from the Wicomico and Nanticoke rivers, both of which drain extensive swamp areas, indicate the presence of greater amounts of filter passing material than found in the samples from the lower Bay and the James River. This seems reasonable since we would expect greater amounts of organic material to be present in these two rivers.

Each time a sample was drawn for color determination, part of it was left unfiltered and was placed in a second spectrophotometer fitted with 10-cm cells. Measurements comparable to absorbency per meter were obtained at 50-mμ intervals of wavelength across the same part of the spectrum as that for which color determinations had been made. These measurements, which take into account both the filter passing material and the nonfilter passing suspended matter, were then compared with the absorbency values for the corresponding filtered samples. The upper sets of curves in Figs. 1 and 2 are typical examples of untreated samples. The narrowness of the envelope for the color curves on Fig. 2 shows that filtering effectively eliminates the optical difference between samples taken at various depths.

The primary factor in light extinction in Chesapeake Bay waters is the particulate matter which can be readily filtered out. The river data in Fig. 1 show filterable material to be at least four times as effective at all wavelengths as the filter passing material. In open bay samples, maximum effectiveness of the filter passing material was approximately one-fifth that of the filterable material.

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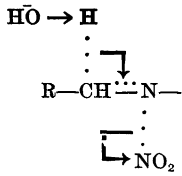
Comments and Communications

The Second Order Elimination of Nitrous Acid from Secondary Nitramines

IN a recent discussion (*1*) of the Hofmann and Saytzeff rules for elimination reactions it has been proposed that the operation of the Hofmann rule in bimolecular eliminations may signify the dominant importance of steric effects, the Saytzeff rule being more general and implying electromeric control. A case of Hofmann elimination in an E1 reaction has also been attributed to steric factors, and this has led to the generalization that all types of eliminations may be governed by the Hofmann rule when steric factors are important (*2*). This contrasts with the view of Hughes, Ingold, and co-workers (*3*) that the Hofmann rule implies inductive control of elimination and is in force in E2 reactions in which the atom of the departing group which is involved in the bond-breaking carries a positive charge, as in $-\overset{+}{N}R_3$, $-\overset{+}{S}R_2$, $-\overset{+}{P}R_3$, and $-\overset{+}{S}\overset{-}{O}_2R$; the Saytzeff rule is then considered to be applicable to all other cases of E2 and to "unimolecular" eliminations. Swain and Scott's (*4*) interpretation of the Hofmann rule also involves attack on the most acidic hydrogen, and thus refers to inductive control.

An interesting case of E2 elimination which has apparently been generally overlooked and which may be pertinent to this discussion is that of the loss of nitrous acid from secondary nitramines under the influence of alkali. These reactions were studied some years ago (*5–9*), and of the mixed aliphatic secondary nitramines employed, the predominant products were always such as to lead to the enunciation of the rule that the larger group formed an amine, the other radical resulting in an aldehyde. With benzyl and substituted benzyl derivatives the rule was reversed. The reactions were assumed to involve an intermediate imine, and it was shown (*8*) that under the experimental conditions an imine would decompose to give the products. Further, the reaction of alkali with a secondary nitramine is second order and nitrite ion is produced in the rate determining step, or, conceivably, in a subsequent rapid reaction (*10*). Hence, by analogy with other second order eliminations, such as the structurally similar alkaline decomposition of *p*-toluenesulfonbenzylmethylamide (*11*),[1] it seems quite reasonable that the transition state may be represented by:



If this is the case, the results of the orientation experiments are all interpretable by the Hofmann rule, the benzyl group reversing the results, as in other systems (*3*). The geometries of the $> C=C <$ and $> C=N\diagup$ systems seem sufficiently similar to permit comparisons, and hence it appears difficult to attribute

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[1] It may be noted that the present system is a nitrogen analogue of the carbonyl elimination reaction ($E_{CO}2$) of organic nitrates investigated by J. W. Baker and D. M. Easty (*J. Chem. Soc.*, 1208 [1952]). In the latter instance there was no possible alternative product, and no obvious steric difficulty; there was evidence of inductive influences in the relative rates of the methyl, ethyl, and isopropyl compounds.

the results to steric factors alone, since the bulk of the nitro group is much less than that of, say, $—\overset{+}{N}R_3$, or $—\overset{+}{S}R_2$; it seems, in fact, to be more similar to that of the halogens, which give Saytzeff orientation. The products are, however, in line with the Hughes-Ingold classification, since the nitrogen of the nitro group carries a unit formal positive charge.

