

were influencing ventilation. It is pertinent to remark that the procedure employed was not described in the *Science* report which Krueger read. His "demonstration" consists of replacing BHCO_3 for pCO_2 in the equation, leaving *two* essential variables still present, and thus confirming my statement that one variable alone does not account for the experimental data.

(5) Krueger takes exception to my analysis of the respiratory response to exercise because I assumed that metabolism is not increased by passive exercise. This analysis was adequately labeled as incomplete and preliminary; the tentative nature of the *quantitative* values was indicated. The *qualitative* validity of the conclusions requires only that passive exercise produce less increase in metabolism than in ventilation in comparison with active exercise.

(6) It is claimed that in referring to Nielsen's theory I state "categorically" that a unique potency of CO_2 is denied by the fact that Nielsen obtained a response to both acid and CO_2 . My statement was that the occurrence of responses to both agents denied the conclusion Nielsen drew from them, namely, that only *one* was a potent stimulus. Krueger further states that I "overlooked" the fact that the injection of acid causes hypercapnia, which could be responsible for the respiratory response to the acid. The truth is that I have analyzed the acute responses to injected acid in detail (4). Unfortunately, Krueger seems to have "overlooked" the

fact that Nielsen did *not* inject acid, but fed NH_4Cl and that he observed *apapnia* (as have all others) and not hypercapnia.

The title I selected for my theory has turned out to be an unfortunate one, in that it does not adequately distinguish it from other theories. The consequences have been that the theory is superficially judged to be no different from others, since its title can be appropriately applied to others. Many theories have included multiple *factors* presumed to operate by controlling the concentration of a unique stimulus or by controlling the sensitivity of the respiratory center to a unique stimulus. The multiple factor theory differs from these in that it postulates multiple *stimuli* exerting individual or partial effects. Gesell's and Nielsen's theories, therefore, are appropriately classified as multiple factor theories, and mine might better have been called the multiple stimulus theory.

References

1. GRAY, J. S. AAF School of Aviation Medicine, Projects No. 131, April 12, 1943; No. 290, July 15, 1943; No. 291, July 19, 1943.
2. GRAY, J. S. AAF School of Aviation Medicine, Project No. 310, August 26, 1944.
3. GRAY, J. S. AAF School of Aviation Medicine, Project No. 386, Report No. 1, May 7, 1945.
4. GRAY, J. S. AAF School of Aviation Medicine, Project No. 386, Report No. 2, December 14, 1945.
5. GRAY, J. S. AAF School of Aviation Medicine, Project No. 386, Report No. 3, November 21, 1945.
6. GRAY, J. S. *Science*, 1946, **103**, 739-744.

Chemical Research Conferences, AAAS, 1947:

Colby Junior College, New London, New Hampshire, June 16-August 22

W. George Parks, *Director*,
Rhode Island State College, Kingston

INFORMATION ON THE CHEMICAL RE-
search Conferences for 1947 with respect to location,
purpose, and registration was published in the
preliminary announcement in *Science* (March 14, 1947).

Requests for attendance at the Conferences or for any
additional information should be addressed to W. George
Parks, Department of Chemistry, Rhode Island State
College, Kingston, Rhode Island. From June 15 to
August 20, 1947, mail should be addressed to Colby
Junior College, New London, New Hampshire.

The final program follows:

ORGANIC HIGH POLYMERS

C. C. Price, *Chairman*; W. O. Baker, *Vice-Chairman*

June 16 C. S. Marvel, "New Monomers for Synthetic
Rubber"; R. L. Frank and Norman Rabjohn, "Structure of
Synthetic Rubbers."

June 17 G. S. Whitby, "Proliferous Polymerization of
Butadienes"; John Rehner, Jr., "The Polyisobutylene Reac-
tion."

June 18 A. J. Warner, "New Polymers"; H. Mark,
"Cyclo-octotetraene."

June 19 A. V. Tobolsky, "Aging and Degradation of
Polymers"; E. H. Farmer, "Thermally-promoted Olefinic
Reactivity and Polymerization."

June 20 M. G. Evans, The University, Leeds (tentative).

