be oxidized are catalase (a ferrous hemin complex), hemoglobin, glutathione, sulphhydryl groups, ascorbic acid and so forth. With catalase more or less inactivated, H_2O_2 would accumulate locally. And H_2O_2 with ferric or ferrous ion (present in serum and tissues) is a rapid oxidant of sulphanilamid and of sulphapyridin. Once slowly started, more and more of the toxic oxidation products would thus be formed, in proportion as O_2 is available and H_2O_2 is produced. Bacteria in the blood stream and in regions of rich blood supply should be most exposed to the bactericidal effects. The appearance of methemoglobin is evidence of activity in the blood. Conversely, bacteria sequestered in tissues or locations (abscesses) with poor blood supply may be expected to be less accessible to the bactericidal effects. The relative immunity of host tissues to toxic effects is perhaps due to their lower oxygen tension, their higher metabolism and to higher catalase content. A dominant reducing environment should protect tissues from the sulphanilamid products in the same way as bacteria are protected from I_2 in Clark's demonstration above mentioned. In general, these hypothetical expectations appear to be in accord with clinical and experimental experience.

As the writer sees the evidence now available, the probable mode of action of sulphanilamid is that outlined in the above statement. The drug provides a mechanism by which the sterilizing oxidation intensity of molecular oxygen is applied nearly at its maximum to bacteria and unavoidably also to some extent to host cells. It is not surprising that toxic as well as therapeutic effects are observed from the use of such substances.

If the ideas here advanced are even in part correct, the new era of bacterial chemotherapy will be directly concerned with that fund of systematic information dealing with oxidation-reduction potentials and with the relation of molecular structure of organic substances to potential levels, as well as with the fascinating complexities of reactions that occur particularly among the intermediate oxidation stages of nitrogenous compounds.

From this store of information a number of predictions can at once be made. For example, if high potentials are desired, ortho rather than para substitution of the oxidizable group may be preferable. It is unlikely that the sulphonic acid group is essential to activity, though it does raise potentials and increase solubility. Hydroxyl rather than amino compounds may be useful. The applicability of these and other similar ideas will be explored and tested in future work in this laboratory.

SCIENTIFIC EVENTS

FELLOWSHIPS IN THE NATURAL SCIENCES OF THE NATIONAL RESEARCH COUNCIL

THE National Research Fellowships Board in the Natural Sciences of the National Research Council has made the following appointments for the academic year, 1939–1940:

John Nathaniel Adkins (Ph.D., seismology, University of California, 1939). The Massachusetts Institute of Technology. "The Electromagnetic Response of an Ellipsoid Imbedded in a Conducting Material."

Daniel I. Axelrod (Ph.D., tertiary paleobotany, University of California, 1939). The United States National Museum, Washington, D. C. "The Late Tertiary Floras of the Great Basin Province."

Richard Henry Bolt (Ph.D., physics, University of California at Los Angeles, 1939). The Massachusetts Institute of Technology. "The Wave Theory Approach to Room Acoustics."

Herbert Leonard Eastlick (Ph.D., chemistry, Washington University, 1936). The University of Chicago. "A Study of Pigmentation, Muscle Development, etc., by Means of Reciprocal Heteroplastic Transplants between Different Species of Avian Embryos."

Eugene Henderson Eyster (Ph.D., physical chemistry, the California Institute of Technology, 1938). The University of Michigan. "The Application of Infra-red Spectroscopy to Problems of Molecular Structure."

Frank Junior Fornoff (Ph.D., chemistry, the Ohio State University, 1939). University of California. "The Establishment of Subgroups within the Rare Earth Group of Elements by Means of Heat Capacity Studies of Rare Earth Salts."

Jackson Walter Foster (Ph.D., soil microbiology, Rutgers University, 1939). The University of Cambridge, England. "Respiration Studies on Filamentous Fungi."

Orville Goodwin Harrold, Jr. (Ph.D., mathematics, Stanford University, 1936). The University of Virginia. "The Structure of Semi-schlicht Images of a Compact Metric Space with Especial Reference to (k, 1) Transformations. The Topology of Rectifiable Curves."

Norman Harold Horowitz (Ph.D., embryology, the California Institute of Technology, 1939). Stanford University and Hopkins Marine Laboratory. "An Investigation of the Respiratory Enzymes of Developing Marine Eggs."

John Oliver Hutchens (Ph.D., zoology, the Johns Hopkins University, 1939). The Carlsberg Laboratorium, Copenhagen, Denmark. "The Carbon and Nitrogen Metabolism of Chilomonas Paramecium."

Francis Philip Jahn (Ph.D., physical chemistry, New York University, 1938). Princeton University. "Azoethane: Preparation, Pyrolysis and Photolysis, Molecular Spectra and Thermodynamic Properties of Azoethane."

Ralph Ernest Lincoln (Ph.D., genetics, the Iowa State College, 1939). Cornell University. "Mutation in *Bacterium stewartii* Including Its Pathogenicity on Maize."

John Lafayette Magee (Ph.D., chemistry, University of

Wisconsin, 1939). Princeton University. "A Theoretical Treatment of Photochemical Processes."

