when inoculated upon the rabbit cornea and were immunologically identical. All the strains were productive of "Type A," intranuclear inclusion bodies within epithelial cells of the rabbit cornea (Table I). Cultures of the vaginal ulcers of each case, including attempts to isolate *Corynebacterium diphtheriae,* were not of significance. Dark-ground examinations of the scrapings from the lesions and repeated serological tests revealed no evidence of syphilis.

The neutralizing power of undiluted, acute and convalescent phase serums from each patient was determined against decimal dilutions of both the homologous virus and of the HF strain of herpes virus.[14] Each mixture of serum and virus was tested for neutralization in 3 mice, the test carried out with the acute phase serum serving as a control. A summary of the results is given in Table II. The neutralizing capacity of the serums was computed by subtracting the logarithm of LD_{50} of virus plus patient's serum from the logarithm of LD_{50} of virus plus normal rabbit serum. It is apparent that the results of investigation of the 3 cases fulfill the criteria for identification of a primary infection due to herpes virus, as set forth in the introduction to the present report. The similarity and clinically distinctive nature of the cases support this conclusion. It may also be seen in Table II that there is probably no significant difference in the degree to which convalescent serums of patients B.H. and F.E. neutralized both the homologous and HF viruses. However, as tested against convalescent serum of LH, the LH and HF strains appear to be significantly different. Further evidence bearing upon this dissimilarity is contained in an accompanying report.[15]

That herpes progenitalis is essentially a venereal disease[16-18] has attracted little attention in recent years. The husband of patient L.H. had an evanescent, penile sore a few days before his wife became ill. His serum, obtained during the early stages of his wife's illness and again several months later, displayed, on both occasions, a high titer of antibodies against the LH virus. This finding suggests that the husband's infection was of long standing and that conjugal transmission coincided with its recrudescence.

Summary. Primary, herpetic vulvovaginitis may be a clinically distinctive disease. Isolation of the virus from 3 cases and immunological data establishing the probable primary nature of the infection in each have been presented.

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Antigenic Dissimilarity between Strains of Herpes Simplex Virus.

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In the course of experiments with the virus of herpes simplex, several strains were compared by means of neutralization tests. A significant antigenic difference between some of the strains was demonstrated.

The antiserum used in all the neutralization tests included in the present report represented a pool of single bleedings of each of 2 rabbits, previously infected with one of the strains under consideration. These ani-

TABLE I.

Results of Neutralization Tests Comparing 3 Strains of Herpes Virus on the Basis of an Antiserum Against One of the Strains.

Strain of virus	Origin	Control: Normal rabbit serum, Dilution of virus* 10³	10⁴	10⁵	10⁶	Endpoint control (LD_{50})	Neutralization: Anti-FE immune rabbit serum, Dilution of virus* 10²	10³	10⁴	10⁵	Endpoint neutralization (LD_{50})	Quantity of virus neutralized by immune serum (LD_{50})
FE	Genital	17/20†	15/19	7/20	‡	10^4.5	6/20	2/20			≦10^2	≧ 300
HF	Labial			20/20	6/20	10^5.7	18/20	5/19	0/20		10^2.6	1250
LH	Genital		20/20	80/20	0/20	10^4.8		17/20	2/20	1/20	10^3.5	20

* Initial dilution of the virus before mixture with serum.
† Numerator = number of mice that died. Denominator = total number of mice inoculated.
‡ Blank space signifies that no test was done with corresponding dilution of the virus.

mals, which were inoculated upon the cornea with strain FE, developed typical keratoconjunctivitis. Encephalitis did not ensue. They were bled from the heart 32 days after inoculation and the serums were pooled. The animals were not hyperimmunized because of the possibility of decreasing the specificity of their serums.

Three strains of herpes virus were included in the study. The HF strain originally isolated from a human lip vesicle in 1922,[1] and maintained by brain-to-brain passage in mice was employed in its 213th passage. Strains FE and LH were recently isolated from primary herpetic lesions of the genitalia of 2 adult females.[2] Both of the latter strains were also passed serially by intracerebral inoculation of mice. The 19th intracerebral passage in mice of FE and the 20th of LH were used in the neutralization tests.

Neutralization tests were performed by mixing equal volumes of undiluted immune serum and decimal dilutions of the viruses. All tests, including controls, were done as a single experiment on a single day. Neutralization of each virus was controlled concomitantly by mixing normal rabbit serum (pooled serum of 3 rabbits) with appropriate dilutions of the viruses. After 90 minutes at room temperature and 30 minutes in the refrigerator, the mixtures of serum and virus were tested for neutralization by injecting 0.03 ml quantities intracerebrally in adult mice. The animals were inspected daily and deaths recorded over a period of 17 days.

The results of the neutralization tests compared with their controls are shown in Table I. The choice of dilutions of the viruses was based upon a preliminary "pilot-experiment" that yielded a similar result but in which the neutralizing capacity of the serum for decimal dilutions of the viruses was tested in only 3 mice. The quantity of the viruses neutralized was calculated by subtracting the logarithm of LD_{50} of virus plus antiserum from the logarithm of LD_{50} of virus plus

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[2] Slavin, H. B., and Gavett, E., PROC. SOC. EXP. BIOL. AND MED., 1946, **63**, 343.

normal serum. Failure to include a mixture containing 10^1 dilution of the FE virus plus antiserum prohibits an exact calculation of the endpoint (LD_{50}) of neutralization for this virus. It is highly likely that more than 300 LD_{50} of the homologous virus, FE, were neutralized by the antiserum. In any case, it is apparent that, in the presence of a monovalent antiserum (prepared against strain FE) the FE and HF strains display an antigenic similarity, whereas, in the presence of the same antiserum, the LH strain differs significantly from both of them.

Strains FE and LH were isolated from primary herpetic infections. Convalescent serum of patient FE neutralized the homologous virus and the HF strain to about an equal degree. On the other hand, convalescent serum of patient LH, although it neutralized the homologous virus, showed decidedly less neutralizing capacity against the HF strain.[2] In other words, immune serum of human origin reveals the same antigenic dissimilarity between strain LH and strain HF as does the rabbit antiserum used in the present experiment. In like manner, human antiserum reveals an antigenic similarity between strains FE and HF. These findings lend weight to a supposition that, as judged by the method of comparison used in the present study, the antigenic constitution of strains FE and LH has not been greatly altered by artificial passage in laboratory animals. It remains to compare the strains by means of antiserums prepared against each of them.

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Allergic Sensitization to Penicillin: Experimental Results.

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Hypersensitivity reactions to penicillin have occurred frequently in patients treated with this antibiotic and also have been produced in healthy men and animals. Some have been attributed to impurities in the penicillin, and some to penicillin itself, although there is a paucity of reports on the pure crystalline preparation. This paper reports the successful production of allergic sensitization, particularly the Arthus phenomenon in rabbits, by the use of crystalline sodium penicillin G and of commercial calcium penicillin.

Previous reports have described clinical sensitization of several types. The most common have been urticaria, angioneurotic edema, vesicular, bullous or papular eruptions, contact dermatitis, the Arthus type of reaction, and a condition resembling serum sickness.[1-3] Reactions have been most frequent after topical application of the drug,[4-8] but have also occurred after parenteral administration following initial topical use,[9] and after parenteral administration only.[10,11] In some cases the symptoms appeared after the initial exposure, and in others at later intervals. Among the more comprehensive studies have been those of Keefer,[12] who

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