November 19, 1952

Dear Dr. Edwards:

I am writing again without having given you a chance to reply to my previous letter because of the occurrence of some very anomalous results in a recent transduction experiment, on which I need your help.

I have been studying the genetic behavior of your #157, "S. paratyphi B", monophasic, phase 2. In my hands this appears to be strictly monophasic, although we have not done very intensive selections as yet. The theory that has been developed from our previous studies isthat the determinants for phase 1 and phase 2 are related to two distinct loci, A_1 and A_2. Thus, the genetic notation for typhimurium would be: $A_1^{i}\ A_2^{12}$. This does not say very much except that in transduction experiments, phase-1 factors are mutually exclusive and phase-2 factors likewise. It is of course consistent with the distribution of group and specific antigens in the diagnostic scheme. #157 appeared to be anomalous, however, in that its 1,2 phase was transducible to monophasic-1 types such as S. typhi and monophasic S. paratyphi B FK# 248, thevresult being what appeared to be a replacement of d or b, resp., with --1,2. Other 1,2 phases, of diphasic types, do not behave this way.

In a further study of this situation, FA (abony enx phase) was transduced to #157, i.e., b:enx --X -:1,2 . I should not have been surprised to have replaced the 1,2 by enx, that is to have substituted A_2^{enx} for $A_2^{1,2}$, but the resulting stock appears to be rather the anomalous enx:1,2 ! This would be in line with the notion that #157 instead of being $A_1^{-}\ A_2^{12}$ is actually $A_1^{12}\ A_2^{-}$, i.e., that from a genetic point of view, its 1,2 complex is related to the specific phases of other organisms. How such a thing can have come about, I cannot imagine. I cannot go much further with this until the serology of the enx:1,2 is verified. I am enclosing cultures of the two phases, one obtained from the other by serum selection as SW-926 (enx) and SW-926 (1,2). In fact, the enx phase seems also to show a strong reaction with 1,2 despite the fact that it can be passed through 1,2 serum agar. The designations 1,2 and enx are based on reactions with the complex, unadsorbed sera and the inference as to their origin. It is obviously of some importance to verify whether "enx" means e, n, and x or whether its expression has been modified during the transduction from abony to 157.

Details on the origin of this strain 157 thus become more urgent. In addition, for a manuscript on O-H variation, I would appreciate whatever information you can provide on the history of 4937/50 —i.e., was it first isolated as an O form, or did it appear in the laboratory from a cultures already typed as typhimurium?

Has SW-664 been typed yet, as eh or enx,15?

Sincerely,

Joshua Lederberg