tact with the antigen but rather as an adaptive process analogous to that involved in the production of adaptive bacterial enzymes.

This general hypothesis provides a rational explanation for the formation of cross-reactive antibodies upon prolonged immunization with a single antigen: More extensive contact with the antigen enhances the opportunity for more intimate regions of the antigen to impress specific modifications on the proteinase system. Also, antigen fragments produced by the hydrolytic action of the proteinases may themselves impress their mark. Conversely, the formation of low-grade antibodies during the transition period of decreasing antibody titer may be assumed to occur as in the absence of further antigenic stimuli, the intracellular enzymes gradually return to their normal specificity.

It is obvious that a large part of the ideas expressed in this monograph is speculative and requires experimental testing. However, the general picture which the authors present is congruous and a rich source for thought on this stimulating problem.

HANS NEURATH

DEPARTMENT OF BIOCHEMISTRY,
DUKE UNIVERSITY SCHOOL OF MEDICINE

MUSHROOMS

Mushrooms of the Great Lakes Region. By VERNE OVID GRAHAM. Illustrated. Pp. vii + 390. Chicago Academy of Sciences and the Chicago Natural History Museum.

UNDER the title "Mushrooms of the Great Lakes Region" Verne Ovid Graham, honorary curator of mycology in the Chicago Academy of Sciences, has issued a volume on the higher fungi of that region. The title "Mushrooms" is a little misleading, for it is not strictly a mushroom book as that term is ordinarily used. It is rather a descriptive list of all the higher fungi, Ascomycetes and Basidiomycetes, known to occur in that region. Although it must necessarily be very incomplete, it will doubtless serve as an aid to students in identifying the more common species of fungi, the purpose for which it was evidently intended.

FRED J. SEAVER

SELECTED EXPERIMENTS IN CHEMISTRY

Selected Experiments from Laboratory Manual for Introductory College Chemistry. By J. A. BABOR and A. LEHRMAN. New York: Thomas Y. Crowell Company. 64 pages. 29 figs. 1944. $1.00.

THIS is a reprint of thirty-eight of the experiments which the authors first published in 1941. There is one new experiment on the preparation of copper, lead and antimony from their ores, and two new experiments on a qualitative analysis for thirteen cations. Teachers of accelerated courses desiring an abridged manual of the conventional experiments in general chemistry, with questions and problems to fill in and tear out, will find this edition handy.

HUBERT N. ALYEA

PRINCETON, N. J.

REPORTS

THE SOUTHERN RESEARCH INSTITUTE

IN March of this year the Southern Research Institute will begin an active research program in its laboratories in Birmingham. This is the culmination of years of study and preparation on the part of a number of southern industrialists who long have realized the importance of scientific research in the development of the economy of the southern part of the United States. In studying the need for research facilities in the South, it was found that although southern universities and colleges are well prepared for teaching the natural sciences and for undertaking certain fundamental research projects, generally there has been a deficiency in research facilities available for solving industrial problems on behalf of private enterprise.

The Alabama Research Institute was incorporated in 1941, and recently became the Southern Research Institute to conform more properly with its region-wide function. The institute is a non-profit corporation. Its purpose is to assist industry in creating new and improved products; to make research facilities available to existing establishments which do not have the equipment and specialized personnel to undertake the solution of their own technological problems; and to afford facilities to those industries which, although having well-equipped laboratories of their own, find it advantageous from time to time to have certain types of research work done in an atmosphere removed from the distractions incident to their own production problems.

On entering into a research agreement with the institute, the sponsor will set forth the objectives of the project and establish a fund for its prosecution. The institute will select from its staff suitably qualified personnel or employ research men specialized in a particular field who will be assigned to that research project. The sponsor of the project will pay into the institute a sum of money commensurate with the purpose of the investigation for the agreed period, and all salaries and expenses connected therewith and all spe-

cial equipment and services essential thereto will be paid from that fund. The agreement will stipulate the estimated cost of the undertaking, which will include an amount to be retained by the institute for overhead expenses. The sponsor of the undertaking will be kept informed as to the progress of the work and will be expected to lend active support to the program by making available to the institute special knowledge and experience relative to the undertaking at hand, and such specialized facilities as may be indicated to be of aid in the solution of the sponsor's research problem.

