SEX DIFFERENCES IN THE STRUCTURE OF *BOWMAN'S CAPSULE IN THE MOUSE*

SELYE,[1] in his observations on the effect of testosterone propionate injections in female mice, reports characteristic changes in the structure of the parietal lamina of Bowman's capsule. An instance of similar variation from the usual structure of the capsule in a normal adult male mouse was noted by Dr. Esther Carpenter of this department.[2] Comparative studies of a limited number of both adult and immature mice have enabled me to demonstrate that this modification in structure is correlated with sex.

In the kidneys studied, two quite different types of capsules were observed. The first type is that generally described in text-books of mammalian histology. The capsule consists of a double layer of flattened epithelial cells. The visceral layer of the capsule is closely applied to the capillary tuft, and the parietal layer forms a goblet-shaped structure which may or may not be separated from the visceral layer by the presence of filtrate in the lumen. The second type is similar to that described by Selye, and mentioned by a number of other workers. The visceral layer appears as usual: thin and closely applied to the endothelial walls of the loops. In the parietal layer of Bowman's capsule part or all of the cells which make up this outer layer are high cuboidal in type, with clearly demonstrable brush borders. In sections which show the neck and a portion of the convoluted tubule, the cuboidal cells of the capsule are indistinguishable from those of the tubule itself, and extend one half, two thirds, or often completely around the glomerulus to the point where the afferent and efferent arterioles are seen and where the parietal lamina is reflected back to form the visceral lamina.

In a differential count of capsules of the adult male mouse, 89 per cent. show the "abnormal" high-cuboidal epithelium which extends at least half way around the capsule. These altered malpighian corpuscles are not confined to the male. In a similar count of the normal adult female, 13 per cent. of all the corpuscles observed were thus modified. Comparisons of the histological kidney structure of the immature mouse of about 5.5-grams body weight show that same condition to exist, although to a markedly lesser degree. A differential count of the young male revealed only 25 per cent. of the capsules to exhibit the high-cuboidal cells of the parietal layer. In the immature female 13 per cent. were again found.

This preliminary publication will be supplemented by more extensive data in the near future.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

HAY VENTILATION

THE spontaneous heating of stored hay is a serious problem in many parts of the country, and large quantities of hay are damaged or destroyed each year as a result of self-heating, following storage with too high a moisture content. A dependable and economical method of preventing dangerous self-heating would result in enormous savings to the farmers of the United States.

The principle of the chimney (Fig. 1) was applied to stacks of under-cured hay in preliminary trials at the Western Washington Experiment Station in the summer and fall of 1939, to prevent, by naturally induced ventilation, the excessive heating of under-cured hay in storage. Ventilation was provided by an opening in the hay extending from the base upward through the top of the stack. In some stacks, the ventilator shaft consisted of an open frame-work of wood around which the stack was built, in others the ventilator shaft consisted merely of an opening moulded into the hay by a sheet-metal cylinder which was pulled upward as the stack was built. The only direct connection of the ventilator with the outside air was at the top.

A flow of air, induced through the mass of hay and up the chimney by the differential in temperature between the stack and the outside air, by wind movements, or by both forces working together, effectively

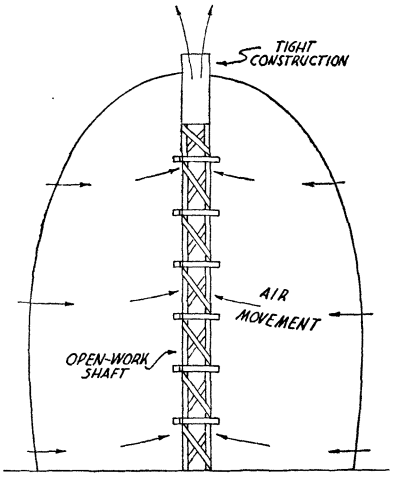

FIG. 1. Induced circulation of air through stacked hay using the principle of the chimney.

[1] H. Selye, *Jour. Urol.*, 42: 637, 1939.
[2] E. Carpenter, personal communications.

prevented excessive heating of under-cured hay (having a moisture content up to 37.0 per cent. in stacks so far tried).

Three round stacks consisting of approximately 6½ tons, 3 tons and 2¼ tons, and having when built, moisture contents of 37.0, 29.4 and 35.3 per cent., respectively, reached maximum temperatures of 112°, 100° and 76° F., respectively. Ventilation in the 6½ ton stack, provided by a round moulded shaft one foot in diameter, was believed inadequate.

