restricted conditions. One such condition is the reaction of the medium which in the presence of plant tissue may be made to vary over a much wider zone without retarding growth; another condition is oxygen tension which similarly seems to require for sensitive organisms much less accurate control in the presence of plant tissue than in its absence.

The exact nature of the substances contained in plant tissue upon which these properties depend is not yet determined, but the studies so far made suggest that they are related to the presence of certain oxidizing and reducing enzymes in fresh plant tissues as well as to the presence of so-called accessory food substances.

55 (1802)

The diffusion of sodium chloride through a "lecithin"-collodion membrane.

By HAROLD A. ABRAMSON and SAMUEL H. GRAY.

[*From the Department of Pathology, College of Physicians and Surgeons, Columbia University, New York City.*]

A study of the diffusion of sodium chloride through: (*a*) membranes prepared from collodion; and (*b*) membranes prepared from collodion which contained approximately four grams of commercial "lecithin from eggs" per hundred cubic centimeters, was made under the following conditions.

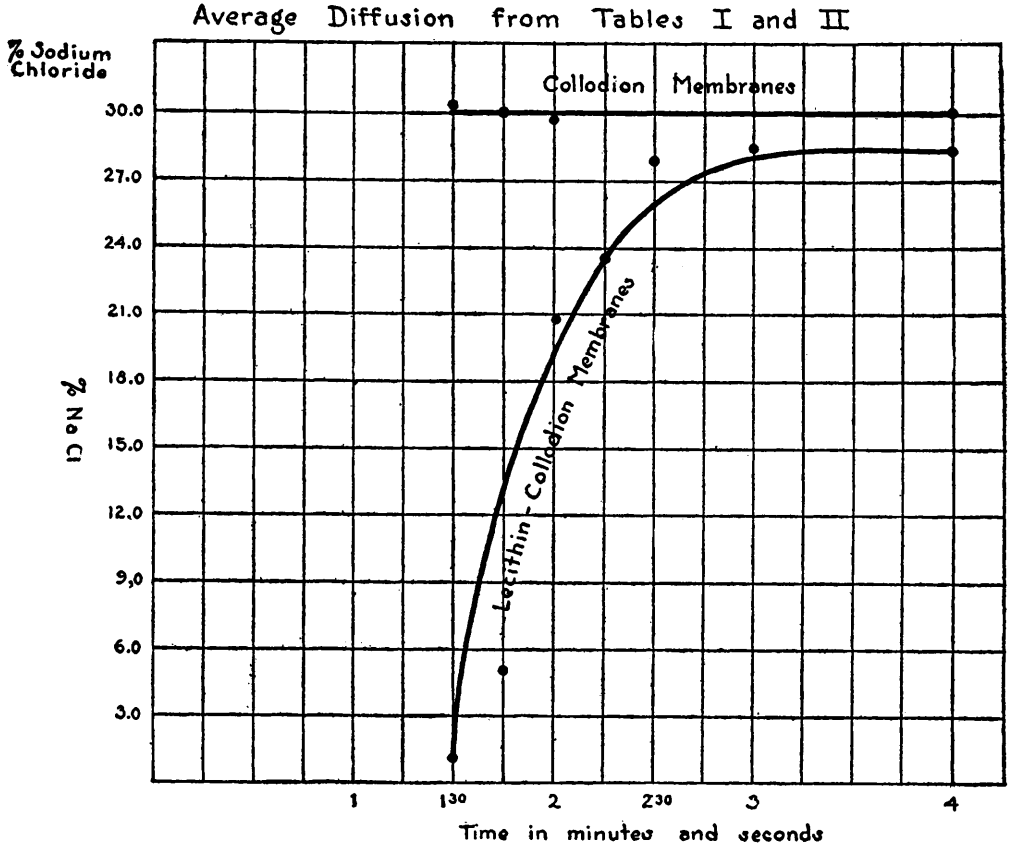
1. The collodion (Eimer and Amend's, U.S.P. IX) contained about four grams of guncotton per hundred cubic centimeters. The membranes, therefore, which contained "Lecithin" were approximately fifty per cent. lipoid by weight.

