tivity of low voltage, with some 10 cycle waves. The potentials recorded between the sphenoidal electrodes and the scalp electrodes corresponded to those secured from the corresponding scalp electrode and ground. Thus there were no waves felt to be characteristic of the sphenoidal leads.

Records were secured from 12 patients with Parkinsonism. Of these, 6 were incidental to cerebral arteriosclerosis and 6 were post-encephalitic. Nine showed gross tremor, bilateral in all cases. Of these patients with tremor, 5 showed no evidence of slow activity on the EEG, either from the sphenoidal or the scalp leads. The remaining 4 showed slow activity, all of them from the sphenoidal leads, and 3 from one or more scalp leads as well. Fig. 1 shows the 4 cycle activity recorded from the sphenoidal and frontal leads in one of these patients, and its disappearance on opening the eyes, indicating that it was due to eye movement incidental to the tremor. Fig. 2 shows 4 cycle activity in another patient from the sphenoidal and occipital leads, and its disappearance when the patient's hands were restrained.

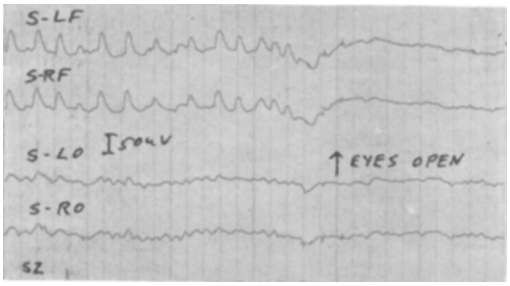


FIG. 1.
Disappearance of 4 cycle activity on opening the eyes in a patient with Parkinsonism. The electrode placement is S-LF, sphenoidal to left frontal; S-RF, sphenoidal to right frontal; S-LO, sphenoidal to left occipital; S-RO, sphenoidal to right occipital.

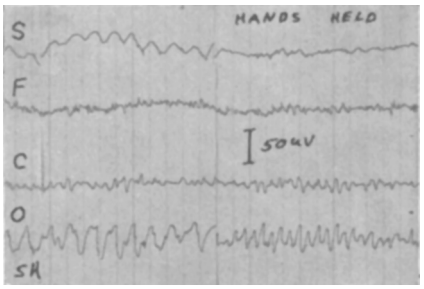


FIG. 2.
Disappearance of 4 cycle rhythm on mechanical restraint of the hands in a patient with Parkinsonism. The electrode placement is S, sphenoidal; F, frontal; C, central, and O, occipital, all bipolar.

In the one patient who showed slow activity from the sphenoidal leads but not from the scalp leads it is a little more difficult to dismiss the slow rhythm as artifact, but since it too was suppressed by mechanical restraint it seems reasonable to ascribe it to head movement.

In none of the 3 patients who had no gross tremor was any slow activity demonstrated from either the sphenoidal or scalp leads.

*Summary.* Patients with Parkinsonism do not show slow activity in the EEG, using either sphenoidal or scalp electrodes, except that incidental to movement artifact.

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## Blood Level of Sodium l-Methyl Butyl Barbituric Acid and Duration of Anesthesia in Rabbits. (17343)

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Since the report of Koppanyi, *et al.*,[1] on the barbiturate-cobalt reaction extensive investigations of the metabolic fate of the barbiturates have taken place. The recent development of an ultraviolet spectrophotometric method utilizing small samples of blood has

[1] Koppanyi, T., Murphy, W. S., and Krop, S., PROC. SOC. EXP. BIOL. AND MED., 1933, **30**, 542.

TABLE I.
Blood Level (mg/%) at Time of Awakening as Influenced by Dose and Route of Administration.

| Intravenous, 30 mg/kg | Intramuscular, 35 mg/kg | Intraperitoneal, 35 mg/kg | Subcutaneous, 35 mg/kg | Oral, 50 mg/kg |
|---|---|---|---|---|
| 1.2 | 1.4 | 1.2 | 0.9 | 1.1 |
| 1.1 | 1.2 | 1.2 | 1.6 | 1.0 |
| 1.4 | 1.1 | 0.9 | 1.4 | 1.1 |
| 1.4 | 1.7 | 1.2 | 1.0 | 1.1 |
| 1.1 | 1.1 | 1.1 | 1.6 | 1.1 |
| 1.0 | 1.0 | 1.4 | 1.4 | 1.7 |
| *1.20 | 1.25 | 1.17 | 1.32 | 1.12 |
| † .17 | .16 | .30 | .30 | .26 |

* Mean.
† Standard deviation.

made feasible the reinvestigation of the variations in the blood level of the barbiturate during anesthesia. This report describes the relationship found between the blood level of the barbiturate and the duration of anesthesia.

The sodium salt of l-methyl butyl barbituric acid was used throughout the study. Female albino rabbits weighing about 2 kg were given a single dose of the drug after having been allowed only water for the 12 to 18 hours preceding injection. Blood samples of 5 cc were obtained by cardiac tap and analyzed by the ultraviolet spectrophotometric method of Goldbaum.[2] Each figure in Table I represents the average of a duplicate analysis. The "awakening time" was taken the instant the animal spontaneously assumes the prone position.

A group of 19 animals was given a dose of 35 mg/kg of sodium pentobarbital intravenously. The injections were made in the marginal vein at the rate of 1 cc (20 mg pentobarbital/cc) per minute. Following the injection the animals were placed in the supine position. Blood samples were withdrawn both at 10 minutes and upon spontaneous righting.

