occurs; they are as pronounced with pepsin, which does not dissociate, as with haemoglobin which does. The specificity of amides for both effects and the repeated occurrence of the amide bond in proteins suggest that the two phenomena may nevertheless have related causes. They do not appear to be related to changes in dielectric constant. Urea and formamide solutions have dielectric constants greater, and acetamide solutions much smaller, than that of water. Glycine solutions, with dielectric constants still higher than those in urea, are without effect on dissociation, and have relatively small influences on solubility.

These measurements were made possible by the facilities provided by Prof. The Svedberg at Uppsala, and by Sir Joseph Barcroft at Cambridge. They owe much to the advice and assistance rendered by Dr. K. O. Pedersen at Uppsala, and by Dr. G. A. Millikan and Prof. D. Keilin at Cambridge. Full details will be published elsewhere.

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Inhibited Deposition of Stearin from Chilled Olive Oil

WE have observed that the addition of very small amounts of air-blown cacao-butter (Iodine No. = 20) to olive oil permits such oil to remain liquid and free from stearin deposit on storage at temperatures between 2° C. and 4° C. Untreated olive oil in such storage sets solid within 12 hours, whereas we have found the inhibition effect to persist after even four years storage at 2° C. (Fig. 1).

The amount of blown cacao-butter required varies from 0.1 to 0.5 per cent, depending on the technique of its oxidation, and the length of time the olive oil is to be stored cool. The inhibition effect is highly specific in that: (a) no other blown oil or fat serves so well, and (b) protection is not afforded to other oils such as arachis, or cotton-seed.

This inhibition phenomenon has been found to furnish a quantitative guide to the very remarkable property of blown cacao-butter to prevent fat-bloom in stored chocolate, in which respect it is greatly superior to lecithin or other anti-bloom agents.

Our investigations will be fully reported elsewhere.

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FIG. 1.

Increase of Diamagnetic Susceptibility on the Death of Living Cells

ACCORDING to E. Bauer's theory, the lack of equilibrium in living systems is due to an excited state of the protein molecules of the protoplasm. The maintenance of this state is operated through the process of metabolism, collisions of the second kind between the molecules of the protoplasm and those of the food substance leading to an activation of the latter, and their chemical energy, set free in the reaction, being used to maintain the active, excited state of the molecules of the living substance¹.

If now this active state of the molecules of the living substance consists in an electronic excitation or—what seems more probable—in the existence of free valencies, which on death are saturated within the protein molecule, then the living and dead substance must differ with respect to its magnetic susceptibility, since, owing to the falling out of the paramagnetic component, the resulting diamagnetic susceptibility must increase on death.

Measurements to check this point were carried out by us with the assistance of the magnetic laboratory of the Ural Physico-Technical Institute (formerly at Leningrad, now at Sverdlovsk). They gave a positive result. In the case of yeast and suspensions of bacteria (*B. coli*, *B. proteus*) we found an increase of diamagnetic susceptibility on death amounting to 4 per cent, the maximum possible error not exceeding 0.7 per cent. This result was independent of the way the cells were killed: beating or cooling down with liquid air produced the same effect as spontaneous death. It is important to note that denaturation of native protein did not affect the magnetic susceptibility.

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¹ A detailed presentation of the theory has been given in E. Bauer's "Theoretical Biology" (Russian), 1935. A brief sketch and a few applications in *Biodynamica*, No. 14, 15 (1936).

Nitrogen Losses in Green Plants

A FEATURE of the nitrogen metabolism of plants which has received little attention is the possibility of considerable losses of nitrogen during the process of nitrate reduction. It is generally agreed that this process leads first to the production of nitrites, and the presence of nitrites in plants actively engaged in nitrate reduction has been shown by Eggleston¹. As plant tissues are normally acid, nitrous acid should be present, and this should combine with mono-amino nitrogen to give elementary nitrogen. It is well known that this reaction is rapid *in vitro*². It has been shown by Irving and Hankinson³ that *Elodea* produces elementary nitrogen when immersed in solutions containing nitrates and asparagine as a source of amino-nitrogen.

Two examples in which such losses of nitrogen occur have recently been observed by us and studied in some detail. In one of these, pure cultures of *Chlorella vulgaris* growing (in the dark) in a nutrient medium (pH 5.8) containing glucose (10 gm. per litre) and sodium nitrate (0.26 gm. per litre), retained in the cells 3.4 mgm. of nitrogen out of 13 mgm.