Any discoveries growing out of a sponsored investigation shall become the exclusive property of the project sponsor, and it will be incumbent on the institute to assign all rights, patents and titles to the sponsor. There may be an occasional exception in the application of this principle in cases where the investigation has originated in the institute or involves some special knowledge already acquired by the institute in its own researches. The institute is bound to complete secrecy as to the developments and will agree that no publication thereof shall be made for a stipulated period without consent of the sponsor. Although the Southern Research Institute has been established to provide new research facilities in the South, the acceptance of sponsored research projects will not be limited by any specific geographical considerations.

The Southern Research Institute now has in excess of $500,000 in capital, all contributed by business enterprises and persons in the southern states. In general the contributors are manufacturing enterprises to whom facilities and scientific skill will be available on a fee basis; trade and service establishments who will share in the region's expanded purchasing power; public utilities who inescapably feel the impact of generally higher economic attainments; agriculturists whose markets are likely to be broadened; trade and industrial associations who enjoy in common the benefits of increased basic knowledge of their mutual products; and finally those engaged in the professions whose welfare is dependent on that of the community at large.

For the duration of the emergency, the closest attention is being given to providing added research and testing facilities of interest to the war agencies and to aiding local manufacturers engaged in the production of war materials.

Current funds are sufficient to equip the institute and to insure operations for its initial period, or until the institute can be made self-supporting. As the scope of usefulness of the Southern Research Institute increases, further additions to the institute's capital funds will no doubt be needed. A genuine and substantial interest in research is spreading throughout the South which gives friends of the institute confidence that the necessary funds for a healthy growth will be forthcoming.

W. A. LAZIER,
Director

BIRMINGHAM, ALABAMA

SPECIAL ARTICLES

ROLE OF FAT IN INCISOR DEPIGMENTATION OF VITAMIN E-DEFICIENT RATS[1]

IT has been reported[2, 3] that the normally brown-yellow pigment of maxillary rat incisor teeth disappears when the animal suffers from vitamin E deficiency. Development of an orange-brown coloration in the adipose tissue of E-deficient rats has been shown by one of us[4] to depend on the presence of certain unsaturated fats in the diet. In order to investigate a possible relationship between such dietary fat and dental depigmentation, we established five groups of animals comprising 6 newly weaned rats, and reared them for 80 days on the following diets:

Group 1 (vitamin E deficient, fat free): Sugar 65 per cent.; casein, alcohol-extracted, 20 per cent.; dried yeast, ether-extracted, 10 per cent.; salt mixture no. 2, U.S.P., 5 per cent.; tetrasodium salt of 2-methyl-1,4-naphthohydroquinone diphosphoric acid, 1 mg; vitamin A and D concentrate in oleic acid, 2 drops weekly per animal corresponding to 560 i.u. A and more than 80 i.u. D. Group 2 (vitamin E containing, fat free): Same as group 1 plus 10 mg per cent. of d,l-alpha-tocopherol acetate. Group 3 (vitamin E deficient, high fat): Same as group 1 but with 20 per cent. sugar replaced by 20 per cent. cod liver oil. Group 4 (vitamin E containing, high fat): Same as group 3 plus 10 mg per cent. d,l-alpha-tocopherol acetate. Group 5 (normal control) was fed dog chow.

Degree of pigmentation was recorded weekly by comparison with a scale of colors, 1 to 10, 1 being the color of pigment-free mandibular incisors in just-weaned animals, 10 the brown-yellow color of pigmented maxillary incisors in normal adult animals.

Animals in groups 1, 2 and 4 developed incisor pigment essentially in the same way as group 5, color intensity increasing from 2.5 in maxillary incisors and from 1 in mandibular. In group 3, pigmentation of the maxillary incisor teeth occurred as in other

[1] Aided by grants of the Carnegie Corporation of New York, Eastman Dental Dispensary of Rochester, and Wyeth, Inc., Philadelphia.

[2] A. W. Davies and T. Moore, *Nature*, 147: 694, 1941.

[3] T. Moore, *Biochem. Jour.*, 37: 112, 1943.

[4] H. Dam, *Jour. Nutrition*, 27: 193, 1944.