administration of pharmacopeal and clinical doses of a drug. The observance of drug effects was continued for approximately an hour and a half. The effects of recorded activity were also visually observed with regard to expulsion of fecal contents from the visible anus thereby allowing intestinal activity to be classified as being propulsive or non-propulsive in nature.

Morphine sulphate was given intramuscularly in ⅛ grain doses and continuous tracings were taken in the manner described. There were 10 separate administrations of morphine.

The number of peristaltic waves (propulsive activity) and mixing waves (non-propulsive activity) during the preinjection period serves as a satisfactory basis for comparison of pharmacodynamic effects on intestinal muscle.

A complete suppression of the peristaltic wave with an increase in the frequency of the mixing wave followed ⅛ grain of morphine in all trials. The effects first appear 2 to 4 minutes after administration. Circular and longitudinal muscle tone was increased in half the trials. ¼ grain of morphine decreased the frequency and amplitude of contraction of the mixing wave, and increased the tone of both muscle coats in all experiments. Depression of propulsive and non-propulsive activity was still more complete when a total of ⅜ grain of morphine had been given. Increases in tone did not progress beyond that following ⅛ or ¼ grain of morphine.

9842 P

Persistence of Sylvatic Plague.

K. F. MEYER AND B. EDDIE.

From George Williams Hooper Foundation, University of California, and the California State Department of Public Health, San Francisco.

In June, 1916, sylvatic plague was first demonstrated in San Mateo County by gross anatomical examinations of squirrels *(Citellus beecheyi)*. During the next 4 years infected rodents were again discovered by dissection. Between 1921 and 1931 no surveys were conducted. In 1932 to 1935 annually, a few hundred squirrels and rats were shot and autopsied; no gross anatomical lesions suggestive of plague were observed. During August and September of 1936, a total of 863 beecheyi squirrels were again examined with negative results. The fleas, which had been killed with chloroform, were re-

moved from the animals and collected in physiological salt solution. A total of 18,729 fleas were thus assembled in 355 pools, which were stored at 3°C. for approximately 10 to 11 months since suitable facilities to examine them were not available. In 1937 the insects collected from the squirrels of the same area were pooled in 155 lots, carefully washed with salt solution, ground in a mortar and then injected subcutaneously into guinea pigs. Of the 155 pools so tested 6 produced fatal plague infections within 6 to 8 days. Two of the locations in the County where infected fleas were found in 1936 were recognized as the same colony or series of burrows proven to harbor diseased squirrels in the summer of 1916.

These and similar observations indicate that sylvatic plague persists probably indefinitely in an area once invaded and that the gross anatomical examinations fail to detect rodent infections. Squirrels, just as rats, may harbor *P. pestis* without visible lesions. The biology of these latent infections is the subject of further investigations. Although the viability of *P. pestis* in stock cultures for many years is well known, the fact that the bacteria remained alive in the dead fleas soiled with a variety of microörganisms *(B. coli, B. proteus,* Cocci, etc.) held at ice box temperature is indeed noteworthy.

9843 P

Antiviral Substances to the Virus of Encephalitis (St. Louis Type) in Serums Collected in California.

B. F. HOWITT. (Introduced by K. F. Meyer.)

From the George Williams Hooper Foundation, University of California Medical Center, San Francisco, and the California State Department of Health.

During the summer of 1937 reports were obtained of an outbreak of acute encephalitis in the San Joaquin Valley region in California. A number of fatal cases were recorded and while brain material was received from 3 of these, no virus was recovered. Monkeys and mice were inoculated but all remained negative, even after repeated serial passages in the mice. Nasopharyngeal washings were also taken from 6 patients still hospitalized but no virus was recovered. Since the histopathology of the human material was typical of an acute encephalitis, serum was obtained through the courtesy of the Health Departments of both Fresno and Tulare