An unventilated 8½ ton stack containing 37.2 per cent. moisture when stacked, reached a maximum temperature of 148° F. and contained considerable moist brown hay when opened.

A fourth stack, rectangular in shape, containing 9 to 10 tons of hay, carrying 21.2 per cent. moisture, was so constructed that half the stack was ventilated and half not ventilated. Maximum temperatures in similar locations in the ventilated (68° F.) and unventilated (92° F.) portions of the stack showed a difference of 24° F. in favor of the ventilated hay. A slight difference in quality of the hay in favor of ventilation was noted.

Frequent velometer readings in the chimney of the ventilated part of the stack showed that the upward flow of air in the ventilator shaft commonly reached a speed of 150 feet per minute with occasional velocities of 250 to 300 feet per minute.

This principle of hay ventilation is believed applicable to most existing hay barns and mows, as well as stacks, and seems to offer a hope of eliminating much of the hazard of spontaneous heating of hay, at small cost for installation and no cost for operation.

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ORGANIC MERCURY DERIVATIVES OF BASIC TRIPHENYLMETHANE DYES

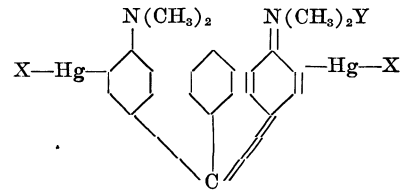
BECAUSE of the distinctive characteristics of the basic triphenylmethane dyes the organic mercury derivatives of these dyes would seem to present interesting bacteriological and pharmacological possibilities. It has proved difficult to mercurate basic dyes directly,[1,2] but I have found that the mercury compounds can be prepared by a two-stage process in which a derivative of the basic triphenylmethane dye is mercurated and the resulting mercury compound converted into the dye. Proceeding in this way, it is possible to prepare series of mercury compounds of both the colorless and colored forms of amino triphenylmethane derivatives.

[1] F. C. Whitmore and G. J. Leuck, *Jour. Am. Chem. Soc.*, 51: 2782–2784, 1929.

[2] L. Chalkley, *Jour. Am. Chem. Soc.*, 47: 2055–2061, 1925.

For example, 4,4′ bis-dimethylamino-triphenylacetonitrile is readily mercurated, and the mercurated nitrile can then be converted into the corresponding mercurated malachite green by means of a photochemical reaction. Both mono- and di-mercuri derivatives are produced smoothly in the mercuration.

The dimercuri malachite green probably has the formula:



Here X and Y are anions, but not necessarily the same anions.

The mercury in this compound is relatively stable to ammonium sulfide, which, in presence of ammonium hydroxide, gives only a colorless organic mercuric sulfide, which remains colorless for some time at room temperature.

When X is an anion which ionizes readily from the mercury the salts of even this dimercurated dye are generally quite soluble in alcohol, and the alcoholic solution, if not too concentrated, may be diluted with water without precipitation of the dye. From such solutions chlorides, even in low concentration, precipitate the insoluble chloromercuri compound. However, dicyanomercuri malachite green—where X is CN^-—has the solubility of the ionizable salts and, in addition, is soluble in presence of moderate concentrations of chloride ion.

Further details of these reactions and compounds will be published elsewhere. The chief purpose of this note is to call the existence of these new substances to the attention of bacteriologists and pharmacologists. I have a little of the dicyanomercuri malachite green and should be glad to supply small samples to interested scientists while my stock lasts.

LYMAN CHALKLEY

POINT PLEASANT, N. J.

BOOKS RECEIVED

GERICKE, WILLIAM F. *The Complete Guide to Soilless Gardening.* Pp. 285. 60 figures. Prentice-Hall. $2.75.

Living Specimens in the School Laboratory. Pp. 93. Illustrated. General Biological Supply House, Chicago. $1.00.

LORD, EUGENE H. *Experimenting at Home with the Wonders of Science.* Pp. xii + 243. 107 figures. Appleton-Century. $2.00.

PERRIER, GEORGES. *Petite Histoire de la Géodésie: Comment l'homme a Mesuré et Pesé la Terre.* Pp. 188. 9 figures. Alcan, Presses Universitaires de France, Paris. 18 fr.

POOL, RAYMOND J. *The Foundations of Plant Science.* Pp. v + 654. 541 figures. Ginn. $3.75.

YATES, RAYMOND F. *Science with Simple Things.* Pp. xv + 245. Illustrated. Appleton-Century. $2.50.