of much of the feldspar, and of many of the Maine gems and a large variety of minerals; the Lewiston Falls and a number of other localities. It is hoped that the geologists from other parts of New England will take part in the meeting, and it is expected that Professor George P. Merrill, curator of the National Museum at Washington, will deliver an address in the evening. The headquarters of the association will be at the Auburn Chamber of Commerce.

UNIVERSITY AND EDUCATIONAL NOTES

BOWDOIN COLLEGE receives $500,000 under the will of the late Edward H. Blake, of Bangor.

PHILIP A. LEHENBAUER, professor of plant pathology at the University of Illinois, has accepted a position as head of the department of horticulture at the University of Nevada.

DR. FREDERICK C. LEONARD has been appointed instructor in astronomy and mathematics, in charge of the work in astronomy, at the Southern Branch of the University of California in Los Angeles.

PROFESSOR BENJAMIN A. WOOTEN, Ph.D., head of the department of physics at the Alabama Polytechnic Institute, has been elected professor of physics at Washington and Lee University, in the place of Dr. Walter LeConte Stevens, who has been retired and made professor emeritus.

LELAND H. TAYLOR, who received the degree of doctor of science from Harvard in 1922, has been elected to an instructorship in zoology in West Virginia University.

DISCUSSION AND CORRESPONDENCE

CONCERNING THE BOTULINUS TOXIN

RECENTLY Bronfenbrenner and Schlesinger[1] have reported the death of laboratory animals (mice) as a result of the intraperitoneal injection of 3×10^{-21} cc of a solution of the toxin of *B. botulinus*. In a preliminary communication[2] concerning the matter they state that under suitable "conditions of the experiment the *botulinus* toxin which ordinarily kills mice in amounts not smaller than 3×10^{-7} cc can be increased in potency to such an extent that 3×10^{-21} cc occasionally and 3×10^{-18} cc quite regularly kills mice of 18-20 g. in less than 48 hours after intraperitoneal injection. While the total solids of such a minute dose of toxin amounts to only 3×10^{-23} g (this amount also includes the inorganic portion of the medium), the toxic product thus obtained, nevertheless, possesses all the essential characteristics of bacterial toxins," etc.

Because of the smallness of the quantity it seemed worth while to examine some of the consequences involved. Since a gram molecule of any compound contains 6.06×10^{23} molecules then one gram of water or approximately 1 cc would contain $1/18 \times 6.06 \times 10^{23} = \frac{10^{23}}{3}$ molecules and 3×10^{-21} cc would contain $\frac{10^{23}}{3} \times \frac{3}{10^{21}} = 10^2$ molecules

From the quotation given it is apparent that the solution of toxin can not be even a one per cent. solution, but assuming that it is a one per cent. solution and that the molecular weight and density of the pure toxin are the same as those of water then 3×10^{-21} cc would contain only one molecule of toxin. However, the molecular weight is probably higher than that of water and not even one molecule in a hundred would be a toxin molecule. Consequently the average 3×10^{-21} cc quantity of solution would contain no toxin. If one takes the larger quantity, 3×10^{-18} cc, which quite regularly kills mice, and assumes that the molecule has ten times the molecular weight of the water molecule then one hundred molecules of toxin would be present.

In the case of the smaller quantity it is unlikely that at best more than one or two molecules of toxin could have been present and since the animal was killed one seems forced to conclude that the life of an organism is dependent upon the integrity of one or two cells or that the action of the toxin is catalytic and

[1] *Journal American Medical Assn.*, 78: 1519 (1922).

[2] *Proceedings Society Exper. Biology and Medicine*, 19: 1 (1921).

accelerates or inhibits some vital process. In either case a difficulty arises when the probability of a single or even small number of molecules reaching the necessary cells is considered.

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THE PERIODICAL CICADA

TO THE EDITOR OF SCIENCE: It is probably desirable to record the appearance, in accord with expectation, of brood XIII of the periodical cicada or seventeen-year locust (*Tibicina septendecim*) in the Chicago area this year. Reference to Marlatt's excellent paper[1] enables one to satisfactorily identify the present insects as those of the compact brood described by Fitch as brood 6, by Walsh-Riley as brood III, by Riley as brood V and by Marlatt as brood XIII. In Dr. Gideon B. Smith's manuscript chronology the present brood was listed as appearing "in Winnebago, Monard County, and neighborhood in 1854; again in 1871."

The writer first noted the larvæ April 29 of this year, at which time they were present in great numbers at Flossmoor, occupying their characteristic "chimneys." The adults emerged May 28 in enormous numbers, distributed from at least Batavia and Wheeling to Flossmoor and to Crown Point. Two weeks ago oviposition seemed to be past its crest and at the present time in localities visited the adults have practically disappeared.

The precision of appearance of this brood over a period of seventy years is an interesting instance of the uniformity of developmental tempo under natural conditions.

JAMES NELSON GOWANLOCK
THE UNIVERSITY OF CHICAGO,
JUNE 30, 1922

SOME SIDELIGHTS ON THE LIFE OF RUSSIAN PROFESSORS

IT has been noted on various occasions that the Russian professors and the research men are "book-hungry." Being shut off from the remainder of the civilized world for nearly eight years, they have but very little and very fragmentary knowledge of what has been and is being done in western Europe and America. To work under such conditions is at least very inconvenient. But in reality the situation is much worse. The Russian men of science literally have been "bread hungry" for the past several years. Every one of us who had a chance to talk to Russian refugees heard of stories of bread hunting for four or five hours at a time. Those days, let us hope, have passed. The conditions in Russia are becoming better. But even the so-called "better conditions" are very far from good, as one can judge from the following extracts from a letter which the writer received from a Russian professor in Petrograd:

> Notwithstanding the fact that the salaries are regulated by associations of professionals and continuously raised in parallel with the value of the ruble, yet the highest paid specialist in various departments will receive in May, 1922, nearly 40,000,000 rubles in Soviet paper money, plus the food ration of 36 pounds of flour, 7 pounds of fish and a pound each of salt, sugar and fat, plus (in exceptional cases) special academic portion (a little in excess of one mentioned above). Meantime, according to quotation of Government Bank for May, $100 is equal to $193,000,000 Soviet paper rubles.
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> But even this meager portion and the pack of worthless money do not come on time, adding further to the discomfort of professional people in Russia.
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> On account of shortage of funds at the government's disposal, the personnel in all departments is systematically decreasing, the salaries come late as well as the food rations. As a matter of fact, the salaries in our division (of an agricultural experiment station) have not been received for March, while the food ration is just being received for April. [The letter was dated May 27, 1922.]
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> In the same way, the allowances for current expenses of the experiment station are being decreased and delayed.
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> In spite of all these conditions, of which I do not think it advisable to talk in detail, we are still alive and continue our research, although, of

[1] Marlatt, C. L.: 1907, "The Periodical Cicada," *Bureau of Entomology Bulletin No. 71*, U. S. Department of Agriculture.