from *Aëdes aegypti* indicate that the poison does not deteriorate on standing for several months. Material tested after 8 months from the time of preparation is just as active as in the beginning. Furthermore the poison may be diluted with 5 volumes of 95% alcohol or ether, desiccated at room temperature over calcium chloride, redissolved in physiological saline, and still retain its full potency when tested by intradermal skin injection. The poison when shaken out several times in ether does not lose any of its strength. Exposure of the salivary gland poison in saline to the action of ultra violet light, at one foot distance, in quartz tubes, for a period of 20 minutes has no apparent effect. The saline extract of the salivary glands gives a negative biuret reaction, a negative Fehlings test but a definitely positive Molisch reaction. The chemical tests indicate the carbohydrate nature of the toxic substance and the skin reactions obtained (wheel, without pseudopods, surrounded by erythema) are quite similar to those obtained with carbohydrates isolated from certain microorganisms.

5001

Resistance of Hemolytic Staphylococci to Bacteriophage Lytic for Non-Hemolytic Staphylococcus Aureus.

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A very common infection in Porto Rico is caused by a hemolytic *Staphylococcus aureus.* These infections are exceedingly virulent as a rule and offer a serious problem in our clinics and hospitals. Pomales[1] has shown that this organism is present in the throat flora of about 19% of supposedly healthy individuals and in pathological cases it predominated in 24%. This organism proved to be the predominating microbe in the crypts and the interior of 65 pairs of tonsils removed at operation. Because of the severity of infections with this organism we have attempted treatment in a few cases with a bacteriophage which is lytic for a non-hemolytic *Staphylococcus aureus.* The administration of the bacteriophage has had no effect upon the course of the infection. The bacteriophage employed was

[1] Pomales, A., *Porto Rico J. Pub. Health and Trop. Med.*, 1929, v, 196.

supplied to us by Larkum,[2] who has reported the efficacious use of this lytic principle in clinical cases.

We have attempted to adapt the bacteriophage which is lytic for a non-hemolytic variety of *Staphylococcus aureus* to 7 strains of hemolytic staphylococci which have been isolated in Porto Rico. Repeated attempts to bring about this adaptation have been made during the past year without success. This is in agreement with the work of Epstein and Fejgin,[3] who have reported the resistance of hemolytic staphylococci to bacteriophage and it may be, as these authors suggest, that such resistance may have some bearing upon the high virulence of hemolytic staphylococci.

5002

Bacteria as "Carriers" of Bacteriophage.

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There has been a great deal of discussion in the literature regarding the production of bacteriophage from bacterial cultures. A classical example of this phenomenon is the *B. coli* of Lisbonne and Carrére[1] which is able to elaborate lytic principle for *B. dysentery Shiga.* This subject has been treated extensively by one of us (McKinley[2]) in another publication. More recently Muckenfuss[3] has studied these cultures supplied to him by us and he concludes that such organisms as *B. coli* Lisbonne may be made lysogenic by exposing the organisms to a bacteriophage and that the organisms so exposed then "carry" the lytic principle and antibodies are produced against the bacteriophage when the "phage infected" bacteria are used for immunization. However, this author states that failure of such antibodies to appear on immunization with bacteria does not necessarily indicate that bacteriophage is not present.

We have attempted to "contaminate" or "infect" a strain of *B. coli* with a bacteriophage lytic for *Staphylococcus aureus.* The organ-

[2] Larkum, N. W., *J. Infect. Dis.*, 1929, xlv, 34.

[3] Epstein, T., and Fejgin, B., *Compt. Rend. Soc. Biol.*, 1926, xcv, 908.

[1] Lisbonne and Carrére, *Compt. rend. Soc. de biol.*, 1922, lxxxvi, 569.

[2] McKinley, Earl B., *Philippine J. Science*, 1929, xxxix.

[3] Muckenfuss, Ralph, *J. Exp. Med.*, 1928, xlviii, 723.