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Inhibition of Mold Contamination in Drosophila Food Using Sodium Orthophenylphenate

ALTHOUGH general use of *Drosophila melanogaster* as an experimental animal in genetics and general biology classes and research has been facilitated by heat sterilization or the incorporation of fungistatic substances in the food, a number of reports from colleges and universities indicate the need of a still more reliable and efficient method of mold control. The following method has been used by the author since 1942 with complete elimination of molds and with consistently high *Drosophila* population numbers. The cornmeal medium, the preparation of which has been outlined by Bridges (*1*), Lebedeff (*2*), and Sinnott and Dunn (*3*), was used with slight modification, but with sodium orthophenylphenate as the fungicide.[1] The ingredients used were: 15 g agar dissolved in 500 ml of water; ¾ g of Dowicide A dissolved in 10 ml of 95% ethanol; 125 ml dark corn syrup; 110 g of yellow cornmeal in 250 ml of water. The ingredients were mixed in the order given here, dispensed in containers, and allowed to cool. A heavy suspension of compressed yeast in water was then poured over the surface of the medium. After 24 hr the surplus yeast suspension was drained off. This medium has been stored for many weeks without becoming contaminated, and attempts to get several species of *Penicillium* and *Aspergillus* to grow on it have been unsuccessful. As yet no systematic study has been made of the effects of sodium orthophenylphenate in other media used for food for *Drosophila* or other animals, except that it has been shown that 0.5-g or 1-g lots when added to one l of Pearl's S101 medium (*4*) prevent fly reproduction.

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[1] The sodium salt of orthophenylphenol used in the experiments was contributed by the Dow Chemical Company as Dowicide A.

Channel Area in Electroconvection Apparatus

SEVERAL designs of apparatus have been described recently (*1–7*) for the laboratory use of electrodecantation or electrophoresis-convection. (I prefer to shorten this name to electroconvection.) It is not generally recognized that within wide limits, which include the usual range of laboratory apparatus, the rate of fractionation in electroconvection apparatus is practically independent of the channel face area. This conclusion has been confirmed experimentally by comparison of different cells and can be derived theoretically from the equations given by Brown (*8, 9*) for the characteristic transport time.

In the following equations the symbols employed are those of Kirkwood (*9*), viz:

θ = characteristic time of the transport function
V = volume of top reservoir
D = diffusion constant of solute
$h = \left(\dfrac{4\eta l D}{\alpha \rho_0 g C_0}\right)^{1/4}$ with η the viscosity and
ρ_0 the density of the solvent,
l the height of the channel,
α and C_0 the partial specific volume and the concentration of the solute
g the acceleration of gravity
μ = electrophoretic mobility of solute
E = field strength in the channel
(Other symbols employed are defined as used.)

$$\theta = 2VD/hA\mu^2E^2 \qquad (1)$$

in which the field strength E is calculated from the total electric current I through the apparatus and the area A of the channel face: $E = I/kA$, where k is the conductivity of the solution. The electric power consumed in the channel is given by $H_c = RI^2 = aI^2/kA$, where a is the distance between the channel faces. Substituting in the equation for θ,

$$\theta = 2VDak/h\mu^2H_c \qquad (2)$$

This equation shows that for fast transport it is not necessary to use large areas of membrane which are difficult to support satisfactorily. A channel area of 1 × 12 cm was equal to one or 3 × 20 cm in transport rate, at equal power level.