

text-book and a laboratory manual. The first 183 pages, covering the lecture portion, is followed by 52 pages of Laboratory Directions and Experiments.

The chapters discussing the theoretical side are devoted, in this order, to (I) Methane and its Derivatives, (II) Saturated Hydrocarbons, (III) Unsaturated Hydrocarbons, (IV) Aromatic Hydrocarbons, (V) Alcohols, (VI) Ethers, (VII) Aldehydes, (VIII) Ketones, (IX) Acids and Derivatives, (X) Optical Isomerism, (XI) Carbohydrates, (XII) Amines, (XIII) Amino Acids and Proteins, (XIV) Phenols, (XV) Quinones and (XVI) Heterocyclic Compounds. These chapters are followed by two dealing with some of the outstanding industrial developments of organic chemistry: (XVII) Industrial Developments in Aliphatic Chemistry and (XVIII) Coal Tar Products. A chapter (XIX) is then assigned to Structure and Valence, and one (XX) to Natural Products.

In the experimental portion, after general laboratory directions, discussions of melting points, boiling points and crystallization, 23 experiments are described in detail, for the preparation of individual or groups of organic compounds, or a study of their reactions, each of these experiments concluding with a list of suggestive and helpful questions. The particular experiments given were selected with special reference to the interests of the groups of students for whom the book is primarily intended.

The scientific repast it offers to beginners is assuredly most attractive and, in those who partake, should arouse a keen appetite for more courses from the same cuisine.

Paper, presswork and binding are excellent.

*Organic Analytical Reagents.* By JOHN H. YOE and LANDON A. SARVER. ix + 339 pp. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd. 1941. \$4.00.

THE authors explain that their purpose in writing this book was to furnish an up-to-date bibliography on organic analytical reagents and, based upon the

literature thus assembled, to discuss the theoretical aspects of the subject and to suggest further research in this important field.

One of the most promising sources of new and valuable analytical reagents certainly exists in the vast number and illimitable variety of organic compounds. In that domain are to be found specific and highly sensitive reagents for gravimetric, colorimetric and nephelometric determinations; primary standards and indicators for volumetric analysis; pH indicators, buffers, protective colloids, flocculating agents, oxidizing and reducing agents, etc.

The volume consists of two parts. Part I is descriptive and theoretical. Part II consists of Glossary, Bibliography and Index. In Part I, the organic analytical reagents are classified into solvents and wash liquids, substances used in neutralizations, oxidizing agents, reducing agents, indicators, primary standards, acidic and basic salinogenic compounds, photometric aids and substances for the control of adsorption, diazotization and coupling agents, alkalis and natural products.

First is given a list of all the compounds in each of these categories, arranged according to chemical character. This is followed by separate chapters for each (or several) of these classes, in which the appurtenant reagents are described seriatim and in detail, both as to their properties and their applications.

In Part II there is found a very helpful tabulation of all these various reagents, arranged alphabetically under each chemical element to which they apply, which elements likewise are printed in alphabetical order. This is followed by a Glossary of some 750 organic reagents, and a Bibliography of 2,419 titles. No laboratory procedures are included in the volume.

The book can be cordially recommended as a compact and useful reference work on organic analytical reagents. Paper, presswork and binding are excellent.

MARSTON T. BOGERT

COLUMBIA UNIVERSITY

## REPORTS

### FELLOWSHIPS IN SCIENCE AWARDED BY THE GUGGENHEIM FOUNDATION

EIGHTY-TWO John Simon Guggenheim Memorial Fellowships carrying awards amounting to \$196,600 to American and Canadian scholars and creative workers have been announced. In making these appointments the trustees of the foundation adopted a resolution that all these fellows of the foundation should be informed that their use of their fellowships is subject to the requirements of any National Service for which they may be required; and the foundation's position is, further, that if any fellow is required for

any National Service in a manner and of a kind such that his fellowship stipend would contribute to the war effort he may use the fellowship funds granted him while doing the work which the Government wants him to do.

This is the seventeenth annual series of fellowship awards by the foundation which was established and endowed by the late U. S. Senator Simon Guggenheim and by Mrs. Guggenheim as a memorial to their son John. More than 1,500 applications were received this year.

The fellowships are granted to research workers,

scholars, artists and others who by their previous work have shown themselves to be persons of unusual ability. Men and women, married and unmarried, of all races and creeds who are citizens or permanent residents of the United States, citizens of Canada and of certain Latin American countries, are eligible on equal terms. The fellows are normally of ages between twenty-five and forty years. The stipends are usually \$2,500 for a year.

Since its establishment seventeen years ago the foundation has granted 1,210 fellowships with stipends amounting to \$2,488,000.

