even with the addition of 0.1*M* sucrose, causes rejection (*5*). Thus, although the present experiments indicate that the solution is an olfactory attractant, it would not be expected in the field to detain flies which had oriented to it unless an additional factor acceptable to tarsal and oral chemical senses was also present.

In order to determine the actual effective concentration in the gas phase, extensive tests were conducted by means of an olfactometric technique (Fig. 1) (*3*). Results to date show that the vapor concentration producing maximum attraction is approximately $1.2 \times 10^{-5}M$. Over the range $2.0 \times 10^{-5}M$ to $2.8 \times 10^{-5}M$ the aldehyde is partly attractive and partly repellent. This crossing-over phenomenon has been emphasized in the literature (*1*). Beyond $6.0 \times 10^{-5}M$ maximum repellency is obtained. Studies are continuing in order to determine the complete active concentration curve and to investigate the effectiveness of other homologs.

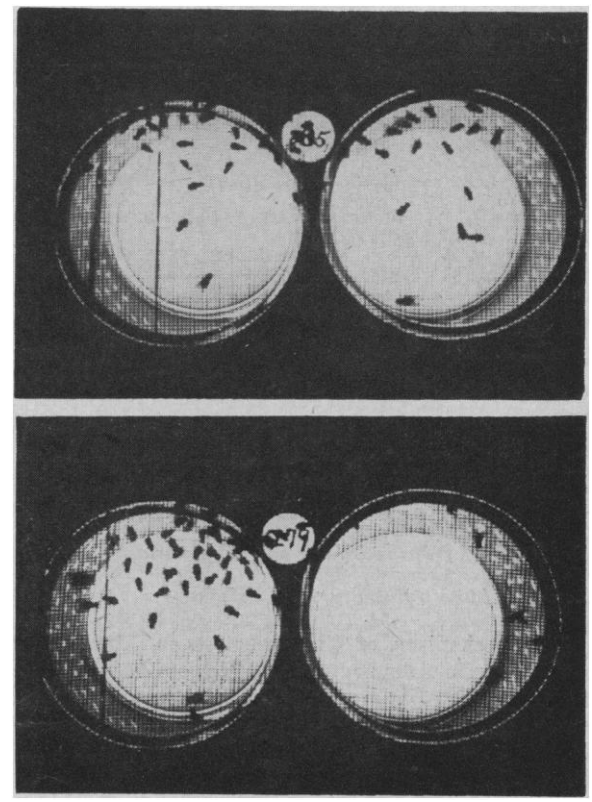

FIG. 1. Record of response of *Musca domestica* in an olfactometer to the odor of iso-valeraldehyde. Top, control: filtered air passing through both ports; bottom, experimental: iso-valeraldehyde vapor passing through left port.

As indicated above, other aldehydes have been reported as insect attractants. Those with short chains (up to 5 carbon atoms) attract codling moths and the Natal fruit fly, *Pterandrus rosa* (Ksh.) (*6,7*). Palmitaldehyde is an effective attractant for cabbage looper moths, *Autographa* spp. (*8*). Recently it has been shown that acetaldehyde as a natural constituent of potato leaves directs the Colorado potato beetle in its selection of food (*9*). Whereas this case is apparently concerned with action on the gustatory sense, other aldehydes undoubtedly act through the agency of the olfactory sense.

The action of the various homologs listed here in attracting several species of insects which occupy rather widely different habitats suggests that naturally occurring aldehydes may comprise a class of compounds of some considerable importance in influencing the chemosensory behavior of insects.

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The Effect of Choleretic and of Hydrocholeretic Agents on Bile Flow and Bile Solids in the Isolated Perfused Liver[1]

Ralph W. Brauer[2] and Rita L. Pessotti[2]

Department of Pharmacology and Experimental Therapeutics, School of Medicine, Louisiana State University, New Orleans

The mechanisms of bile formation and the factors controlling bile flow rates have hitherto been studied *in vivo* only; innervation, complex blood supply, variable oxygen tensions in the organ, and other factors that may influence bile secretion cannot be separated under those conditions. The development of an isolated liver preparation secreting bile for 12 hr or more (*1*) promises to greatly facilitate analysis of the physiology of bile secretion. The present communication is an example of the application of this preparation to the solution of a problem formulated but not resolved on the basis of studies in the intact animal.

