

or out of the blood stream. The response to a hot environment is peripheral vasodilation *plus* hemodilution; a cold environment evokes vasoconstriction *plus* hemoconcentration.

To simplify the above presentation the rectal temperature readings have been omitted; these showed in the case of the cold baths and sometimes in the case of the hot, that the bath conditions were too extreme for the animal to withstand in spite of the regulatory responses.

Confirmatory evidence has been accumulated since the above experiments were carried out.

93 (1675)

The life history of an amiconucleate race of *Didinium nasutum*.

By **MARY W. PATTEN.**

[*From the Osborn Zoölogical Laboratory, Yale University.*]

A series of pedigree lines of *Didinium nasutum*, consisting of the progeny of a single exconjugant, were bred continuously under practically constant environmental conditions from December 16, 1919, to September 10, 1920.

A cytological investigation of the preparations made daily from stock left after each isolation, demonstrated the absence of a morphological micronucleus in vegetative, dividing and conjugating animals. In the race from which these pedigree lines were derived by conjugation, and also in other unrelated races of *Didinium*, micronuclei were easily demonstrable. It is clear, therefore, that the parent race was micronucleate, while one of its progeny, a single exconjugant (the original cell of the race under investigation) was amiconucleate. Moreover, this amiconucleate condition persisted throughout the life of the race, that is, through 652 generations.

At various intervals during the life history of this culture, periods showing a tendency for encystment and conjugation occurred, but the animals which encysted or conjugated invariably died, a fact undoubtedly related to their amiconucleate condition. Rhythmical periods of depression followed by increased vitality,

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.

94 (1676)

Calcium in the blood.

By WM. C. THRO and MARIE EHN.

[From Cornell Medical College, New York City.]

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.