be due to their filtration by the viscera, particularly the lungs, as suggested by Fülleborn.[8]

It is apparent that, in the case of the dog heartworm-infection, periodicity cannot be explained on the basis of cyclical parturition and daily destruction of the larvae.

7433 P

Observations upon the Complement Titre in Experimental Leukopenia and Leucocytosis.*

HERBERT J. SCHATTENBERG AND WILLIAM H. HARRIS.

From the Department of Pathology, School of Medicine, Tulane University.

In connection with the causation of the Schultz syndrome or so-called agranulocytic angina, allergy has been considered as a factor.[1, 2] In observations upon allergy Deutsch and Weiss[3] have shown that the complement titre was markedly lowered and in anaphylactic shock, apparently absent.

During certain studies upon the production of granulocytopenic leucopenia with bacterial toxins[4, 5] we considered that it would be of interest to make observations upon the complement content of animals in which these cells had been depressed. As another factor in the production of granulocytopenic leucopenia we added the use of benzene inoculations. In addition to the animals wherein the leucocytes were depressed, others were employed in which experimental leucocytosis had been provoked.

In the present experiments 36 guinea pigs and 18 rabbits were employed. The complement titre of all rabbits used was found to be approximately 1/10 the strength of that of the guinea pigs. Seventeen guinea pigs in which granulocytopenic leukopenia was produced with *in vivo* prepared toxic filtrates of *B. enteritidis* and *B. typhosus* were bled from the heart. Eight rabbits were injected

* Aided by a grant from the David Trautman Schwartz Research Fund of Tulane University.

1 Pepper, O. H. P., *Calif. and Western Med.*, 1931, **35**, 173.

2 Editorial, *J. Am. Med. Assn.*, 1933, **101**, 368.

3 Deutsch, F., and Weiss, E., *Med. Klin.*, Berlin, 1933, **29**, 1402.

4 Harris, W. H., and Schattenberg, H. J., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 843.

5 Schattenberg, H. J., and Harris, W. H., PROC. SOC. EXP. BIOL. AND MED., 1934, **31**, 847.

with benzene in olive oil over a period of 7 to 9 days with the production of leukopenia after which blood was withdrawn from the heart. The leukopenia could be more consistently produced in the guinea pig than in the rabbit.

In the production of experimental leucocytosis as previously found by us,[6] antigens of staphylococcus, milk, and *B. typhosus* injected intravenously in rabbits provoked the higher leucocytic responses of the group employed. In the present work, therefore, 15 guinea pigs and 5 rabbits were injected with sterile milk or suspensions of killed *Staphylococcus aureus*. The rabbits injected intravenously yielded a more constant and higher leucocytosis than the guinea pig.

In both the leucopenia and the leucocytosis the depression or increment of these cells were maintained for at least several days in order that the effect, if any, upon the complement may be more definite.

The sheep cell hemolytic series was employed in the titrations. using 0.5 cc. of a 2% suspension of washed sheep cells. The hemolytic unit was first determined with the complement of control animals and the sera of the experimental animals paralleled with

TABLE I.
Complement Titration.

Animal	Count	Amount of Diluted Complement .1 cc.	.2 cc.	.3 cc.	.4 cc.	.5 cc.	.6 cc.	.7 cc.	.8 cc.
Leucopenia—									
G.P. No. 14	3,400	**	*	†	—	—	—	—	—
G.P. No. 15	3,200	**	†	†	—	—	—	—	—
G.P. No. 17	3,000	***	**	*	†	†	—	—	—
Rabbit No. 24	3,400	**	—	—	—	—	—	—	—
Rabbit No. 25	2,800	****	*	†	—	—	—	—	—
Leucocytosis—									
G.P. No. 16	14,200	****	****	***	**	†	†	—	—
G.P. No. 18	16,800	***	**	†	†	—	—	—	—
G.P. No. 21	16,000	****	*	†	—	—	—	—	—
Rabbit No. 26	27,200	****	***	*	—	—	—	—	—
Rabbit No. 27	41,600	****	**	†	—	—	—	—	—
Controls—									
G.P. No. 1	9,800	***	†	—	—	—	—	—	—
G.P. No. 2	8,200	****	***	†	—	—	—	—	—
G.P. No. 3	7,800	****	***	*	†	—	—	—	—
R. Blood^x	8,800	****	**	†	—	—	—	—	—

**** = No hemolysis.
*** = ¼ ''
** = ½ ''
* = ¾ ''
† = Almost complete hemolysis.
— = Complete hemolysis.

Guinea pig complement 1-100.
Rabbit complement 1-10.
R. Blood^x = Average count and pooled sera of 6 rabbits.
G.P. Guinea pig.

[6] Harris, W. H., and Schattenberg, H. J., PROC. SOC. EXP. BIOL. AND MED., 1931, **29**, 265.

this unit as a guide. Because of the known variation of the normal complement curve, all series of animals including controls were bled and tested at the same time. The time of titration of the different series, after withdrawal of blood, varied from 4 to 18 hours.

Table I demonstrates the results obtained for representative animals of the different series and controls. In general it may be stated that no marked or clear cut difference in the complement content is manifested in animals showing leukopenia or leucocytosis as compared to the controls. Upon closer analysis there is an indication that leukopenic animals have a slightly higher complement titre than either the normal animals or those showing leucocytosis. In certain of the animals wherein benzene injections had been employed, the complement titre was high even just prior to death. The complement content of the sera of the animals with leucocytosis was quite similar to that of the controls.

While complement may be reduced or absent in allergy and this latter factor may play a rôle in the causation of the Schultz syndrome, our preliminary results do not show any reduction of the alexin of the sera of animals in which experimental leukopenia was produced.

7434 P

Barbiturate-Strychnine Antagonism in the Spinal Cat.

W. T. DAWSON AND E. L. PORTER.

From the Departments of Pharmacology and Physiology, University of Texas School of Medicine.

Barbiturates are generally thought to act chiefly on the brain,[1] strychnine to exert its convulsant effects by an action on the cord.[2] If this were an absolute difference between the two, it would be difficult to see how the barbiturates could act as effective antagonists to strychnine, as numerous observers[3] have shown.

To test whether this antagonism does exist in the cord, the writers have made use of 9 spinal (decapitate) cats, prepared by the Sher-

[1] Sollman, T., Manual of Pharmacology, 4th Ed., 1932.

[2] Dusser de Barenne, J. G., *Physiol. Rev.*, 1933, **13**, 325.

[3] Zerfas, L. G., and McCallum, J. T. C., *Curr. Res. Anesth. and Analg.*, 1929, **8**, 349. Dawson, W. T., and Taft, C. H., Jr., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 917. Llopis Llorente, R., *Cron. Med. Valencia*, 1932, **36**, 58. Swanson, E. E., *J. Lab. and Clin. Med.*, 1932, **17**, 325. Haggard, H. W., and Greenberg,