of the litters but without any success. We have employed 18 mothers which were allowed a total of 108 young to be reared, the daily dosage allowed the mothers was 1500 to 2500 mg. and the infant mortality was 100%. When at the critical point in lactation a daily dosage of 2500 mg. of "Vitavose," which proved a failure as a source of vitamin B for milk secretion, was replaced by a daily allowance of 1500 to 1800 mg. of dehydrated brewer's yeast (furnished by the Schlitz Beverage Co., 7 years old and which might have even deteriorated in vitamin potency due to aging) lactation was not only improved but the majority of the young were successfully weaned.

"Vitavose" compared with dehydrated brewer's yeast or dehydrated baker's yeast proved to be a complete failure as the only source of vitamin B for lactation.

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A New Means of Control of Action of Ciliated Epithelium. Effect of Moisture.

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(Introduced by Victor E. Levine.)

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It has been proved by the authors that ciliary movement, though initiated automatically, is regulated, like movement of other types of visceral contractile tissue of higher organisms (vertebrate), by sympathetic and parasympathetic nervous acceleration and inhibition, and by sympatho- and parasympatho-mimetic types of chemicals. We here present another factor of control of the rate of activity of this tissue, not described heretofore, namely, moisture. We have found during the last 2 years that the propulsive power of ciliated epithelium is absolutely dependent upon the presence of a surface film of fluid, since this power is completely paralyzed by drying. The method for determining ciliary speed rate was the same as that formerly reported.[1] The average time in seconds required for a fine, light particle upon the mucus membrane of the palate and pharynx of the frog to cross the field of a binocular microscope was

[1] McDonald, James F., Leisure, C. E., and Lenneman, E. E., PROC. SOC. EXP. BIOL. AND MED., 1927, xxiv, 968.

recorded. The movement, or lack of movement, during and after various degrees of drying of the mucus membrane was recorded. Drying was done by blowing air gently from a rubber bulb upon the surface. We have also used mammals in similar experiments.

In every case evaporation of the surface film of moisture slowed and finally stopped completely its propulsive action, when drying was maintained. The particle remained at a stand-still upon the mucosa as long as the ciliated surface lacked a film of fluid. When moisture (physiological saline, Ringer's solution, or tap water) was again added after incomplete drying the ciliary propulsive action was resumed but at a slower rate. Ciliary activity was not resumed upon the addition of moisture after complete drying.

We also confirmed repeatedly the principle, noted by Kraft,[2] Gray,[3] and others, that the rate of ciliary activity is profoundly influenced by temperature, since on cold days one to several minutes was required for the particle to cross the microscopic field; whereas in hot weather its speed was rapid.

It seems that the principle of the utter dependence of the propulsive power of cilia upon moisture should be highly important in relation to the respiratory function of higher organisms including man, because the brunt of the task of filtering a pure stream of oxygen for the blood and tissues out of an abundantly dust- and bacteria-polluted inspiratory air stream is normally borne by the sheet of ciliated epithelial tissue lining the respiratory passages. In fact, this is the only visceral system in extensive, intimate, and continuous contact with the outside environment.

We have evidence from studying the nasal cavities and accessory sinuses of the mammal that these cavities may form an auxiliary irrigation plant for delivery of moisture from their glands, via ciliary propulsion, to the nose. The increased lachrymal secretion from nasal irritation seems to have a similar function.

[2] Kraft, H., *Arch. ges. Physiol.*, xlvii, 196.

[3] Gray, J., *Royal Soc. B.*, Series xcv, 6.