Do any permanent reservations of that bureau contain stands of Douglas fir in which the mature trees average 275 feet or more in height; Sitka spruces, western hemlocks, lowland white firs, western white pines or western red cedars 225 feet tall; Port Orford cedars, Ponderosa pines, western larches or Noble firs 180 feet tall or more, to name a few of the species? Hundreds of square miles of stands of timber of such sizes have been sold out of the National Forests.

While the Forest Service has made vast "reservations" of unimportant and commercially valueless areas, a great deal of traveling in the forest regions of the west during past years and recently a number of letters of inquiry have failed to bring out from the Forest Service any evidence that it is doing much of anything in the preservation of any fine samples of the forests of our western states, though, of all the government bureaus, it alone had the opportunity to accomplish it and was under the deepest obligations to the nation to do so.

The big timber in the National Forests is mostly gone. Only in certain of the National Parks will the Americans of the future be able to see a few small remnants of the wonderful forests of the western United States in their best development.

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SCIENTIFIC BOOKS

ADVANCES IN ENZYMOLOGY

Advances in Enzymology and Related Subjects. Edited by F. F. NORD and C. H. WERKMAN. Vol. I. 433 pp. + 56 illustrations. New York: Interscience Publishers, Inc. $5.50. 1941.

THE present volume consists of a collection of ten independent articles contributed by investigators from various countries (7 from the United States and one each from Germany, U. S. S. R. and Holland). As stated in the preface, this series of monographs is initiated at a time when research and original thinking are subjected to the gravest of interruptions; it may be difficult to maintain international collaboration in future volumes. According to a letter received by Dr. F. F. Nord, who served as editor of both publications, the aims and scope of the "Advances in Enzymology" are similar to those of the now defunct "Ergebnisse der Enzymforschung."

The ever widening field of enzyme research and the scattering of publications over a large number of scientific periodicals makes it desirable to present from time to time summarizing articles of timely topics by authors eminent in the field. The authors are encouraged to present their own view-point and experimental results and to treat their subject in a critical and synthetic manner rather than in the form of a mere compilation of the literature. In the opinion of the reviewer, the editors, both of whom are well-known investigators in the field of enzyme research, have succeeded in combining in the present volume a number of extremely interesting and valuable articles. While it is impossible to consider in detail each article, a few remarks concerning some of them will be made.

Protein structure is reviewed by Bull. The peptide linkage is considered to be the only important co-valent bond between amino acid residues in proteins. In this connection the theory of peptide chain folding of Wrinch which postulates another type of co-valent bond is examined in some detail. The x-ray diffraction pictures of fiber proteins and their bearing on the structure of these fibers, particularly that of α- and β-keratin, are discussed. Bull regards Svedberg's idea of molecular weight classes of proteins (whole number multiples of the unit molecular weight of 17 600) as unfounded. The Bergmann theory of protein structure is based on the concept of molecular weight classes and of a regular and invariant periodicity of occurrence of amino acids in a single peptide chain; the molecular weight is obtained by multiplying the total number of amino acid residues by the average residue weight. Bull points out that the calculation of the average residue weight is uncertain, because the analytical results for individual amino acids in most proteins are not sufficiently accurate at the present time. Other problems discussed are those of the shape of globular proteins, hydration and denaturation.

The article of Bergmann and Fruton is a valuable review of their work on the specificity of proteinases. A good deal of exact information is now available, due mainly to the use of synthetic substrates of known structure and of crystalline enzymes. Pepsin, trypsin and chymotrypsin are regarded as the best defined proteinases. The typical substrates for pepsin and chymotrypsin contain tyrosine or phenylalanine residues; the former enzyme acts at the peptide linkage that involves the amino group of these amino acids, while the latter enzyme acts at the peptide linkages involving the carboxyl group of these amino acids. Trypsin acts at the carboxyl end of lysine or arginine residues. Enzymatic synthesis of single peptide linkages has been effected with a number of proteinases.

