TABLE II.
Effect of Arbutin (M/25) on Glycolysis Lactic Acid mg. %.

Time min.	Brain		Striated Muscle		Cardiac Muscle	
	Without	With	Without	With	Without	With
0	120		54		162	
30	422	160	257	101	342	250
90	430	246	373	143	372	146

In contrast with phlorhizin and arbutin, the results with salicin and amygdalin were inconclusive.

Since glycolysis may involve dehydrogenation at some point in the process, the effect of these drugs on the reduction time of methylene blue by rat kidney slices with and without glucose and sodium lactate was studied according to the Thunberg technique. All 4 drugs retard the reduction time with and without added substrate. The results are shown in Table III.

TABLE III.

Kidney slices	Without added substrate		With glucose		With lactate	
	A	B min.	A	B min.	A	B min.
Without drug	12	38	13	36	11	27
M/100 Phlorhizin	8	74	9	65	9	53
M/25 Arbutin	17	67	17	58	18	48
M/25 Salicin	12	75	13	58	12	45
M/25 Amygdalin	12	66	13	66	11	49

A—number of determinations.
B—average of the determinations listed in column A = average reduction time.

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Transformation of Bacterial Types.*

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In previous papers the isolation and description of numerous variant forms of *Micrococcus tetragenus* was reported.[1] It was at first believed that these interchangeable variants composed a complex system of bacterial variation different from the orderly one associated with other bacteria. A clue to the solution of the prob-

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[1] Reimann, H. A., *J. Bact.*, 1936, **31**, 385, 407.

lem was provided many months later by the detection of typical rough colonies among the pink colonies already studied. An orderly arrangement of most of the variants and a basis for comparison with other bacteria was then made possible.[2]

With the rough-pink form at hand, this form and the mucoid-pink and pink were grouped together as the usual M, S, and R culture-phases of a given bacterial type. On this basis it was predicted[2] that the yellow, white, pink, pink-yellow, and brown forms represented distinct types of *M. tetragenus* and that each possessed the respective culture-phases. In subsequent investigation involving the aging of 100 cc. broth cultures of the types at hand for months at room-temperature, most of the predicted forms missing from the scheme were detected, isolated, and studied, namely, the mucoid-pink-yellow, mucoid-brown, rough-yellow, rough-pink-yellow, and rough-brown forms. The rough form of the white type has not yet been obtained although several methods known to favor dissociation were employed. The white type under these manipulations changed either into mucoid or translucent form and yellow colonies occasionally appeared. The studies will be published in detail elsewhere. The variant forms of *M. tetragenus* isolated were arranged as follows:

Mucoid-yellow	Mucoid-white	Mucoid-pink	Mucoid-pink-yellow	Mucoid-brown
Smooth-yellow	Smooth-white	Smooth-pink	Smooth-pink-yellow	Smooth-brown
Rough-yellow		Rough-pink	Rough-pink-yellow	Rough-brown
		(G?) bacilli?		

It appears that *M. tetragenus* provides a unique opportunity for the study of type and culture-phase transformation. With most bacteria it would probably be difficult and laborious to determine type-transformation since colonies of different types are often indistinguishable morphologically; with *M. tetragenus* the types are marked by distinctive pigment which renders detection easy.

[2] Reimann, H. A., PROC. SOC. EXP. BIOL. AND MED., 1936, **34**, 344.