Bile flow can be stimulated by various agents; prototypes of these are the conjugated bile acids on the one hand and oxidized unconjugated bile acids like dehydrocholanic acid on the other. The former (*2*) produces a marked increase of bile flow as well as bile concentration; the latter (*3*) produces an enhanced flow of bile with constant or diminished solid content. Drugs acting like dehydrocholates-hydrocholeretics, in dogs, cause marked increases in hepatic arterial, but not in total hepatic, blood flow (*4*). By contrast, choleretics like taurocholate cause no significant changes in hepatic circulation.

Is, then, the difference between choleresis and hydrocholeresis based on this circulatory effect, or is the circulatory effect secondary to a difference in response of the hepatic parenchyma to agents of these two groups? If hydrocholeresis as well as choleresis could be observed in the isolated organ, this preparation with its simple and controllable circulation should permit a resolution of the question raised.

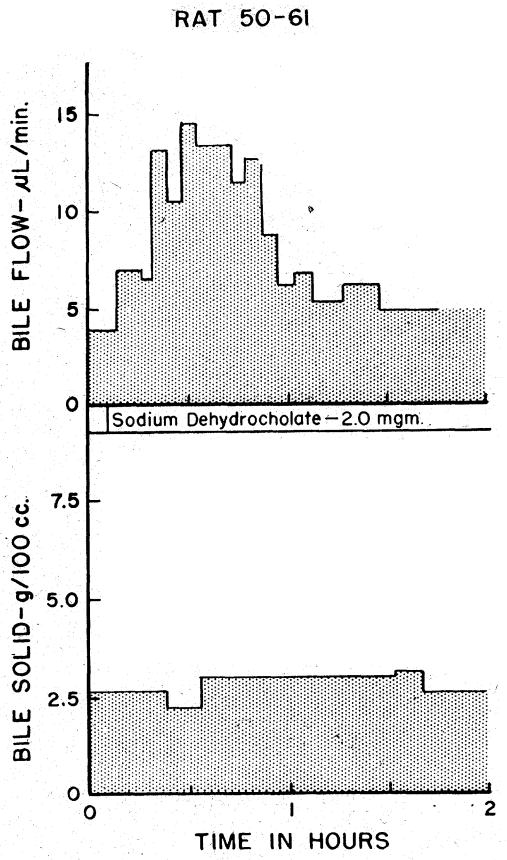

FIG. 1. Bile flow and bile solids after Na dehydrocholate. Rat liver perfusion 50-61, ♀, 280 *g*; 0 time—470 min perfusion. Perfusate flow = 73 ± 3 ml/min.

Livers of mature Sprague-Dawley rats were perfused as described in (*1*). Blood flow, bile flow, and bile total solids were determined (*1*). All studies were made during the steady bile flow phase of each preparation.

Conjugated bile salts were prepared from dog hepatic bile according to (*5*), recrystallized twice from alcohol-ether, and dried over silica gel. Sodium dehydrocholate (Procholon sodium, Squibb) was obtained in 20% solution; 2% solutions of both agents were used for injection.

Bile production by the isolated liver is readily affected by choleretic agents. In a series of 11 preparations the maximal increases in flow rates produced by injecting 2.0 mg sodium dehydrocholate averaged 250 ± 45%. For comparison, administration of the same dose to intact rats with bile fistulas resulted in a mean maximal increase of only 79 ± 17%. The administration of conjugated bile salts similarly caused increased bile flow rates (mean maximal increase after

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[2] Present address: U. S. Naval Radiological Defense Laboratory, San Francisco, Calif.