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<i>The Renal Regulation of Acid Base Balance with Special Reference to the Mechanism for Acidifying the Urine</i> : DR. ROBERT F. PITTS .....	49
<b>Obituary:</b> <i>George Lees Taylor</i> : DR. A. S. WIENER. <i>Recent Deaths</i> .....	55
<b>Scientific Events:</b> <i>The Office of War Information; The American Congress on Surveying and Mapping; The American Standards Association; The British Guiana Natural History Museum; News of European Investigators; Anniversary of the Academy of Sciences of the Soviet Union</i> .....	56
<b>Scientific Notes and News</b> .....	58
<b>Special Articles:</b> <i>Tsutsugamushi Disease in New Guinea</i> : DR. FRANCIS G. BLAKE, DR. KENNETH F. MAXCY, COLONEL JOSEPH F. SADUSK, JR., MAJOR GLEN M. KOHLS and CAPTAIN E. JOHN BELL. <i>Agglutination of Staphylococcus Aureus</i> : DR. EDWARD W. SHRIGLEY. <i>An Antigen-Antibody Reaction with Tetrahymena</i> : PROFESSOR JAMES A. HARRISON and ELIZABETH H. FOWLER. <i>Oral Administration of Penicillin</i> : DR. D. PERLSTEIN, R. G. KLUENER and A. J. LIEBMANN .....	61
<b>Scientific Apparatus and Laboratory Methods:</b> <i>Compounds for Control of Orange Decays</i> : DR. J. F. L. CHILDS and DR. E. A. SIEGLER. <i>The Electronic Blanching of Vegetables</i> : DR. JAMES C. MOYER and PROFESSOR ELMER STOTZ .....	68
<b>Discussion:</b> <i>Fagarine, a Possible Substitute for Quinidine</i> : PROFESSOR VENANCIO DEULOFEU, RAFAEL LABBIOLA, OSCAR ORÍAS, E. MOISSET DE ESPANÉS and ALBERTO TAQUINI. <i>The Effects of DDT and of Sodium Monofluoroacetate upon Physarella Oblonga Morgan</i> : DR. CYRIL E. ABBOTT. <i>Relationship between Pathogenicity and pH Tolerance of Microorganisms</i> : DR. HOBART A. REIMANN. <i>Sleeve Stoppers in Closed Systems</i> : DR. F. H. MCCUTCHEON .....	69
<b>Societies and Meetings:</b> <i>Annual Meeting of the Royal Society of Canada</i> : PROFESSOR G. H. ETTINGER .....	72
<b>Scientific Books:</b> <i>Climate and Human Health</i> : PROFESSOR H. C. BAZETT. <i>Amino Acids and Proteins</i> : DR. HANS T. CLARKE. <i>Books Received</i> .....	74
<b>Science News</b> .....	10

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## THE RENAL REGULATION OF ACID BASE BALANCE WITH SPECIAL REFERENCE TO THE MECHANISM FOR ACIDIFYING THE URINE<sup>1</sup>

By Dr. ROBERT F. PITTS

ASSOCIATE PROFESSOR OF PHYSIOLOGY, CORNELL UNIVERSITY COLLEGE OF MEDICINE

LARGE quantities of acid are continuously produced in the body by the metabolism of the various food-stuffs, yet in health the hydrogen ion concentration of the body fluids is maintained remarkably constant. This regulation of balance between the acidic and basic constituents of the body fluids is dependent upon both respiratory and renal homeostatic mechanisms. In a quantitative sense the rate of production of carbonic acid, amounting to about 20 mols per

<sup>1</sup> Presented as an Abraham Flexner Lecture at Vanderbilt University School of Medicine on April 20, 1945, and as a Lecture in Medicine at the University of Utah School of Medicine on May 18, 1945.

day, far exceeds the rate of production of other metabolic acids. But because of the volatility of its anhydride, carbon dioxide, carbonic acid is readily and rapidly eliminated by the lungs. Less than one one-hundredth of this quantity of phosphoric and sulfuric acid is produced each day, yet the excretion of these acids, which is effected largely by the kidneys, is in some ways a greater problem than is the excretion of the much larger quantities of carbonic acid. Rarely does any disease process lead to a disturbance of acid base balance because it interferes with the elimination of carbon dioxide in the lungs.

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