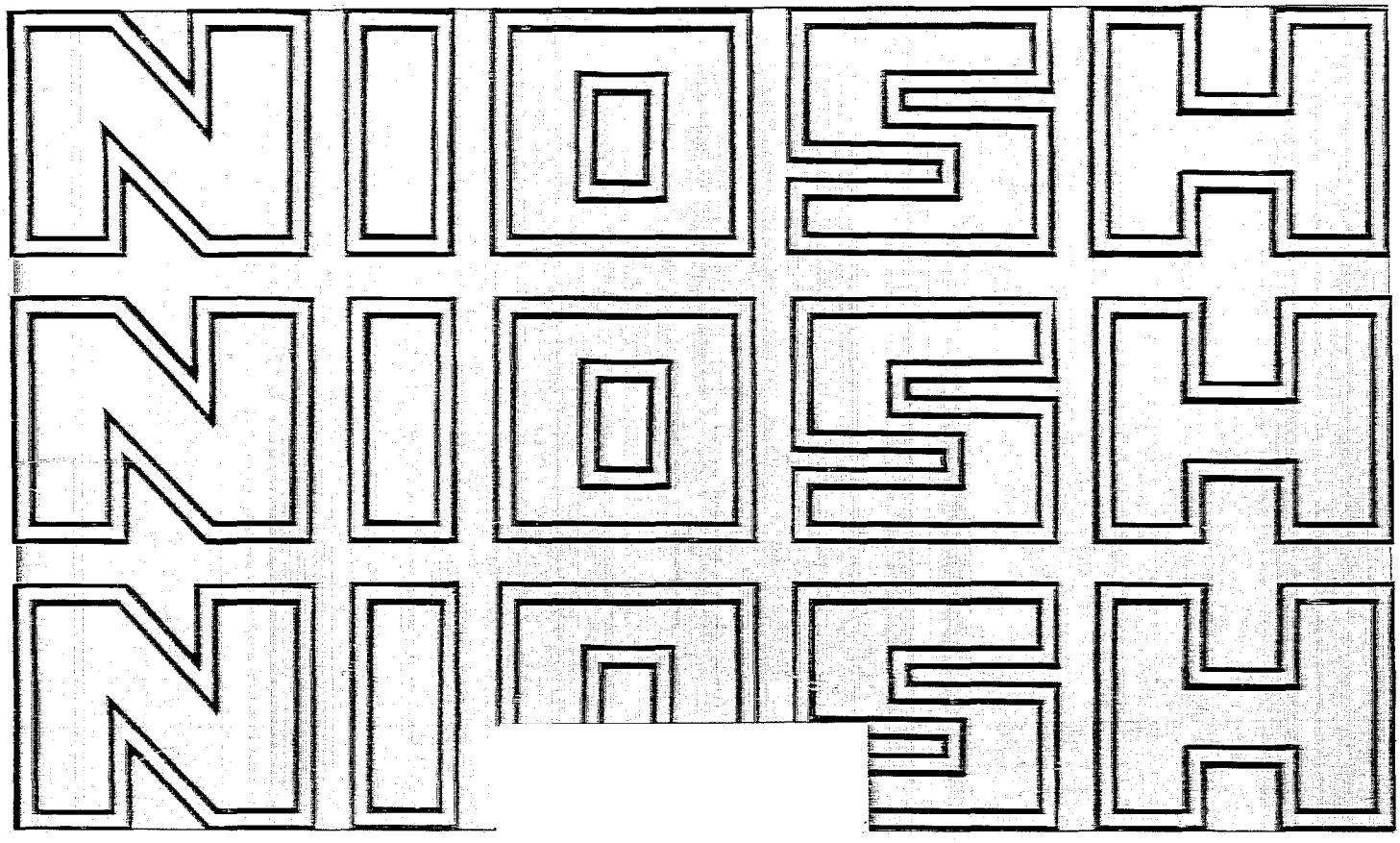
NIOSH

OCCUPATIONAL SAFETY AND HEALTH RESEARCH AND DEMONSTRATION GRANTS F.Y. 1975



OCCUPATIONAL SAFETY AND HEALTH

RESEARCH AND DEMONSTRATION

GRANTS

FY 1975

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health
Office of Extramural Activities
Cincinnati, Ohio 45202
July 1975

HEW Publication No. (NIOSH) 76–101

FOREWORD

The National Institute for Occupational Safety and Health (NIOSH) plans, directs, and coordinates the national program effort to develop and establish recommended occupational safety and health standards and to conduct research, training, and related activities to assure safe and healthful working conditions for every working man and woman. Under the provisions of the Federal Coal Mine Health & Safety Act of 1969, and the Occupational Safety & Health Act of 1970, research investigations, particularly those in which dose-effect relationships may be identified and quantified thereby leading to the development of effective standards, represent one of the principal areas of responsibility of NIOSH.

