

200 c.c. of liquid passed through the upper orifice into a graduated cylinder which was supported underneath it to catch the overflow.

The authors are engaged in a study of various relationships that are suggested by the demonstrated phenomena.

43 (568)

A demonstration of the diffusion of pigments from fat through rubber into fat.

By **WILLIAM J. GIES.**

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The author has found that many fat-soluble pigments, such as Sudan III and Scarlet R, readily diffuse from solid and liquid fats through rubber into various solid and liquid media, among them both solid fat and oil. Thus, when Sudan III is dissolved in melted lard, the red liquid poured into a rubber bag, the bag supported in melted lard in a bottle, and the apparatus promptly immersed in ice water—the fatty matter will congeal before any sign of pigmentary diffusion occurs, but, in a few hours, a reddish tinge will develop outside of the bag, and on each successive day for several weeks further extension of the pigmented matter may be witnessed, until the whole of the external lard is deeply suffused with red. This process takes place quite rapidly when the lard and apparatus are kept in a thermostat at 40° C.

The demonstrations were intended to exhibit a few instances of such pigmentary diffusions as occur speedily enough at room temperature to yield positive results within an hour. The appended

	Contents of the Rubber Bag.		Nature of the Liquid in which the Bag was Suspended.	Result.
	Oil.	Pigment.		
1	Olive oil.	Scarlet R.	Olive oil	Visible diffusion of the pigment occurred promptly.
2	Cocoanut oil.	Scarlet R.	Cocoanut oil.	Visible diffusion of the pigment occurred promptly.
3	Lard oil.	Sudan III.	Lard oil.	Visible diffusion of the pigment occurred promptly.
4	Paraffin oil.	Sudan III.	Paraffin oil.	Visible diffusion of the pigment occurred promptly.
5	Olive oil.	Sudan III.	Ether.	Visible diffusion of the pigment occurred <i>almost immediately</i> .

summary indicates briefly the precise nature and results of the demonstrations (including two control tests—4 and 5), which were made with thin rubber bags in ordinary glass bottles.

The bags were securely supported in the bottles and the mixtures were shaken occasionally during the demonstration. The bags were found, after the adjournment of the meeting, to be without defects.

Numerous related experiments are now in progress.

42 (567)

Comparative dialysis experiments, with demonstrations.¹

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When dry bags of rubber, gold beaters' skin, parchment and collodion, each containing olive oil and Sudan III, are separately immersed in olive oil, and the remaining conditions of the environment are uniform, diffusion of the pigment promptly occurs through rubber, but does not take place at all through any of the other three membranes. When the bags are lifted from the oil, washed externally with ether, and then immersed in ether,² the pigment quickly passes through the rubber, but diffuses very slowly if at all through the remaining membranes.

Successive immersions of *moist* impermeable membranes (gold beaters' skin and parchment) in alcohol and ether, for different periods of time, fail to render the treated membranes more per-

¹This and the two preceding communications relate to studies in 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.

²In experiments which the senior author has been conducting with Dr. Welker's cooperation, it has been found that collodion bags are disintegrated by *ether containing more than about 1.5 per cent. of alcohol*. *Pure ether* does not dissolve or in any way disorganize collodion membranes. A collodion bag containing *pure* ether may be immersed for a week or more in *pure* ether without undergoing any appreciable deterioration.