LETTERS TO THE EDITORS

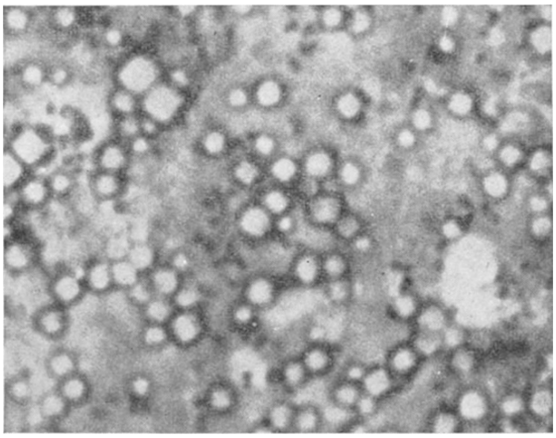
The Editors do not hold themselves responsible for opinions expressed by their correspondents. No notice is taken of anonymous communications

Transmission of Polyhedral Viruses between Different Insect Species

MOST workers with the polyhedral viruses affecting insects have regarded them as strictly species-specific and only transmissible to closely related species with great difficulty. Indeed, previously in such attempted cross-transmissions we have had little success although we have transmitted the polyhedral virus of the common clothes moth, *Tineola bisselliella*, to the case-bearing larva of another species of clothes moth, *T. pellionella*.

Most of the attempts to transmit polyhedral viruses from one insect species to another have been carried out between closely related or similar insects, on the assumption that transmission would be easier in these circumstances. We have, however, disregarded this assumption which, even with plant viruses, is not entirely justified, and have, instead, attempted transmission between the most distantly related lepidopterous larvæ we could find. This gave immediate success, and we have had positive transmissions to the larvæ of the small tortoiseshell butterfly (*Aglais urticæ*) and the peacock butterfly (*Vanessa io*) of no less than seven and five different viruses respectively. These include viruses from the larvæ of the currant moth (*Abraxas grossulariata*), the scarlet tiger (*Panaxia dominula*), the cream spot tiger (*Arctia villica*) and an American species of silk moth (*Telea polyphemus*). Similarly, we have infected the larvæ of the privet hawk moth (*Sphinx ligustri*) with viruses from *P. dominula*, *A. grossulariata* and the silk moth (*T. polyphemus*), and the larvæ of the cinnabar moth (*Callimorpha jacobææ*) with viruses from the larvæ of *P. dominula*, the muslin moth (*Cycnia mendica*), the privet hawk moth and the silk moth previously mentioned. Altogether we have carried out a total of thirty successful cross-transmissions of viruses between larvæ of very different types.

The importance of this discovery lies in the fact that it opens the way for fundamental investigation into the nature of the polyhedra-virus complex, the metabolic basis of polyhedroses and the relationshid between the virus and the type of polyhedral crystal formed. As regards this last point, in the experiments thus briefly outlined, we have found that in staining properties and morphology the polyhedra which develop in the new host are similar to, but not always identical with, those developing in the original host. In the accompanying illustration is shown a photograph of the polyhedral bodies produced in larvæ of the peacock butterfly by a virus of the scarlet tiger moth. Note that the rectangular shape characteristic of scarlet tiger polyhedra is still preserved. We do not think, however, that it is permissible to make a definite statement attributing the characteristics of the polyhedral crystal to either virus or host. For example, much seems to depend upon the age of the larva at the time of infection, and this in turn seems to be closely connected with yolk metabolism.



Polyhedra from a larva of the peacock butterfly produced by a virus from a larva of the scarlet tiger moth ; note the rectangular shape of the polyhedra

One of us (N. X.) has carried out independent experiments on this question, investigating predictions made on the lines of a theory on the development of insects and the metabolic basis of polyhedroses. Further experimental study of this theory is in progress, and the theory and observations will be published elsewhere.

In conclusion, we would state that these experiments on the cross-transmission of viruses do not invalidate the idea that latent viruses exist in lepidopterous larvæ as previously suggested[1], though they do throw a new light on the situation.

KENNETH M. SMITH
N. XEROS

Plant Virus Research Unit
(Agricultural Research Council),
Molteno Institute,
Cambridge.
July 31.

[1] Smith, Kenneth M., *Biol. Rev.*, **27**, 347 (1952).

Variation in *Vi*-Phage II of *Salmonella typhi*

THE recent description of phenotypic variation in bacteriophages by Luria[1] and Bertani[2] has prompted us to publish the results of experiments carried out in 1947 which show analogous features.

The object of the work was primarily to investigate the possibility of tracing a specific *Vi*-phage type of *Salmonella typhi* in which 'degraded' variants had arisen (see Craigie and Felix[3]). It was hoped also to gain more information about the mechanism of 'degradation' of cultures and the processes concerned in the adaptation of *Vi*-phage II of Craigie and Yen[4] to the specific *Vi*-types of *Salm. typhi*. Degradation in a specific *Vi*-type can take all forms from the appearance of minor cross-reactions with heterologous phages, typical of partly degraded strains, to the full susceptibility to all adapted phages which characterizes Type *A*.

Our experiments showed that it is not possible by the adaptation of *Vi*-phage II to a degraded variant to prepare phages bearing the specificity of the type from which the degraded variant has sprung. This was reported at the fifth International Congress for Microbiology in 1950[5].

Valuable information was obtained on the mechanism of adaptation of *Vi*-phage II to the various *Vi*-types of *Salm. typhi*, and it is this aspect of the work which is summarized here. A full account will be given by us later.