

occurs, and inspiratory dyspnea is always present to a greater or less degree.

Under these conditions therefore each alveolus which is in connection with a stenosed bronchus or bronchiole will act like a miniature dry cup during inspiration, because the pressure in these alveoli will decrease as the intrathoracic pressure decreases during each inspiration, for little or no air enters through the stenosed air passage. Therefore during each inspiration, which is slow, labored and prolonged in the gassed cat, the capillaries of the alveolar walls are subjected to an aspirating action which facilitates or initiates the passage of a transudate into the alveolar spaces. The production of this transudate is probably also aided by a local damage of the alveolar epithelium which the war gas produces.

It is thus seen that the fundamental conditions which apparently cause the local pulmonary edema of dimethyl sulphate are the same which are also operative in adrenalin pulmonary edema, as Gates and I have described elsewhere.¹

Practically these observations may be of some value. In gassed soldiers all inspiratory dyspnea should be ameliorated as much as possible, by tracheotomy and artificial respiration if necessary. At another time I hope to report concerning the marked beneficial action of tracheotomy in fulminant cases of pulmonary edema produced by a different type of war gas.

174 (1352)

On the electrical resistance and permeability of tumor tissues.

(Preliminary communication.)

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Preliminary determinations of the electrical conductivity of primary breast carcinomas in mice (supplied by Mr. Millard C. Marsh) indicate that cancer tissues are more permeable to ions than are normal tissues and that the permeability bears a definite relation to the speed of growth, rapidly growing tumors exhibiting

¹ *Jour. Exp. Med.*, 1917, XXVI, p. 215.

a lower resistance than slowly growing tumors. Similar determinations on plant galls (supplied by Dr. Irvin F. Smith) indicate that plant tumor tissues are uniformly more permeable than normal plant tissues, the tumor tissues frequently exhibiting, under reasonably comparable conditions, a conductivity more than twice that of normal tissues. The observations of McClen-
don, Gray, etc., that sea urchins' eggs exhibit an increased conductivity during the first stages of development harmonize with the above observations on cancer tissue and lend support to the conclusion previously reached by the writer, as a result of chemical analysis of mouse tumors and blood reactions exhibited in cancer and pregnancy, that both normal and pathological proliferative processes depend upon an increased permeability of the protoplasmic film to water and water-borne food stuffs.

An attempt will be made in the next paper to indicate briefly by means of a physical model, the mechanism whereby changes in protoplasmic permeability may be induced by changes in chemical and physical environment and in a subsequent paper to apply the principles involved to cancer.

175 (1353)

On the action exerted by antagonistic electrolytes on the electrical resistance and permeability of emulsion membranes.

(Preliminary note.)

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Artificial emulsion membranes suitable for electrical conductivity and permeability experiments may be prepared by interposing layers of filter paper saturated with an emulsion of oil in soap between supporting sections of rubber tubing in a glass U-tube of the type commonly employed for electrical conductivity determinations. A thicker layer or film of emulsion is generally preferable and may be prepared by introducing into the U-tube a section of rubber tubing of any desired length which is then filled with emulsion. Retaining layers of filter paper above and below