

which resembled those shown by Woodruff and Erdmann¹ to be associated with endomixis in *Paramecium caudatum* were also observed. Endomixis, however, if such occurs in the free living state of *Didinium*, could not be carried out in this race during the rhythmical periods owing to the lack of a definitive micronucleus.

The amiconucleate state without doubt arose from some irregularity during conjugation. Prandtl² in his study of the cytology of conjugation in *Didinium* found individuals in which all the micronuclei had become transformed into macronuclei, but he thought animals so endowed were incapable of living. The present study shows that they are viable but unable to undergo processes such as encystment, conjugation, and endomixis which are dependent largely upon micronuclear activity.

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Calcium in the blood.

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One year ago we read a paper before this society on the "Calcium in the Blood of Patients with Furunculosis and Acne." We were aware that we obtained very large amounts of calcium in the blood of some of the patients, but were unable to detect our error. At that time we used the gravimetric method and with it were unable to detect any calcium in the filter paper used, although we made six attempts. This year, after perfecting ourselves in the titration method for calcium determination, as given by Halversan and Bergeim,³ we found that some of the filter paper we had been using contained considerable amounts of calcium. We then decided to abandon the gravimetric method and have used the titration method in obtaining the results given here.

¹ Woodruff, L. L., and Erdmann, R., "A Normal Periodic Reorganization Process without Cell Fusion in *Paramecium*," *Jour. Exp. Zool.*, 1914, xvii, 425-518.

² Prandtl, H., "Die Konjugation von *Didinium nasutum*," *Arch. f. Protistenkunde*, 1906, vii, 229-258.

³ Halversan, J. O., and Bergeim, O., *Jour. Biol. Chem.*, 1917, xxxii, 159-170.

We have made nearly one hundred determinations of the amount of calcium in human blood in the following conditions:

Acne.....	23	Nephritis.....	3
Diabetes.....	40	Normal.....	7
Furunculosis.....	9	Pneumonia.....	3
Miscellaneous.....	8	Tuberculosis (cured).....	1

The figures given are milligrams per 100 c.c. of blood plasma:

Acne 12.1, 10.0, 9.0, 4.5, 6.8, 8.3, 11.3, 10.6, 10.6, 9.8, 8.3, 9.8, 6.0, 4.9, 11.0, 9.1, 13.2 (16.6, 16.5 repeated), 13.2, 15.9, 12.1, 7.1.

Furunculosis 6.9 (Dr. J. 1.1, February 11; 5.9, March 11), 9.4, 9.1, 12.0, 8.0, 8.1, 9.8.

Normal 9.8, 9.4, 7.9, 9.1, 9.3, 8.3, 7.8.

Diabetes (8.7, January 27; 9.4, January 31; 7.9, February 9; 1.1, February 11), 5.0, 10.0, (10.0, January 31; 3.4, February 28), 4.8, (7.5, February 15; 10.6, February 25; 11.1, March 2), 9.8, 8.7, (8.8, February 4; 10.2, February 16), 9.8, (7.2, February 8; 6.0, February 11; 9.1, March 2), 8.7, (11.0, February 9; 12.8, February 14), 12.5, 10.2, 9.8, 9.1, 11.0, (9.8, February 21; 10.6, February 25), (7.9, February 25; 5.3, March 7), 3.7, 10.0, 8.0, 8.0, 5.9, 11.1, 5.3, 16.7; 11.1.

Hemophilia 5.1; purpura hemorrhagia 7.4; hemiplegia 9.8, 9.8; secondary anemia 10.2, 10.2 repeated; nephritis 11.7; 11.1, 8.4; pulmonary tuberculosis, healed, 14.3; pneumonia 7.8, 9.1, 8.4; familial paralysis 8.6, 9.0 repeated.

The calcium content of the blood of patients with diabetes varied considerably, but with most of them the amounts were normal or below normal and very few were above normal. If such patients were put on a restricted diet the amount of calcium in the blood usually became lower.

Our chief aim was the determination of the calcium content of the blood of patients with acne and furunculosis. We found that the calcium content of the blood was high in patients with very severe acne who had not been treated, but there were great variations in the amounts of calcium in the blood of acne patients. Four patients with furunculosis had reduced amounts of calcium in the blood. One patient had a very slight amount, *i.e.*, 1.1 mg. in 100 c.c. of plasma, and one month later, after calcium sulphide therapy, the amount had increased to 5.9 mg. per 100 c.c.

The figures in the braces represent determinations on the same patient on different dates.

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Studies in the regeneration of blood.

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In continuation of the unpublished studies of Jencks in this laboratory upon blood regeneration in the rat, it is desired to report the following data: The normal erythrocyte count of rat's blood ranges between 7.5 and 10.5 millions per cubic millimeter; and the hemoglobin content between 110 and 140, as determined by the Smith-Cohen method. Data from rats of varying ages and different sex appear to fall within these limits.

Single hemorrhages, equivalent to 2 per cent. of the body weight, and double hemorrhages, of 2 per cent. on two successive days, were carried out. With the latter procedure it was found possible to reduce the erythrocyte count and hemoglobin content to about one third normal.

On the usual mixed food regeneration of blood was complete in from 7 to 10 days after single hemorrhage, and in 10 to 14 days after double hemorrhage; erythrocyte count and hemoglobin content being taken as indices of regeneration. During starvation regeneration followed single hemorrhage in normal time, but was accompanied by heavy loss in body weight. In starvation following double hemorrhage, the animals usually succumbed before regeneration was complete. Splenectomized rats appear to regenerate in normal time on the normal diet. Rats reared upon the Osborne-Mendel fat-deficient diet showed normal erythrocyte count and hemoglobin content, and after double hemorrhage regenerated in normal time upon the same diet. On a diet deficient in either protein, vitamine, or mineral matter, blood regeneration was appreciably delayed, after double hemorrhage. Hence the data at present available suggest that although blood is parasitic upon the other tissues, any one of the three