In Lipmann's article on phosphate bond energy, the central theme is that there are two groups of organic phosphate compounds found in nature, a large group with relatively low potential energy in the phosphate bond and a smaller group which con-

tains an energy-rich phosphate bond. To the first group belong all compounds in which phosphate is combined with an alcoholic hydroxyl in an ester linkage, *e.g.*, hexose-, pentose-, triose-, glycerol- and glyceric acid phosphates. The change in standard free energy resulting from the splitting of the ester linkage of this group of compounds is estimated at $-2{,}000$ to $-4{,}000$ calories. The same numerical values with reversed sign gives a measure of the group potential. The energy-rich phosphate bonds are of the type, P-O-P, N-P, carboxyl-P, enol-P, represented by such compounds as adenosinetriphosphate, creatine and arginine phosphate, phosphoglyceryl- and acetyl phosphate and phosphoenol-pyruvate. The average energy available in these types of linkages is assumed to be 9,000 to 11,000 calories. The following reaction phases are distinguished in the constantly occurring metabolic turnover of phosphate. (1) Introduction of inorganic phosphate into ester linkage. (2) Generation of energy-rich phosphate bonds. (3) Distribution of phosphate by the adenylic acid system. (4) Regeneration of inorganic phosphate. A fine coordination between a great number of enzymatic reactions is necessary in order to avoid obstruction of the phosphate cycle by the accumulation of intermediates. The fall of the phosphate group potential from a higher to a lower level during the metabolic phosphate cycle provides a source of energy which may be utilized for a variety of purposes, *e.g.*, resynthesis of glycogen, mechanical work during muscular contraction, bone formation and various organic chemical syntheses in the cell. Lipmann suggests that a large part of available metabolic energy passes through energy-rich phosphate bonds; this provides a uniform source of energy which can be used for all-around purposes. Transfer of other active groups (amino, amidine, methyl, acetyl) occur quite generally in cellular metabolism. As in the case of phosphate transfer some of these reactions are reversible, while others are not. In the latter case there occurs a decrease in the group potential.

Sumner's article deals with the chemical nature of catalase. Theories concerning the mechanism of catalase action are discussed, especially the theory of Keilin and Hartree which is based on the claim that catalase has a diminished action on hydrogen peroxide in the absence of molecular oxygen. This observation has not been confirmed by Sumner. He proposes a mechanism in which catalase containing ferric iron forms a peroxide which is decomposed by another molecule of hydrogen peroxide.

There are two articles on photosynthesis, one by Franck and Gaffron and another by Van Niel; the latter deals more specifically with bacterial photosynthesis. Both articles contain a good deal of unpublished material. The quantum efficiency, *i.e.*, the number of light quanta needed for the photochemical reduction of one molecule of carbon dioxide, is discussed at some length. The value of Warburg and Negelein of four quanta per molecule of carbon dioxide has now been superseded by one which is three times as large. The present trend is to interpret photosynthesis in plants and certain bacteria as an oxido-reduction process which may be expressed by the following equations:

Green plants	$4(H_2O + \text{light} \rightarrow H + OH)$
	$4H + CO_2 \rightarrow (CH_2O) + H_2O$
	$2(2OH \rightarrow \text{peroxide} \rightarrow H_2O + O_2)$
Purple bacteria	$4(H_2O + \text{light} \rightarrow H + OH)$
	$4H + CO_2 \rightarrow (CH_2O) + H_2O$
	$2(2OH + H_2A \rightarrow H_2O + A)$

Photosynthesis in purple bacteria occurs without liberation of molecular oxygen. The peroxide mechanism in green plants is here replaced by one in which appropriate hydrogen donors (*e.g.*, hydrogen sulfide) regenerate the system. Van Niel suggests that the photochemical decomposition of water with the aid of chlorophyl and special enzymes is the light reaction, while the actual reduction of carbon dioxide is a dark reaction. This does not imply, however, that carbon dioxide itself is the immediate hydrogen acceptor or that it is necessarily converted to carbohydrates.

In other articles Holzapfel deals with the physical chemistry of virus proteins, Green with enzymes and trace substances, Kurssanov with enzymatic processes in living plants and Vonk with digestion in lower vertebrates. The article by Kurssanov summarizes literature not easily accessible in this country, but contains too few technical details to judge the merit of many of the experiments which are reported.

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SOCIETIES AND MEETINGS

THE EASTERN SECTION OF THE SEISMOLOGICAL SOCIETY OF AMERICA

THE Eastern Section of the Seismological Society of America held its sixteenth annual meeting jointly with the Section of Seismology, American Geophysical Union, on May 2, 1941, at Georgetown University, Washington, D. C. The members were welcomed in the name of the president of the university by the Reverend F. W. Sohon, S.J., director of the Georgetown seismic station. Ralph R. Bodle, of the U. S.