The trustees of the foundation are Mrs. Simon Guggenheim, Francis H. Brownell, Carroll A. Wilson, Charles D. Hilles, Roger W. Straus, Charles Earl, John C. Emison and Medley G. B. Whelpley.

The Committee of Selection consisted of Dr. Frank Aydelotte, director of the Institute for Advanced Study, *Chairman*, Dr. Florence R. Sabin, of the Rockefeller Institute for Medical Research; Professor Edwin Bidwell Wilson, of the Harvard University School of Public Health; Professor Linus Pauling, of the California Institute of Technology, and Professor Wallace Notestein, of Yale University.

The fellows chosen this year come from twenty-two states and Hawaii, and from two Canadian provinces; and they are members of the staffs of thirty-six educational institutions.

Fellowships awarded in the sciences are:

#### FOR WORK IN BIOLOGY

*Dr. Thomas Rogers Forbes*, instructor in anatomy, the Johns Hopkins University Medical School: Studies of the physiology of reproduction.

*Dr. Robert Gaunt*, assistant professor of biology, New York University: Studies of the functional control of the adrenal cortex.

*Dr. Salvador E. Luria*, research assistant in surgical bacteriology, Columbia University: Studies of certain biological and physico-chemical properties of bacteriophage.

*Dr. Jane Marion Oppenheimer*, instructor in biology, Bryn Mawr College: Studies of the development of structure and function in the central nervous system of fishes.

*Dr. Simon Dworkin*, lecturer in physiology, McGill University, Montreal: The preparation of a monograph comparing the higher nervous activity of dog, cat and rat, as revealed by the experimental method of conditioned reflexes.

*Dr. Charles Leonard Huskins*, professor of genetics, McGill University: The preparation of a book on the cytology and genetics of plants, animals and man.

*Dr. Floyd Alonzo McClure*, professor and curator of economic botany, Lingnan University, Canton, on leave in the United States: The preparation of a book on the Chinese bamboos.

*Dr. David R. Goddard*, associate professor of botany, University of Rochester: A study of the respiratory enzymes of higher plants.

*Dr. John Thomas Curtis*, assistant professor of botany, University of Wisconsin: Studies of the ecological status of the "Lake Forest" of Michigan, Wisconsin, Minnesota and Ontario.

*Dr. Hugh Carson Cutler*, research associate, Botanical Museum, Harvard University: An attempt to determine the location of the area in which corn originated.

*Dr. Richard Evans Schultes*, research associate, Botanical Museum, Harvard University: Studies of the economic aspects of the flora of southern Colombia and the adjacent part of Ecuador; and an ethnobotanical study of the useful plants, cultivated and wild, among Indian tribes of the same area.

*Dr. Rolf Singer*, research associate in mycology, Harvard University: Studies of the mycological flora of sub-tropical America.

*Dietrich Bodenstern*, research associate in biology, Stanford University: Investigations of the problem of metamorphosis in insects, with special emphasis on the rôle of hormones in development.

*Dr. E. Raymond Hall*, associate professor of vertebrate zoology and curator of mammals, University of California, Berkeley: Preparation of a monograph on the American weasels.

*Dr. Hans Jenny*, professor of soil chemistry and morphology, University of California: A study of the relation between nitrogen and organic matter content of soils and annual precipitation in the tropics.

#### FOR WORK IN GEOLOGY

*Dr. Max Harrison Demorest*, instructor in geology, Wesleyan University: Studies of the physics of ice, in particular, studies of the structure and flow of glacial ice.

*Dr. George Prior Woollard*, geophysicist, Princeton, N. J.: Seismic, gravitational and magnetic investigations of the geologic structure underlying the North American Atlantic coastal plain.

*Dr. Wilson Marcy Powell*, assistant professor of physics, Kenyon College, will continue his studies of cosmic rays, on the top of Mount Evans, Colorado.

#### FOR WORK IN ANTHROPOLOGY

*Dr. Gordon Townsend Bowles*, assistant professor of anthropology, University of Hawaii: Studies of functional adaptations in the human skeleton, based on Hawaiian skeletal materials.

*Dr. Morris Edward Opler*, assistant professor of anthropology, Claremont Colleges: The preparation of a book on the cultures of four related Apache Indian tribes of the Southwest.

#### FOR WORK IN PSYCHOLOGY

*Dr. Robert Brodie MacLeod*, associate professor of psychology, Swarthmore College: Studies of the psychology of color vision.

*Dr. Burrhus Frederic Skinner*, associate professor of psychology, University of Minnesota: The completion of a book on the psychology of language.

*Dr. Rudolf Arnheim*, psychologist, New York City: Studies of the application of the principles and methods of gestalt psychology to art analysis.