Despite careful attention to the technic of injection there was a wide variation in the level of the drug found in the circulating blood ten minutes after injection. A mean of 3.21 $\pm$ 0.22 mg % with a range of from 2.3 to 3.9 mg % was found. In contrast, the level on awakening was constant exhibiting a mean of 1.16 $\pm$ 0.04 mg %. The blood level at the time of awakening was found to be unrelated to the duration of anesthesia. Thus, the shortest time recorded, 45 minutes, was found in an animal with a level on awakening of 1.2 mg %; whereas the animal which slept longest, 225 minutes, had an awakening level of 1.0 mg %. Upon statistical evaluation the correlation coefficient between duration of anesthesia and awakening blood level is found to be $r = -0.181$, indicating no dependence. Neither could a relation between the total sleeping time and the concentration of drug in the blood at 10 minutes be established. Although those animals which slept over 200 minutes had 10 minute levels of 3.3 mg % and greater, the correlation coefficient $r = 0.316$ indicates that no dependent relationship exists.

The effect of route of administration upon the awakening blood level was also investigated. Each of 6 rabbits received 35 mg/kg in the thigh muscle, 6 received 35 mg/kg intraperitoneally, 6 received 35 mg/kg subcutaneously in the flank, and 6 were given 50 mg per kilogram by stomach tube. In addition, 6 rabbits received 30 mg/kg in the marginal ear vein in order to determine the effect of a lower dosage level. The animals were placed on their backs when anesthetized and blood samples were taken as soon as they had righted themselves. The results are shown in Table I.

It will be seen that there was little variation between routes. The mean was found to be about 1.2 mg % for all routes with standard deviations of about 0.2 mg %. Evaluation of the differences between routes by means of the analysis of variance reveals the differences to be of no significance ($F = 0.38$).

[2] Goldbaum, L., *J. Pharm. and Exp. Therap.*, 1948, **94**, 68.

*Summary.* 1. The correlation between the blood level of sodium pentobarbital and the duration of anesthesia in rabbits was investigated.

2. The awakening level was found to be quite constant at about 1.2 mg %, and was uninfluenced by route of administration or dose of the drug in the range tested.

3. No relation could be demonstrated between duration of anesthesia and the barbiturate blood level 10 minutes after injection, or with awakening blood level.

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## A Method of Preparing Collodion Particles for Serologic Agglutination.* (17344)

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The agglutination of collodion particles as a method of demonstrating union between antigen and antibody has been utilized by several investigators as a highly sensitive serologic technic.[1-3] However, difficulty in producing uniformly active pellets and the frequency of non-specific reactions have limited its general use. Cavelti[4] recently reviewed these points and suggested certain modifications of earlier methods to avoid their inherent difficulties. In the course of attempts made in this laboratory during the past two years to devise a serologic test for viral hepatitis, the use of the collodion particle agglutination technic was explored. A simple method of preparing collodion particles which give consistently reproducible results was devised. It is the object of this paper to describe this method.

*Preparation of collodion particles.* The general method of Loeb[5] modified by Cannon and Marshall[6] was used with certain alterations. All glassware used was sterile.

*Stock solution.* One and one-half pounds of collodion, U.S.P. Merck (non-flexible) is poured slowly into 2 liters of singly distilled water contained in a 4 liter glass beaker. The water is stirred constantly with a glass rod while the collodion is being added, and a mass of collodion separates. The water is decanted and the mass is then washed three times with distilled water, and is finally pressed by hand between several layers of bibulous paper to remove excess water. The mass of collodion is further dried in an incubator at a temperature of 37°C for 24 hours or until the odor of ether is no longer detectable. During the period of drying, the mass is broken up into smaller pieces to allow exposure of more surface. When dry, the mass of collodion is weighed, and a 5% solution in acetone is prepared in a water bath at a temperature of 37°C. Stirring with a glass rod expedites the solution. This stock solution is stored in the ice-box at 4° to 6°C.

*Suspension of pellets.* 150 ml of stock solution is poured into the glass container of a Waring Blendor. The base of the Blendor is wrapped with a damp towel, and another damp towel is draped over the open top of the glass container to avoid splashing. The apparatus is set before an open window in such a way that escaping fumes of acetone may be readily dispersed by currents of air. A glass funnel with the stem pulled to a fine capillary tip is placed on a ring stand so that the tip is approximately 2 cm below the top

* These investigations were conducted, in part, with the aid of the Commission on Virus and Rickettsial Diseases, Armed Forces Epidemiological Board, Office of the Surgeon General, U. S. Army, Washington, D.C.

1 Goodner, K., *Science*, 1941, **94**, 241.

2 Saslaw, S., and Campbell, C. C., PROC. SOC. EXP. BIOL. AND MED., 1948, **68**, 559.

3 Lange, K., Gold, M. M. A., Weiner, D., and Simon, V., *J. Clin. Invest.*, 1949, **28**, 50.

4 Cavelti, P. A., *J. Immunol.*, 1947, **57**, 141.

5 Loeb, J., *J. Gen. Physiol.*, 1922, **5**, 109.

6 Cannon, P. R., and Marshall, C. E., *J. Immunol.*, 1940, **38**, 365.