2. The membranes were made with as nearly uniform technique as possible. The viscousness of the collodion and of the lecithin-collodion solution was kept constant and the same. The volume of the membranes, which were shaped inside of Erlenmeyer flasks, varied between fifty and sixty cubic centimeters.

3. The only factor experimentally varied was the drying time which was terminated by fixation with tap-water.

4. In every determination of permeability, the membranes were filled with one fourth molar sodium chloride and immersed

in beakers containing three hundred and fifty cubic centimeters of water. At the end of twenty minutes they were withdrawn and a known volume of the outside fluid titrated for chloride.



The following tables enumerate the results of one set of a series of experiments. The drying time of one minute and thirty seconds was the lowest at which membranes which did not cloud could be prepared.

The least permeable fixed lecithin-collodion membranes were clear. Those of the later drying times were delicately opalescent. This opalescence was more marked when the drying time was increased beyond four minutes. A study of the tables shows that with the change from clearness to opalescence there was a corresponding change in the permeability of the membranes. The pure

TABLE I.

COLLODION MEMBRANES.

Percentage of Sodium Chloride Diffusion in Twenty Minutes.

Drying Time, (Minutes and Seconds).	1:30	1:45	2:00	4:00
Membrane No. 1.....	30%	30%	30%	29%
2.....	31%	30%	30%	30%
3.....	30%	29%	28%	28%

TABLE II.

"LECITHIN"-COLLODION MEMBRANES.

Percentage of Sodium Chloride Diffusion in Twenty Minutes.

Drying Time, (Minutes and Seconds).	1:30	1:45	2:00	2:15	2:30	3:00	4:00
Membrane No. 1.....	<2%	1%	25%	21%	30%	27%	28%
2.....	1%	6%	27%	11%	29%	30%	28%
3.....	<1%	<1%	24%	27%	28%	28%	29%
4.....	3%	12%	3%	28%	28%	28%	29%
5.....		8%			28%	28%	26%

collodion membranes were all clear and had a practically constant diffusion rate. This is suggestive of the possibility that the change in the size of the aggregates of lecithin molecules may have here influenced the rate of passage of the salt. Neither structure nor fat-droplets were visible under the oil-immersion of stained and unstained sections. In this connection it is interesting to note that membranes prepared with olive oil become definitely cloudy in less than one minute before fixation and this cloudiness persists after fixation. In these membranes definite oil droplets are visible under low power. Curiously enough both olive oil and lecithin-collodion membranes are clear after fixation when the drying time was extended over hours. The study of these membranes is incomplete.

CONCLUSIONS.

I. Changes in the drying time, to four minutes, of membranes prepared from collodion and fixed with water does not appreciably

alter their permeability to sodium chloride, whereas membranes prepared under the same conditions containing fifty per cent. of "Lecithin" by weight become relatively semi-permeable with decreasing drying times.

II. Changes in the sizes of the aggregates of the lecithin molecules is suggested as a possible influence on the permeability of the lecithin-collodion membranes.

56 (1803)

Notes on studies in the physiology of the gall bladder.

By LIONEL S. AUSTER and BURRILL B. CROHN.

[*From the Laboratory of Physiology, Cornell University Medical College, New York City.*]

In undertaking the following animal experiments on the nature of the expulsive action of the gall bladder, we had particularly in mind the investigation of the modus operandi of magnesium sulphate when applied to the papilla of Vater as suggested by Meltzer.

Laparotomy and duodenotomy was performed on several dogs anesthetized with chloretone. Observation of the gall bladder immediately after laparotomy showed a distended bladder in all except one animal. The flaccid bladder was seen in a fasting dog.

A solution of methylene blue was injected into the gall bladder to differentiate its content from the bile flowing from the liver. The duodenal mucosa in the region of and including the papilla of Vater was irrigated with magnesium sulphate solution; although an increased flow of bile was observed, no expulsion of the gall bladder content was noted. This observation was carried on for several hours in a series of eight dogs. The gall bladder retained its bile independent of whether the dog was in the fasting or the actively digesting state.

Stimulation of liver bile flow as obtained with magnesium sulphate was also observed after the application of sodium sulphate, sodium phosphate, peptone, *N*/10 hydrochloric acid, bile and sodium glycocholate. No stimulation was seen after the application of water, sodium chloride or sodium hydroxide.