nent clearing of the blood stream of trypanosomes during the follow up period, and death occurred on the average in the treated group as quickly as in the untreated controls. No treated animal survived longer than 6 weeks after it became infected.

Summary. Atoxyl (in 60 to 200 mg. per kilo), acetarsone (in 200 to 300 mg. per kilo), and carbarsone (in 150, 250, and 300 mg. per kilo) were given orally without significant effect to guinea pigs experimentally infected with *T. hippicum.*

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Comparative Protective Efficiency of Some Barbitals Against the Symptoms of Anaphylactic Shock.

SAMUEL H. HURWITZ AND ARTHUR L. WESSELS.

From the Departments of Medicine and Pharmacology, Stanford University School of Medicine.

It is well known that certain depressants of the central nervous system are effective in preventing fatal anaphylactic shock. Many of them, however, would not be as good protective agents against the symptoms of shock in sensitized individuals as would certain hypnotics. We have, therefore tried out the efficiency of some of the barbitals for this purpose. Three representative members of this group were selected for study: amytal, phenobarbital, and barbital. The experimental evidence here recorded supports the conclusion that phenobarbital alone possesses a highly protective efficiency against the symptoms of anaphylactic shock.

Experiments were carried out on 61 animals divided as follows: 14 controls, 10 injected with amytal, 14 with barbital, and 23 with phenobarbital. Guinea pigs weighing 250 to 300 gm. were sensitized by the intraperitoneal injection of 1 cc. horse serum. After an incubation period of 2 to 3 weeks, an intracardiac injection of a second dose of serum usually produced typical anaphylactic shock with rigid distention of the lungs in about 86% of the controls. These control observations as well as those recorded in previous communications,[1, 2] have satisfied us that the intraperitoneal route

[1] Hurwitz, S. H., and Nicholls, E. G., PROC. SOC. EXP. BIOL. AND MED., 1930, **28**, 139.

[2] Hurwitz, S. H., and Wessels, A. L., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 120.

for sensitization and the intracardiac route for shock injections give a high percentage of positive results.

The sodium salts of the barbitals were administered intramuscularly: amytal from 50 to 70 mg., barbital 80 to 200 mg., and phenobarbital 40 mg., per kilo of body weight. These doses were found to be nonfatal and definitely depressant for guinea pigs, though very large compared to single therapeutic doses in man. The effects produced corresponded to the ordinary hypnotic action of the drugs with more marked depression and some anesthetic effect in animals given daily injections of amytal and the larger doses of barbital. In only a few instances was the drug effect sufficient to mask the symptoms of anaphylactic shock. About 20 minutes was allowed for the preliminary injection of the barbitals before giving the intracardiac injection of the second dose of serum.

Results. 90% of the guinea pigs given injections of amytal showed the typical signs of anaphylactic shock and died in about 5 minutes. Those animals given daily cumulative doses of amytal for a week showed no more resistance to shock than those which received the single doses. Of the 14 animals receiving barbital, 77% died in typical anaphylactic shock; whereas only 5 of 23 animals given phenobarbital, or 22%, succumbed. That the survivors passed through mild shock and were therefore sensitized was shown by the presence of some of the typical symptoms: restlessness, convulsions, dyspnea and rubbing of the nose. Compared with a control mortality of 86%, a reduction of the mortality to 22%, or approximately one-fourth, by the administration of phenobarbital is impressive.

In man, our experience with phenobarbital in anaphylactic conditions has been limited to a small number of patients with allergic and intractable asthmas. In them, the oral administration of phenobarbital in therapeutic doses has been found to prolong the relief from the symptoms of bronchospasm obtained by epinephrine or ephedrine. A combination of ephedrine and phenobarbital has been found particularly useful in the intractable asthmatic who reacts unfavorably to ephedrine products.