CATALYSIS

Waller G. Frankenburg, *Chairman*; H. S. Taylor, *Vice-Chairman*

June 23 Aristid V. Grosse, "Concept of Catalytic Chem-
istry"; H. S. Taylor, "New Data on the Heterogeneity of
Catalytic Surfaces."

June 24 James B. Sumner, "Chemical Nature of Bio-
catalysts; Problems Concerned With the Isolation of En-
zymes"; Paul H. Emmett, "Adsorption of Carbon Monoxide
and Hydrogen on Carbided Iron Catalysts."

June 25 Otto Beeck, "Thermodynamic and Mechanical Statistical Aspects of Catalysis"; Thomas W. DeWitt, "Mechanism Studies with C^{14} on Iron Fischer-Tropsch Catalysts"; P. W. Selwood, "Magnetochemistry and the Structure of Catalytically Active Solids."

June 26 Marion Armbruster, "Sorption of Gases on a Plane Surface of Stainless Iron-Chromium-Nickel Alloys at 20°, -78°, and -185°C."; M. Jellinek, I. Frankuchen, R. Ward, and M. Erchak, "X-Ray Diffraction in the Study of Catalysts."

June 27 Herman E. Ries, Jr., "Adsorption Studies of Some Supported Catalysts and Their Supports."

PETROLEUM

W. G. Lovell, *Chairman*; O. Beeck, *Vice-Chairman*

June 30 F. D. Rossini, "Hydrocarbons in Petroleum"; S. S. Kurtz, "Analysis of Petroleum Products for Hydrocarbon Types."

July 1 H. M. Smith, "Survey of Composition of American Petroleums"; A. C. Fieldner, "Synthetic Fuels and Shale Oil."

July 2 Clark Goodman, "Physical and Chemical Changes Produced by Nuclear Radiations"; A. M. Rothrock, "Power Production From Petroleum."

July 3 J. R. Bowman, "Theory of Distillation and Related Separation Processes"; Manson Benedict, "Diffusion Separation Processes."

July 4 O. Redlich, "Azeotropic and Extractive Separations."

TEXTILES

W. A. Sisson, *Chairman*; Ross C. Whitman, *Vice-Chairman*

July 7 Eugene Pacsü, "Molecular Structure of Cellulose and Its Relationship to Chemical Degradation"; Clifford B. Purves, "Some Aspects of the Chemical Reactivity of Cellulose."

July 8 John A. Howsmon, "Fine Structure, Moisture Regain, and Physical Properties of Rayon"; R. F. Nickerson, "Reaction of Cellulose With Formaldehyde Compounds and Its Effect on Fiber Properties."

July 9 Alfred E. Brown and Milton Harris, "Natural Protein Fibers"; Harold P. Lundgren, "Synthetic Protein Fibers."

July 10 Charles F. Goldthwait, "Swelling of Cotton and Its Utilization in Water-resistant Fabrics"; J. H. Dillon, "Harold DeWitt Smith Memorial Program"; A. K. Schneider, "Sorption of Acid Dyes by Nylon."

July 11 Earl K. Fischer and Charles H. Lindsley, "Rheological Properties of Compositions Used in the Textile Industry."

CORROSION

K. G. Compton, *Chairman*; I. A. Denison, *Vice-Chairman*

July 14 H. H. Uhlig, "Electrochemical Theory of Corrosion"; R. B. Mears, "Factors Affecting the Rate of Atmospheric Corrosion."

July 15 W. S. Loose, "Atmospheric Corrosion of Light Metals"; R. H. Brown, "Atmospheric Corrosion of Light Metals"; A. W. Tracy, "Atmospheric Corrosion of Non-

ferrous Metals"; W. E. Campbell, "Indoor Atmospheric Corrosion of Nonferrous Metals."

July 16 Harry R. Copson and W. O. Binder, "Atmospheric Corrosion of Iron and Ferrous Alloys"; C. H. Sample, "Atmospheric Corrosion of Metallic Protective Coatings."

July 17 I. A. Denison, "Underground Corrosion"; R. B. Hoxeng, "Cathodic Protection of Underground Structures by Means of Light Metals."

