der Speziellen Eiweisschemie" first appeared as a chapter in the "Handbuch der Biochemie" edited by Karl Oppenheim. The entire subject of proteins was treated in that "Handbuch" by several authors, and it was the part of Professor Abderhalden to present that phase of the progress in protein-chemistry which was made possible through the new analytical and synthetical methods, introduced by Emil Fischer.

Professor Abderhalden was a close associate of Emil Fischer during the time when the work was in progress and that makes the chapter more vivid and authoritative than any other on the subject of protein chemistry, written for the Oppenheimer Handbuch.

The work on protein chemistry of Fischer and his school falls into two large groups: one which brought to light the elementary components of the protein molecule, and the second, which elucidated the character of their linkage in the protein molecule. The first was in its nature principally analytical, the second synthetical. The work in either direction was preceded by a careful study of the properties of some derivatives of aminoacids. In course of this study Fischer introduced an improvement into the method of Curtius for preparing the ethylesters of the aminoacids from their hydrochlorides. This made possible the distillation of the esters and their separation one from another in a convenient, neat and comparatively rapid manner. The part assigned by Fischer to Abderhalden and his coworkers was to apply this process to the separation of the aminoacids obtained on the cleavage of nearly every protein known in nature. A part of the book contains a complete and concise account of all this work.

The property of the esters of the aminoacids to form anhydrides of the acids was the basis for the synthetic formation of peptides. It is safe to say that this discovery was the most important phase in the development of protein chemistry, since it contained the key to our knowledge of the manner in which individual aminoacids are linked in the protein molecule.

The original method of peptid synthesis was later improved through the introduction of the halogenacyl synthesis which led to the formation of optically active peptides. This new achievement in its turn opened the way to the study of the configuration of peptides and of the relation of configuration to the action of proteolytic enzymes. The book of Abderhalden gives a complete account of all these achievements in a very concise form. The properties of all known aminoacids and their derivatives are described in a manner which makes the work serve as a valuable reference book. The analytical methods are also described, though not always in minute detail. All this makes the book very serviceable to the investigator, and at the same time it gives a good survey of the development of our knowledge of the chemical structure of the protein molecule. The physical properties of the proteins and the character of their primary cleavage products are not discussed by Abderhalden.

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Scientific Journals and Articles

The opening (October) number of volume 16 of the *Bulletin of the American Mathematical Society* contains the following papers: "Note on Fermat's Numbers," by J. C. Morehead and A. E. Western; "An Extension of Certain Integrability Conditions," by J. E. Wright; "Necessary Conditions that Three or More Partial Differential Equations of the Second Order shall have Common Solutions," by C. A. Noble; "Note on Determinants Whose Terms are Certain Integrals," by R. G. D. Richardson and W. A. Hurwitz; "On the Tactical Problem of Steiner," by W. H. Bussey; "On the So-called Gyrostatic Effect," by A. S. Chessin; "A Continuous Group related to Von Seidel's Optical Theory," by A. C. Lunn; "Shorter Notices": Runge's Analytische Geometrie der Ebene, by M. Bôcher; Netto's Gruppen- und Substitutionentheorie, by W. B. Fite; Czuber's Einführung in die höhere Mathematik, by C. L. E. Moore; Ball-FitzPatrick's Recréations mathématiques, by D. E. Smith; Pockel's

Lehrbuch der Kristalloptik, by E. B. Wilson; "Notes"; "New Publications."

SPECIAL ARTICLES

ON MAGNETIZATION BY ANGULAR ACCELERATION

Some time ago, while thinking about the origin of the earth's magnetism, it occurred to me that any magnetic substance must, according to current theory, become magnetized by receiving an angular velocity.

Thus consider a cylinder of iron or other substance constituted of atomic or molecular systems whose individual magnetic moments are not zero. The simplest ideal system of this kind is of course a negative (or positive) electron revolving about a positive (or negative) center. In its initial state the magnetic moment of the cylinder composed of all the systems is zero. If, however, it is given an angular acceleration about its axis, the resulting torque on each individual system will cause its orbit to change its orientation, or the revolving part its speed, in such a way as to contribute a minute magnetic moment parallel to the axis of the cylinder, all the systems, if alike, contributing moments in the same direction. If the revolving electrons are negative, as appears at least generally to be the case, the cylinder will become magnetized as it would be by an electric current flowing around it in a direction opposite to that of the angular velocity imparted to it.

Early in July I began some experiments on this subject, using slightly modified apparatus constructed originally for other purposes. These experiments appear to show the effect in question in the case of a large steel rod, the intensity of magnetization resulting when an angular speed of about 90 revolutions per second was produced being about $1/1500$ c.g.s. unit, in the direction indicated by theory on the assumption that the revolving electrons are negative. This effect, if substantiated by later work, will account for a minute part of the earth's magnetism, but, apparently, for only a minute part. It is the converse of the effect which has been looked for recently by Richardson.

Superposed on this effect was another, perfectly definite and unquestionable, but exceedingly difficult to account for, viz., a magnetization along the rod in a definite direction independent of the direction of rotation and of the direction of the original residual magnetism of the rod. It was not due to the jarring of the cylinder as it was rotated in the earth's field, nor to a possible minute change in the direction of its axis produced by the pull of the motor. In magnitude this effect was several times as great as the other, which became manifest only at the higher of the two speeds used.

The observations were made inductively with a ballistic galvanometer. The throws were very small, but definite, and were in opposite directions for starting and stopping.

Later on I hope to investigate this subject more thoroughly with apparatus designed for the purpose. I am sending this account to you because of the importance of one of the effects mentioned, and the fact that some months must elapse before a thorough investigation can be undertaken.

S. J. BARNETT

August 5, 1909

NITRIFYING BACTERIA IN NORTH CAROLINA SOILS

IN a recent number of SCIENCE[1] Stevens and Withers present some interesting data concerning the existence in North Carolina of non-nitrifying soils. It was pointed out that 71 per cent. of 62 soil samples representing, with few exceptions, normal agricultural soils near the North Carolina Agricultural Experiment Station failed to nitrify, a state of affairs considered anomalous.

At the time of the publication of this paper the Laboratory of Soil Bacteriology of the Bureau of Plant Industry was receiving a number of soil samples from fields or plots where legume inoculation experiments were in progress. Thirty samples from crimson clover fields in North Carolina (representing nineteen counties) were submitted to a test for nitrification. Seven samples were from the Piedmont Plateau and twenty-three from the coastal-plain region.

[1] SCIENCE, N. S., XXIX., No. 743, p. 506.