The only conclusions we feel justified drawing from these *in vitro* serological tests is that the washed granular material contains calf protein in addition to the virus. This conclusion seems the more probable when one remembers that the "washed granules" are obtained by centrifugation of ground-up material which includes calf epidermis and lymph as well as vaccinia virus.

Therefore we regard the "top layer" or "washed granules" obtained from commercial calf vaccine by the method of Craciun and Oppenheimer[2] as advantageous material with which to start, but by no means as the final product, in the identification and purification of the virus.

The vaccines used were furnished us through the kindness of Dr. W. F. Elgin, of the H. K. Mulford Laboratories, and of Dr. T. M. Rivers.

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B. Pyocyaneus as a "Carrier" of B. Coli Bacteriophage.

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The phenomenon here reported was first observed in the course of an unsuccessful attempt to discover among a number of specimens of *B. coli* bacteriophage one that would be active upon *B. pyocyaneus*. Of 25 filtrates showing marked lysis of one or more strains of *B. coli* none could be demonstrated to have any lytic power for any of the 7 strains of *B. pyocyaneus* tested. The bacteriophage specimens were obtained from the following sources: sewage 4; urine 7; feces 15; pus 2; unknown source 1. The phages were tested on the pyocyaneus cultures both as fresh filtrates and after their lytic power for *B. coli* had been materially enhanced by repeated passage. Neither clearing of young broth cultures nor plaque formation could be demonstrated with any of the strains of *B. pyocyaneus*.

An attempt was then made with one bacteriophage specimen to bring about pyocyaneus lysis by serial passages upon cultures of the latter organism. A filtrate having marked lytic activity on several strains of *B. coli* was chosen for this test and its activity was brought to a maximum by a number of passages upon a strain of *B. coli*, S 1. This coli strain was isolated from a case of pyelitis, belonged to the slow lactose-fermenting group, gave gas on saccha-

rose and marked hemolysis on blood agar plates. One one-hundred-millionth (10^{-8}) cc. of the lytic filtrate produced complete lysis of a young broth culture in less than 18 hours and, spread upon agar, gave numerous plaques.

Three pyocyaneus strains were used in the test. These all gave the typical abundant growth on agar with the characteristic blue-green pigments and funnel shaped gelatin liquefaction. There was a striking difference in the fermentation reactions of the 3 strains. These are given in Table I.

TABLE I.

B. pyocaneus Strain	Source	Glucose	Mannite	Lactose	Saccharose	Maltose	Milk
193	Urine	—	—	—	—	—	Coag. without acid
194	Antrum	acid	—	acid	—	acid	Coag. acid
195	Blood Culture	—	—	—	—	—	Coag. without acid

The procedure in the tests was as follows: —0.5 cc. of the lytic filtrate was inoculated into a 4-6 hour culture of the pyocyaneus strain being tested and the latter placed in the incubator over night. The next day this culture was observed closely for lysis, comparison being made with a bacteriophage-free culture of the same age. It was then filtered through a sterile Chamberland candle and 0.5 cc. of the filtrate added to a fresh 4-6 hour culture of the same strain. This was repeated daily for periods of time varying for the different strains. At no time did any evidence of lysis appear in any of the broth cultures and repeated attempts to produce plaques with the filtrates uniformly failed.

At various stages in the experiments 0.5 cc. portions of filtrate were tested upon the *B. coli* strain S 1. In these tests the most striking results were shown by the filtrates of the strongly fermenting strain 194. Filtrates up to the fortieth serial passage gave complete lysis of *B. coli* S 1, and produced abundant plaques on agar plates. The amount of filtrate necessary to bring about these results, however, gradually increased. Filtrates beyond the fortieth failed to produce complete clearing of a broth culture of S 1 though plaques were readily demonstrated with filtrates up to and including the forty-ninth. Neither lysis of broth cultures nor plaques were demonstrable with the fiftieth filtrate. However, when a broth culture of S 1 was incubated with 0.5 cc. of the fiftieth pyocyaneus filtrate, the filtrate from this coli culture could be demonstrated to contain the phage in practically its original activity.

Strains 193 and 195 of *B. pyocyaneus* showed decidedly less efficiency in maintaining the original activity of the coli bacteriophage. With one of these strains (195) 12 serial passages brought about a total loss of the phage, though some activity could be demonstrated with the 11th filtrate. With strain 193 lytic activity for *B. coli* S 1 was demonstrated up to but not beyond the 20th passage.

A comparison was made of the 24th filtrate from *B. pyocyaneus* strain 194 and the original *B. coli* phage with respect to this activity toward strains of *B. coli* other than S 1. Of the 24 strains thus tested 20 gave identical results with the two filtrates. Of the other four 2 were definitely positive with the original phage and negative with the pyocyaneus filtrate, one was completely lysed by the original and only slightly by the pyocyaneus filtrate while one was definitely positive with the pyocyaneus filtrate and negative with the original phage.

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Repair in the Paranasal Sinuses of Man Following Removal of the Mucous Membrane Lining.

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Sufficient clinical evidence has accumulated in recent years to show that certain persistent infections in degenerated mucous membranes lining the paranasal sinuses require surgical removal. In the usual operative procedure in the antrum the diseased tissue is scraped out with a curette; or the entire membrane is removed in one piece by sub-periosteal dissection through an opening in the canine fossa (Dr. Kistner). Clinically it is observed that repair occurs with variable results. In some cases the new lining is thick and in others thin. The exact nature of the new tissue has never been determined.

In our investigations human material is employed, inasmuch as there is no available experimental animal with the surgical and pathological characteristics of sinusitis in man. At the reoperation the specimens are immediately mounted on thick paper supports and immersed in Zenker's fluid. The tissues are dehydrated in alcohol, cleared in cedar oil, imbedded in paraffin and stained with hematoxylin-eosin.