July 18 R. L. Starkey, "Bacteria and Underground Corrosion"; Paul Weir, "Water Supply Corrosion Tests; A Ten-Year Progress Report."

MEDICINAL CHEMISTRY

E. H. Northey, *Chairman*; J. M. Sprague, *Vice-Chairman*

July 21 ENZYME CHEMISTRY: Carl Vestling, "General Survey"; Sherman Dickman, "Fatty Acid Oxidation"; I. C. Gunsalus, "Transformations of Amino Acids"; M. E. Kralh, "Enzymes for Carbohydrate Utilization in Animal Tissue."

July 22 ANTIBIOTICS: Karl Folkers, "Chemistry of Streptomycin"; C. J. Cavallito, "Antibiotics From Plants"; O. Wintersteiner, "Some Aspects of Penicillin Chemistry."

July 23 (a) CURARE AND CURARE-LIKE DRUGS, (b) FOLIC ACID: J. D. Dutcher, "Chemistry of Curare Alkaloids"; A. R. McIntyre, "Theories of Curarization"; James M. Smith, Jr., "Chemistry of Folic Acid and Related Substances."

July 24 VETERINARY MEDICINE: W. A. Hagan, "Problems for Chemotherapeutic Research in Veterinary Medicine"; A. O. Foster, "Incidence and Treatment of Parasitic Diseases"; Emanuel Waletzky, "Chemotherapy of Coccidiosis."

July 25 TUBERCULOSIS: Guy P. Youmans, "Testing of Tuberculostatic Agents *in Vitro* and in the Mouse"; W. H. Feldman, "The *in Vivo* Evaluation of Substances Effective Against the Tubercle Bacillus."

VITAMINS

D. W. Woolley, *Chairman*; Floyd S. Daft, *Vice-Chairman*

July 28 P. L. Harris and E. L. Hove, "Treatment of Experimentally Induced Stomach Ulcers With Tocopherol"; N. B. Guerrant, "Recent Developments in Vitamin A Standardization and Assay"; W. Trager, "A Fat-soluble Substance With Biotin Activity and Its Relation to the Course of Avian Malaria."

July 29 H. R. Bird, "Studies on an Unknown Growth Factor in Cow Manure"; C. A. Cary and A. M. Hartman, "I. Evidence of the Existence of a Still Unidentified Growth Factor in the Nutrition of the Rat. II. Relation Chemically and Nutritionally to Protein, and Occurrence in Various Prepared Caseins and Other Sources of Protein"; D. W. Woolley, "Streptogenin."

July 30 W. E. Knox, "Identification of New Metabolites of Nicotinic Acid"; D. M. Bonner, "Precursors in the Biosynthesis of Nicotinic Acid"; G. Goldsmith and H. P. Sarett, "Interrelationship of Tryptophane and Nicotinic Acid Metabolism in Man."

July 31 J. Schultz and G. T. Rudkin, "Requirements for Growth of *Drosophila* on the Chemically Defined Medium"; G. Fraenkel, "Nutritional Requirements of Insects"; C. N. H. Long, "Relation of Ascorbic Acid to Adrenal Cortical Function."

August 1 W. D. Salmon, D. H. Copeland, and R. W. Engel, "Production of Neoplasms as a Result of Prolonged Choline Deficiency"; T. Gillman, "Pathological Reactions Encountered in the Livers of Malnourished South African Negroes, With Some Observations on the Response of the Hepatic Lesions to Therapy as Revealed by Serial Aspiration Biopsies."

FOOD AND NUTRITION

Lawrence Atkin, Chairman; P. L. Harris, Vice-Chairman

August 4 Gerald J. Cox, "Caries and Nutrition in Human Subjects"; James H. Shaw, "Diet and Experimental Caries"; Discussion leader, Philip Jay. Curt P. Richter, "Self-Selection of Diets"; Heinrich Waelsch, "Nutrition and Brain Function"; Discussion leader, Edward M. Scott.

