This experiment indicates that the use of the precipitin-test in identifying archæologic relics, while not absolutely hopeless, is not very promising.

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Variation of *Micrococcus tetragenus.*

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Numerous recent studies suggest that the phenomenon of microbic dissociation or dissociative variation is exceedingly complex and involves more than the M, S, R, and G phases so extensively studied during the past decade. Evidence at present indicates that in addition to these so-called phase-transformations, another form of variation exists which involves even greater biologic differences. In studies on a strain of *Micrococcus tetragenus* obtained from a patient I have encountered more than 13 different forms and have isolated and studied 10 of the fairly stable ones.[1] They were named according to pigment-production, colonial morphology and cell-morphology as follows: mucoid-yellow, yellow, mucoid-white, white, mucoid-pink, pink, pink-yellow, brown, translucent, and a bacillary form. There was evidence of frequent change from one form to another and each of the forms except the bacillary one was related to the other directly or indirectly by antigenic similarity. In attempting to correlate the 10 different forms with the M, S, R, and G forms of other bacteria, difficulty was encountered in the fact that 3 mucoid forms existed in the same presumed dissociative pattern. Furthermore no true R forms had been noted during 18 months of observation. The recent appearance of distinctly rough, dry, crinkled, and adherent pink colonies among smooth pink ones when an 8-month-old-broth-culture of the latter form was plated, suggested the possibility that at least 2 kinds of bacterial variation exist. The white, yellow, pink, pink-yellow, and brown forms may represent distinct variants or may even be regarded as antigenically specific types analogous to those existing, for example, among pneumococci, whereas the mucoid-white, mucoid-yellow, mucoid-pink, and rough-pink forms may represent cultural phases of the respective types. The place of the translucent

[1] Reimann, H. A., *J. Bact.*, April, 1936 (In press).

form and its occasional lytic colonies in the scheme has not yet been determined. Thus far I have isolated the usual set of dissociant forms M, S, and R of only the pink type. The bacillary form derived from the pink on numerous occasions may represent the G form. No reversion of the bacillary form to the pink coccic form occurred in the experiments but has been observed by others.[2] The following scheme represents the types (variant forms) and cultural phases of the types thus far isolated:

	TYPES.					
Culture phases						
M	Mucoid-yellow	Mucoid-white	Mucoid-pink			
S	Yellow	White	Pink	Pink-yellow	Brown	Translucent
R			Rough pink			?Translucent lytic colonies
G			?Bacillary form			

Search is at present underway to detect and isolate the M forms of the pink-yellow and brown types and the R forms of the yellow, white, pink-yellow, and brown types, if they exist.

Of further interest is the evidence of specific antigenic parallelism among strains obtained from various sources.[1] For example, the yellow, white, and pink forms of the strain under study were, among themselves, antigenically distinct, but each was similar to the corresponding forms of 2 of 10 other strains of *M. tetragenus*. This again suggests a type-specificity among strains of *M. tetragenus* akin to that existing among pneumococci, and lends indirect support to the theory of the interchangeability of types of other bacteria. It is well known that pneumococci can be changed from one type into another and that each type has cultural phases of M, S, and R forms.[3]

These findings in general conform in a remarkable way with the hypothesis of Hadley concerning different categories of variability which will be published in a forthcoming paper.[4]

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2 Schmidt-Kehl, L., *Arch. Hyg.*, 1930, **103**, 235.

3 Griffith, F., *J. Hyg.*, 1928, **27**, 113; Reimann, H. A., *J. Exp. Med.*, 1929, **49**, 237.

4 Personal communication to the author.