In fulfilling its mission, the NIOSH employs many mechanisms including the making of grants to eligible institutions and organizations for the purpose of supporting research projects relating to innovative approaches to understanding the underlying characteristics of occupational safety and health problems and for effective solutions in dealing with them. Grant support is also available for demonstration projects which are designed to demonstrate, either on a pilot or full-scale basis, the technical and economic feasibility of new or improved methodologies in dealing with occupational safety and health problems amenable to technological solutions.

This booklet which has been prepared to describe the research and demonstration projects supported through grants, should be of interest and assistance to appropriate institutions, organizations, agencies, and individuals such as scientists, engineers, physicians, and others currently engaged in or contemplating activities germane to the responsibilities and functions of NIOSH.

John F. Finklea, MD

John F. Finklea, M.D.
Director
National Institute for Occupational
Safety and Health

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INTRODUCTION

Project grants for research and demonstrations are available to universities, colleges, research institutions, and other public and private non-profitmaking organizations for the support of scientific and technical activities in all the areas of occupational safety and health which sustain and undergird the mission and functions of the National Institute for Occupational Safety and Health.

Examples of appropriate research fields and activities include: 1) Laboratory, clinical, and epidemiologic investigations of diseases, pathologic changes, physiologic and psychologic alterations which arise, or are presumed to arise, from an occupational causation; aspects of prevention, diagnoses, therapy, disease processes and mechanisms, and interpretations of abnormalities are apropos. Specific subjects of interest include: effects (acute, subacute, chronic) of toxic chemicals, metals, dusts, fumes, gases and other fluids, mists, and aerosols, acting upon any organ or body system; effects of physical agents, including heat, cold, electromagnetic energy of certain wavelengths, noise, vibration, and pressure changes; effects of living disease agents under conditions of major emphasis on the occupational involvement in the transmission or modification of human physiologic or behavioral response. 2) Investigations of psychologic and motivational factors in occupational situations and their impact on mental health and job performance. Included in this category are studies of effects of impaired physical, mental, and emotional states on safe and effective work performance and the appropriate placement and observation of workers with physical, mental, or emotional impairments. 3) Research studies of safety factors in work flow, plant design, work operations, man-machine interrelationships, and occupational environmental situations. 4) Research on methods development, evaluation, and application for the sampling, analysis, measurement or other objective appraisals of chemical, physical, biological, motivational and behavioral and other components of the occupational environment and of the extent of exposure to these components. 5) Epidemiologic, biometric, and demographic studies of morbidity and/or mortality of human beings exposed to occupational and industrial hazards and the development, evaluation, and application of methods for diagnosing and measuring the effects of such hazards. 6) Investigations of capacities of workers to withstand and deal with occupational stresses in their work environments, and the development and evaluation of methods for protection of workers from such harmful environmental factors. 7) Investigations of interrelationships between employment conditions and the onset, development, and course of chronic diseases. 8) Studies on the nature of fatigue and its role in worker susceptibility to accidents and occupational illness. 9) Investigations of socio-economic factors related to, or arising from, occupational disease. 10) Studies on absenteeism and its causes. 11) Studies of the factors involved in the development, function, and utilization of occupational health programs.

Grants are made under the authority of applicable legislation and in accordance with the prescribed rules and regulations of the Department of Health, Education, and Welfare and the National Institute for Occupational Safety and Health. All applications for research and/or demonstration grant support are initially reviewed according to established schedules by a consultative committee of distinguished scientific and technical experts, constituted as a study section using the peer review system, who provide objective appraisals of scientific merit of each proposal. These recommendations are then reviewed by (an advisory Council in some cases as appropriate) the Institute for a funding determination within available budgets, taking into account program relevance and consonance with public policy.

All inquiries about research and demonstration grant applications, eligibility, guidelines, regulations, review schedules, program and procedural matters, and the like should be addressed to:

Office of Extramural Activities
National Institute for Occupational Safety and Health
Post Office Building, Room 501, 5th and Walnut Streets
Cincinnati, Ohio 45202

BEHAVIORAL AND MOTIVATIONAL FACTORS

UNIVERSITY OF MIAMI
Coral Gables, Florida

GRANT NUMBER: 5 R01 OH 00346-03

PRINCIPAL INVESTIGATOR:

Earl L. Wiener, Ph.D.
Management Science
University of Miami
Coral Gables, Florida 33124

TITLE:

Computer-Based Training for Watchkeeping Tasks

OBJECTIVES:

This project is directed toward demonstrating the feasibility of automated training for monitoring or vigil-keeping tasks.

DESCRIPTION:

Watchkeeping or monitoring tasks are those for which an operator must maintain a vigil over a system which may display signals or signs of abnormalities or dangerous conditions. Training sessions are automated by use of a computer-based system which schedules and delivers critical signals and non-critical stimuli, allows the trainee to elect certain options regarding his own trainings, and permits him to test himself. The system allows for adaptive training in which the difficulty of the training task can be linked automatically to the performance of the operator, thereby permitting him to progress rapidly toward a desired performance level when his responses merit it. Simpler problems and tutorial instruction may be administered when warranted; that is when performance level does not indicate satisfactory progress.