August 5 H. N. Brocklesby and C. E. Lane, "Some Aspects of the Physiology of Vitamin A"; Discussion leader, H. Sobotka. Walter O. Lundberg, "Food Antioxidants—Fat Soluble"; Roy W. Riemenschneider, "Water-soluble Antioxidants"; Discussion leader, Philip L. Harris.

August 6 Abraham White, "Nutrition and Endocrine Function"; Paul György, "Diet, Liver and Sex Hormones"; Discussion leader, to be announced. Lemuel D. Wright, "Intestinal Microorganisms and Animal Nutrition"; Milicent L. Hathaway, "Intestinal Synthesis of Food Factors Essential for Human Nutrition"; Discussion leader, to be announced.

August 7 M. L. Anson, "Sugar-Protein Reaction, Significance and Methodology"; Earl R. Stadtman, "Chemistry of the Sugar-Protein Reaction"; Discussion leader, J. P. Kass. Donald K. Tressler, "Enzymes in the Food Industry"; Z. I. Kertesz, "Pectins and Pectic Enzymes"; Discussion leader, Carl R. Fellers.

August 8 H. H. Mitchell, "Evaluation of Proteins and Hydrolysates *in Vivo*"; R. J. Block, "Evaluation of Proteins and Hydrolysates *in Vitro*"; Discussion leader, D. Melnick.

CANCER

A. M. Brues, Chairman; Paul S. Henshaw, Vice-Chairman

August 11 Chairman, A. M. Brues. W. H. Summerson, H. Gilder, and J. M. Lee, "Metabolic and Enzymatic Characteristics of Lymphosarcoma"; Symposium on Nucleic Acid Metabolism, Samuel Graff and Hardin B. Jones.

August 12 Chairman, Paul C. Aebersold. Symposium on Radioactive Isotopes in Therapy of Malignant Disease. Paul F. Hahn and C. W. Sheppard, "Radioactive Colloidal Sols"; Rulon W. Rawson, "Radioactive Iodine"; Byron E. Hall, "Radioactive Phosphorus"; Anna Goldfeder, "Radiation Effects on Normal and Malignant Tissues."

August 13 Chairman, Chester Stock. Round Table Discussions on Methods and Results in Chemotherapy of Malignant Disease, Joseph Burchenal, B. E. Hall, D. A. Karnofsky, Robert Mellors, Richard Ormsbee, F. S. Philips, E. B. Schoenbach, C. L. Spurr, K. Sugiura.

August 14 Chairman, Gray H. Twombly. Symposium on Carcinogenic Action of Acetylaminofluorene, K. E. Paschkis and A. Cantarow; H. P. Morris, C. S. Dubnik, T. B. Dunn, J. W. Thompson and B. B. Westfall, V. Suntzeff, "Influence of Aging on Development of Epidermal Cancer"; Roy Hertz, "Inhibition of Estrogen-induced Tissue Growth by Progesterone."

August 15 Chairman, Paul S. Henshaw. Mark W. Woods and H. G. DuBuy, "Similarity of Action of Chondriogenes and Viruses"; P. A. Gorer, "Antibody Responses in Transplanted Tumors."

INSTRUMENTATION

C. O. Fairchild, Chairman; J. C. Peters, Vice-Chairman

August 18 Robert B. Jacobs, "High-Vacuum Measurement and Control"; R. L. Garman, "Physical Properties Not Commonly Used in Indirect Measurement"; C. M. Albright, Jr., and C. H. Neilsen, "Unsolved Control Problems of the Chemical Industry."

August 19 Ralph H. Müller, "Electronics in Modern Analytical Chemistry"; Donald P. Campbell, "Practical Application of Automatic Control Theory"; Ralph E. Clarridge, "Organization and Functions of an Application Engineering Department."

August 20 Norman Wright, "Application of Infrared Measurements in Industry"; John J. Grebe, "Application of Control Principles to Human Behavior."

August 21 James J. Lingane, "Polarography"; J. C. Mouzon, "Low-Temperature Radiation Pyrometry in Industry."

August 22 W. J. Eckert, "Field of Usefulness of Various Mechanical and Electrical Calculators."