Joseph Miller (Ph.D., psychology, Yale University, 1939). Stanford University. "An Analysis of the Temporal Gradient of Reinforcement in Human Subjects and Its Application to Serial Behavior Sequences."

Jack Edgar Myers (Ph.D., botany, University of Minnesota, 1939). The Smithsonian Institution, Washington, D. C. "A Study of the Development of Photosynthetic Activity, Especially as it Relates to the Development of the Plant Pigments."

Myron Hiram Nichols (Ph.D., physics, the Massachusetts Institute of Technology, 1939). Princeton University. "Thermionic Work Function of Thoriated and Caesiated Tungsten for the Different Crystal Faces."

John Booth Peterson (Ph.D., soil fertility, the Iowa State College, 1936). University of California. "The Relation of the Composition of Soil Binding Material to the Stability of Soil Aggregates and the Resistance of Soils to Erosion."

Jean Barnett Piatt (Ph.D., zoology, Yale University, 1937). The University of Utrecht, Holland. "The Specificity Relationship between Individual Motor Fibers and Their Normal Muscle Field in Regenerated Forelimbs of Triturus Pyrrhogaster."

John Robert Raper (Ph.D., general biology, Harvard University, 1939). The California Institute of Technology. "The Sexual Mechanism in the Saprolegniales."

Julian Seymour Schwinger (Ph.D., physics, Columbia University, 1939). University of California. "The Theory of Nuclear Forces."

Dorothy J. Shaad (Ph.D., experimental psychology, Bryn Mawr College, 1934). The Harvard Medical School. "The Value of Controlled Bifoveal Stimulation in the Correction of Anomalous Visual Projection."

Wave Henry Shaffer (Ph.D., physics, the Ohio State University, 1939). The University of Chicago. "Interpretation of Band Spectra of Polyatomic Molecules."

Saul Winstein (Ph.D., organic chemistry, the California Institute of Technology, 1938). Harvard University. "Studies in the Walden Inversion and the Allylic Rearrangement."

George Prior Woollard (Ph.D., structural geology, Princeton University, 1937). Lehigh University. "Investigations of the Geologic Structure beneath the Atlantic Coastal Plain and Related Areas by Means of Seismic and Gravity Profiles."

EXHIBIT OF THE AMERICAN GEOGRAPHICAL SOCIETY

A COMPREHENSIVE exhibit of geographical data, maps, charts and tools of geographical research was opened on May 19 by the American Geographical Society of New York City. The exhibit, which will be free to the public while the World's Fair is in progress, was opened by W. Redmond Cross, chairman of the council of the society, at a private showing for the society's fellows. Captain Robert A. Bartlett, Arctic explorer, was a special guest for the occasion.

The exhibit is divided into sections dealing with exploration and field research, geographical fundamentals, New York City, primitive and historical maps, United States Coast and Geodetic Survey, the polar regions, photographic mapping, map of Hispanic America, economic and social conditions in the United States and international affairs. It will be open to the public from 2 P.M. to 5 P.M. daily except Mondays and Thursdays throughout the World's Fair season.

The society has prepared the exhibit as its share in providing features of unusual interest for visitors to the World's Fair. This is the first time in its eighty-six years of history that it has offered an exhibit of this nature to the general public.

Among the features of the exhibit are:

1. A map mounted on a section of the earth's surface which, if complete, would be nearly 132 feet in circumference. This section shows the actual curvature of the earth on a scale of 1: 1,000,000 and is covered with a map on that scale of the widest part of South America, from the Pacific coast of Ecuador and Peru to the Atlantic coast of Brazil. On this map, on the same scale, Mt. Everest would be 0.35 inch high and the sun would be about as far away as Philadelphia.

2. Field equipment for a modern high-altitude expedition. A nine-pound, two-man tent so designed that the stronger the wind blows the more resistant the tent becomes, air survey equipment, high-altitude stoves and radio equipment.

3. The Flyers' and Explorers' Globe, bearing the signatures and showing the routes of many famous explorers and 'round the world and transatlantic flyers. Those represented include Lindbergh, Post and Gatty, Byrd, Nansen and Wilkins.

4. New York City in maps. From the earliest plan of New Amsterdam to present-day maps illustrating the distribution and classification of buildings, the city's highway, subway and elevated, and railroad terminal systems, its complicated interlacing of power lines and telephone and telegraph offices.

5. Geographical background of the European situation. Maps which illustrate the boundaries in Europe according to language, physical and economic characteristics, religions, major soil regions, and which show political boundaries during five periods of European crisis.

6. Examples of primitive and historical maps, including an Eskimo relief map carved in driftwood and a Turkish map of the Atlantic Ocean and its coasts (1513) believed to be based on a lost map by Columbus and published at the suggestion of the late President Kemal Ataturk of Turkey.

7. Mapping by photography. Illustrations of modern methods and special mechanical equipment developed at the American Geographical Society for doing survey work by airplane and camera in a fraction of the time required by the older methods. A typical survey of an unmapped, almost unknown country, northernmost Labrador. Illustration of the work and details of the functioning of the