January 9, 1952

Mr. E. K. Borman
Department of Health
State of Connecticut
1179 Main Street
Hartford 1, Conn.

Dear Mr. Borman:

I was very pleased to hear from you; I remember very well indeed the cordiality and courtesy afforded me during my visit some years ago.

We have tried the experiment mentioned in your letter, without much success. It is possible that pullorum and gallinarum would need several genetic changes at once to restore motility; on the other hand transduction might not work in the same way with these particular types. However, since every other Salmonella in groups B or D that has been tested has worked reasonably well, I suspect the former possibility. Dr. Bruce Stocker spent a few weeks working with me last summer on transductions of motility to various O forms (from typhi, paratyphi B, paratyphi A, typhimurium, etc.) It appears that there are several factors all necessary for motility, and this would fit the first possible explanation of the failure with gallinarum. In general, only single factors can be transduced at once, so that we could not restore motility to a strain requiring several factors. Incidentally, we have thus developed a technique for "unmasking" the serotype of O forms. If you have any stable nonmotile variants, we would be glad to try to transduce motility to them if they are in group B or D, and can use them in future experiments if not. We are, however, in communication with Edwards at the National Center, and need not trouble you for strains that may already have been forwarded to him.

I can give only a speculative answer to your question about host-adaptation. It seems likely that this is determined by genetic factors which are quite distinct from the flagellar antigens, surely, and, in view of the overt equivalence of the somatic antigens of S. typhi and S. gallinarum, probably from the somatic antigens as well. Restoring or substituting the H antigen should make very little difference. C.C.Spicer and I are now working on the technically more difficult problem of transducing somatic antigens, and these results might lead to a more comprehensive answer. We have been thinking of this problem, but are not sure the present material is the most appropriate. We could compare Typhimurium, paratyphi B, and the "hybrid" paratyphi b —x typhimurium in mice, and may sometime do this.

We have studied your question on relationships to phage action. For FA effect it is not necessary that the recipient strain be lysed by the phage, only that the phage be adsorbed. Thus a bacterium that is already lysogenic for and resistant to a given phage will respond to preparations of the phage grown on another host, ~~xxxx~~ On the other hand, one can saturate the receptors of the bacteria at any time by adding an excess of one phage so that these cells will not adsorb, and suffer transduction from a second phage.

Sincerely, Joshua Lederberg