but entirely from the extra protein which is destroyed, due to the presence of the toxic substance. We cannot state with any degree of certainty, what the character of the intermediary processes is, but that it is specific and peculiar seems very probable, for none of the extra N destroyed goes over into urea. It is all eliminated either as glycocoll or as undetermined N.

TABLE II.

Rabbit No. 6.

Date, 1911.	Period.	Weight.	Total N.	Urea N.	Per Cent. of Total N.	NH_3N.	Per Cent. of Total N.	Hippuric Acid N.	Per Cent. of Total N.	Benzoic Acid Fed.
March 12	I.	1.8	0.802	0.7024	87.6	0.232	2.89	—	—	—
March 13	II.	1.72	1.147	0.796	69.4	0.36	3.177	0.088	7.7	1.7
March 14	III.	1.60	0.913	0.782	85.67	0.166	1.82	—	—	—

Rabbit No. 7.

March 23	I.[1]	1.96	0.596	0.487	81.68	0.043	7.23	—	—	—
March 24	II.	1.71	1.369	0.9673	70.66	0.1127	8.23	0.082	6.0	1.7
March 25	III.	1.68	1.199	1.0898[2]						

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Experiments on the diffusibility of alkaloids through rubber.[3]

By **J. B. SIDBURY** and **WILLIAM J. GIES.**

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Rosenbloom and Gies have found that various ether-soluble substances, when dissolved in ether and placed in rubber bags immersed in ether, readily pass through the rubber membranes

[1] Period of about 12 hours.

[2] Urea + NH_3N = 90.9 per cent.

[3] This study is one of a projected series on *physico-chemical conditions in the cell*, which in turn constitutes a section of a comprehensive plan of research on the composition of protoplasm as well as the structural and dynamic relationships of cell constituents and products. These investigations are now in progress in the Laboratory of Biological Chemistry of Columbia University, at the College of Physicians and Surgeons, and under the auspices of the George Crocker Special Research Fund.

thus imposed.[1] We have found that various alkaloids and some related substances readily diffuse through rubber under such conditions.

Our experiments were conducted as follows: A moderate quantity of the pure ether-soluble substance was mixed with 15–25 c.c. of ether.[2] This mixture was poured through a funnel into a new air-tight rubber condom in such a way as to preclude the possibility of overflow upon the external surface. The bag was then immersed in about 50 c.c. of ether in a narrow salt-mouth bottle 7 inches high. With the bag suspended at full extension in this position, its mouth was about an inch above the opening in the bottle. The protruding condom was supported in the neck of the bottle by a tightly fitting cork stopper, which also served to keep the bag closed. After a diffusion period of convenient length (sometimes 2 to 5 days),[3] the condom was removed from the bottle, the ether diffusate was poured into a porcelain dish, and the ether completely removed by evaporation on a steam bath. At least one appropriate test was then applied to the residue.[4]

Meanwhile, the ether solution in the condom was removed. A large volume of water was then poured into the suspended bag, which, during its distention by the water, was carefully examined for signs of leakage. In a few instances defective membranes temporarily rendered the outcome doubtful. All results with such bags were ignored, of course. Each of the tests, even after reliable positive responses, was repeated at least once with a *new* rubber bag.

The substances named below (the complete list of those already tested in this connection) are readily diffusible under the conditions of these experiments:

A. Apomorphin, atropin, brucin, caffein, cocain, codein, colchicin, coniin, morphin, narcein, narcotin, nicotin, physostigmin, quinin, strychnin, veratrin.

[1] Rosenbloom and Gies, *Journal of Biological Chemistry*, 1911, ix; *Proceedings of the American Society of Biological Chemists*, p. xiv (December, 1910); also, PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE, 1911, viii, p. 71.

[2] Substances which did not dissolve readily were triturated with ether in a mortar.

[3] Some of the alkaloids pass through rubber almost immediately under the conditions of these experiments.

[4] In the experiments with nicotin, the "tobacco odor" of the concentrated liquids was very pronounced.

B. Acetanilid, antipyrin, phenacetin, picric acid, picrotoxin, pyramidon, salicylic acid.

Experiments with other solvents, and with additional substances of alkaloidal type, will be added to this series.

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Notes on Fischer's theory of the influence of acids in the production of edema.[1]

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Several years ago Gies published some of the results of a preliminary study of the effects of acids on tendon collagen.[2] Last December Kantor and Gies reported their observation that collagen fibers from tendon immediately swell markedly in *free* acid but do not swell at all in any strength of *combined* acid[3]—facts on which they base a new microscopic test for free acid. These results naturally led Kantor and Gies to consider the relation of such facts to Fischer's theory of edema, which they were investigating at the time these observations were made. Lately we have gone into this particular phase of the matter with some experiments on fibrin. Similar experiments are under way with other colloids and with various tissues.

Fischer's general conclusion in regard to edema is stated in the following terms:[4]

"A state of œdema is induced whenever, in the presence of an adequate supply of water, the affinity of the colloids of the tissues for water in increased above that which we are pleased to call normal. The accumulation of acids within the tissues,

[1] This study is one of a projected series on *proteins and their combining qualities.* which in turn constitutes a section of a comprehensive plan of research on the composition of protoplasm as well as the structural and dynamic relationships of cell constituents and products. These investigations are now in progress in the Laboratory of Biological Chemistry of Columbia University, at the College of Physicians and Surgeons, and under the auspices of the George Crocker Special Research Fund.

[2] Gies, *Science*, 1907, xxv, p. 462.

[3] Kantor and Gies, *Journal of Biological Chemistry*, 1911, ix; *Proceedings of the American Society of Biological Chemists*, p. xvii.

[4] Fischer, "Edema — a study of the physiology and the pathology of water absorption by the living organism," 1909, p. 99.