## FOR WORK IN MATHEMATICS

Dr. John Charles Chenoweth McKinsey, instructor in mathematics, New York University: Studies of the basic

concepts and logical foundations of mathematics, and by Dr. Alfred Tarski, the Polish refugee mathematician. Both will work at the Institute for Advanced Study, Princeton, N. J.

## SPECIAL ARTICLES

A NEW PROCEDURE FOR STAINING  
VAGINAL SMEARS<sup>1</sup>

IN the course of a study of vaginal smears conducted in cooperation with Dr. Herbert F. Traut, of the Department of Gynecology of Cornell Medical College and of New York Hospital, for the purpose of diagnosing malignant tumors and other pathological conditions of the female genital tract,<sup>2</sup> it was realized that certain modifications and improvements in our procedure of staining vaginal smears were necessary. Methods which proved to be successful in other applications<sup>3,4,5</sup> were not found to be entirely

logical conditions. These cells also have great importance in the evaluation of the normal menstrual cycle, of sterility and of estrogenic and other endocrine therapy.

After long experimentation it was found that a much greater transparency and an equally good color differentiation of the cells can be obtained by the use of solutions of stains in 95 per cent. alcohol instead of aqueous solutions. Various alcoholic stains were thus developed, but here only two will be described which are now being used more generally in our laboratory (see Table I).

TABLE I

|                                               |                                   |                                                   | Stain<br>EA 36 | Stain<br>EA 25 |
|-----------------------------------------------|-----------------------------------|---------------------------------------------------|----------------|----------------|
| Light green SF<br>yellowish                   | National Aniline and Chemical Co. | 0.5 per cent. solution in<br>95 per cent. alcohol | 45 cc          | 44 cc          |
| Bismarck Brown                                | National Aniline and Chemical Co. | 0.5 per cent. solution in<br>95 per cent. alcohol | 10 cc          | 12 cc          |
| Eosin yellowish                               | National Aniline and Chemical Co. | 0.5 per cent. solution in<br>95 per cent. alcohol | 45 cc          | 44 cc          |
| Acid phospho-<br>tungstic                     | Merck                             |                                                   | 0.200 gm       | 0.170 gm       |
| Lithium carbonate, saturated aqueous solution |                                   |                                                   | 1 drop         | 1 drop         |

satisfactory in this particular work because of a common disadvantage. The staining of the cells was too deep to permit a sharp definition of their outlines in smears that were relatively thick or contained much blood. In most cases of carcinomas and in many other pathological conditions there is a profuse vaginal discharge frequently mixed with blood which forms a heavy film on the slides. In such rich and bloody smears there is considerable crowding and overlapping of cells which, when deeply stained, can not be well differentiated. This applies more particularly to the small endometrial cells which are often found in menstrual and other uterine bleedings and have a pathognomonic value in the diagnosis of adenocarcinomas of the fundus<sup>2</sup> and of other gynecologic

The 0.5 per cent. alcoholic solutions are first prepared. As the solubility of the stains in 95 per cent. alcohol is low, the solutions are heated at the time of preparation. The solutions are kept in stock without being filtered. Stains EA 36 or EA 25 should, however, be filtered in order to eliminate undissolved particles of stain.

The staining procedure is as follows:

1. Fix smears immediately (before drying) in equal parts of 95 per cent. alcohol and ether for 5 to 15 minutes.<sup>6</sup> Rinse in 70 per cent. and 50 per cent. alcohols and in distilled water.

2. Stain in hematoxylin for 5 to 10 minutes.<sup>7</sup> Rinse

<sup>6</sup> Although smears may be kept in the fixative indefinitely, a prolonged fixation of a week or more affects the staining reaction of the cells.

<sup>7</sup> Staining for only 2 minutes is often sufficient, but, as a rule, better results are obtained with longer staining of 5 to 6 minutes for normal smears and of 8 to 10 for smears used for diagnostic purposes, more particularly for cancer diagnosis. For sections, even longer staining is advised. This timing applies more specifically to Harris Hematoxylin, prepared with domestic hematoxylin and ammonium alum, which is now used in our laboratory. In order to obtain more uniform staining, used hematoxylin should not be discarded, but filtered from time to

<sup>1</sup> From the Department of Anatomy, Cornell University Medical College, New York, N. Y. Aided by a grant by the Commonwealth Fund.

<sup>2</sup> G. N. Papanicolaou and H. F. Traut, *Jour. Obst. and Gyn.*, 42: 193, 1941.

<sup>3</sup> G. N. Papanicolaou, *Amer. Jour. Anat.*, 52: 519, 1933.

<sup>4</sup> E. Shorr, *SCIENCE*, 91: 321, 1940; *ibid.*, 91: 579, 1940; *ibid.*, 94: 545, 1941.

<sup>5</sup> G. N. Papanicolaou, *Jour. Lab. and Clin. Med.*, 26: 1200, 1941.