

SCIENCE

VOL. 102

FRIDAY, DECEMBER 21, 1945

No. 2660

<i>Chemistry of Penicillin: THE COMMITTEE ON MEDICAL RESEARCH, WASHINGTON, AND THE MEDICAL RESEARCH COUNCIL, LONDON</i>	627
<i>Science and the Government: SENATOR H. M. KILGORE</i>	630
<i>Obituary:</i> <i>Leonard Salomon Ornstein: DR. R. C. MASON. Recent Deaths</i>	638
<i>Scientific Events:</i> <i>Selective Service; Life Insurance Medical Research Fund; Staff Changes of the U. S. Geological Survey; News from Abroad</i>	639
<i>Scientific Notes and News</i>	642
<i>Special Articles:</i> <i>Further Studies on the Monkey Anti-Anemia Factor: DR. JACK M. COOPERMAN, KEITH B. MCCALL and DR. C. A. ELVEHJEM. Influenza Virus, Type B, in a Recent Outbreak of Upper Respiratory Infection: FIRST LIEUTENANT M. M. SIGEL, M. M. HART, T-SERGEANT G. HOBBS and B. GUTHNER. Transmission of the Toxicity of DDT Through the Milk of White Rats and Goats: DR. HORACE S. TELFORD and JAMES E. GUTHRIE</i>	645
<i>Scientific Apparatus and Laboratory Methods:</i> <i>A "Fog" or Aerosol Applicator for DDT: DR. CHARLES T. VORHIES and DR. LAWRENCE P. WEHRLE. Acetone CO₂ Baths: DR. R. R. MCGREGOR</i>	648
<i>Discussion:</i> <i>Nomenclature of Proteolytic Enzymes: THEODORE WINNICK and DR. DAVID M. GREENBERG. Soviet Biology: DR. KARL SAX. Science Legislation: DR. ROBERT CHAMBERS and DR. J. S. NICHOLAS</i>	648
<i>Scientific Books:</i> <i>Astronomy: DR. HARLAN T. STETSON. The Study of Human Behavior: DR. F. A. BEACH. The Story of the Wright Brothers: DR. RALPH H. McCLAREN. Books Received</i>	650

SCIENCE: A Weekly Journal, since 1900 the official organ of the American Association for the Advancement of Science. Published by the American Association for the Advancement of Science every Friday at Lancaster, Pennsylvania.

Editors: JOSEPHINE OWEN CATTELL and JAQUES CATTELL.

Policy Committee: MALCOLM H. SOULE, ROGER ADAMS and WALTER R. MILES.

Advertising Manager: THEO. J. CHRISTENSEN.

Communications relative to articles offered for publication should be addressed to Editors of Science, The Science Press, Lancaster, Pa.

Communications relative to advertising should be addressed to THEO. CHRISTENSEN, Advertising Manager, American University, 3801 Nebraska Ave., NW, Washington 16, D. C.

Communications relative to membership in the Association and to all matters of business of the Association should be addressed to the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington 25, D. C.

Annual subscription, \$6.00 Single copies, 15 cents

CHEMISTRY OF PENICILLIN

By the Committee on Medical Research, O.S.R.D., Washington, and the Medical Research Council, London

THIS brief summary of results obtained by British and American chemists, issued under the joint auspices of the Committee on Medical Research (O.S.R.D., Washington) and the Medical Research Council (London), is a preliminary notice of the principal findings secured up to the end of 1944 in a collaborative effort of a large number of investigators, unnamed at present. It implies some corrections of published data; authors of early publications are among those who have cleared up these points. For the sake of clearness, the account is not given in chronological order of development. The primary object of this communication is to disclose significant facts which have been confirmed by unequivocal synthesis and to record a few essential points which are still matter for conjecture. Full details will be published at a later stage, together with an account of experiments not referred to in this report.

Several antibiotics of the penicillin class are known

and all have the empirical formula $C_9H_{11}O_4SN_2 \cdot R$. In F-penicillin (known in Britain as penicillin-I), R is Δ^2 -pentenyl, $-\text{CH}_2 \cdot \text{CH}=\text{CH} \cdot \text{CH}_2 \cdot \text{CH}_3$; in dihydro-F-penicillin, R is *n*-amyl; in G-penicillin (known in Britain as penicillin-II), R is benzyl; in X-penicillin (also known as penicillin-III), R is *p*-hydroxybenzyl; in K-penicillin (a recent addition to the series), R is *n*-heptyl. The best elementary analyses are of pure crystalline sodium salts. Determinations of the molecular weights of the sodium salt and of the methyl ester of G-penicillin indicate that the empirical formulae truly represent the molecular weights.

The penicillins are strong monobasic acids of pK about 2.8; electrometric titration does not disclose the presence of a basic group. Slow titration with perchloric acid in acetic acid solution indicates such a group, but the penicillin is biologically inactivated by this treatment; rapid titration gives a negative result.

The ultraviolet and infrared absorptions, crystal

Science

102 (2660)

Science **102** (2660), 627-652.

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Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.