PUBLICATIONS:

Wiener, E. L.: Adaptive Measurement of Vigilance Decrement. Ergonomics 16: (4) 353-363 (1973).

Wiener, E. L. and F. L. Keeler: Adaptive Strategies in Vigilance Research. Submitted to Ergonomics (1973).

Wiener, E. L.: Individual and Group Difference in Inspection. Manuscript presented at International Symposium on Human Factors in Quality Control (Buffalo) To be published by Taylor & Francis, Ltd., London, as Human Reliability in Quality Control. (May 1974).

Wiener, E. L.: Loss of Mobility: Elderly Drivers and Ex-Drivers. Presented at A.M.A.-A.A.M.V.A. Conference on the Aging Driver, Washington, May 1974.

Wiener, E. L.: An Adaptive Vigilance Task with Knowledge of Results. Human Factors 16: (4) 333-338, August 1974.

Wiener, E. L.: On Simultaneous Monitoring and Tracking. J. of Applied Psychology 60: (1) 100-105 (1975).

Wiener, E.L.: Computer-Based Training for Watchkeeping Tasks. Final Progress Report (covering period 02/01/71-08/31/74). April 1975.

UNIVERSITY OF MICHIGAN
Ann Arbor, Michigan

GRANT NUMBER: 3 R01 OH 00423-01S1

PRINCIPAL INVESTIGATOR:

John R. P. French, Jr., Ph.D.
Senior Research Scientist
Institute for Social Research
University of Michigan
Ann Arbor, Michigan 48106

TITLE:

Working Conditions, Job Satisfaction, and CHD Risk

OBJECTIVES:

The central aim of this research is the testing of the proposition that intrinsic job satisfaction plays an important role in the etiology of coronary heart disease (CHD). It is proposed that: 1) working conditions which involve low intrinsic job satisfaction and high job stress will produce high psychological strain; 2) psychological strain will be positively related to physiological strains which constitute risk factors in coronary heart disease (e.g. high blood pressure, cholesterol, etc.); 3) therefore, these working conditions will be related to risk factors in heart disease; and 4) under conditions which involve control on urbanization, standard of living, diet, and extrinsic job satisfactions (pay and status), any differences between factory workers and farm workers in risk of coronary heart disease can be accounted for by (a) differences in exercise and (b) differences in intrinsic job satisfaction.

DESCRIPTION:

In a population of 750 male kibbutznikim, comprising farm workers and factory workers, from various kibbutzim all over Israel, representing all three kibbutz movements, a questionnaire will be administered to measure working conditions (intrinsic job satisfiers, stresses, psychologic strain). On the same day, medical examinations will be administered to the same subjects to measure heart rate, blood pressure, cholesterol, gluclose, triglycerides, smoking, obesity, and EKG. Extrinsic job satisfiers are controlled (pay and status). Also controlled are urbanization, diet, standard of living, and life style. Methods of analysis include standard statistical techniques with advanced computer programs.

The investigators aver that if the basic premise underlying this research should be shown to be true, then it is conceivable that the incidence of CHD could be reduced by increasing intrinsic job satisfaction.

PUBLICATIONS:

None

NEW YORK UNIVERSITY MEDICAL CENTER
New York, New York

GRANT NUMBER: 1 R01 OH 00432-01

PRINCIPAL INVESTIGATOR:

Erwin R. Tichauer, Sc.D., PE (Qld)
Division of Biomechanics
New York University Medical Center
Institute of Rehabilitation Medicine
400 East 34 Street
New York, New York 10016

TITLE:

Antihistamine Effects of Motor Skills and Vigilance

OBJECTIVES:

The goal of this research is to determine the extent to which subjects in "realistically-simulated industrial work situations," after the ingestion of antihistamines (chorpheniramine maleate), a) show changes in sensory-motor function (which may lead to hazardous equipment operation), and b)show changes in reaction time and decision-making processes during tasks requiring vigilance. The widespread use of these drugs (antihistamines) and their potential to induce drowsiness are recognized as a basis of need to evaluate their effects.

DESCRIPTION:

This is essentially a pilot investigation involving 12 normal female subjects, between the ages of 21 and 50, who are subjected to a series of tests of task performance after administrations, at different times, of two-levels of antihistamine and one placebo. Eye-hand responses to light activations in an array are measured and analyzed in relation to antihistamine dosage. The equipment used was developed in the laboratories of the principal investigator.

Activity levels of the biomechanical parameters of motion, i.e., reaction time and errors (primarily), displacement, velocity, and acceleration are recorded simultaneously with surface integrated myograms of muscles of the neck rotating the head, the muscles involved in eye movement, and selected muscle groups involved in fine manipulation. Losses of "normal" function may be correlated with potential industrial accidents.

PUBLICATIONS:

Tichauer, E.R. and L.B. Harrison: Antihistamine Effects on Motor Skills and Vigilance. Final Progress Report (Covering period 06/01/73-09/30/74).

UNIVERSITY OF MICHIGAN
Ann Arbor, Michigan

GRANT NUMBER: 1 R01 OH 00563-01

PRINCIPAL INVESTIGATOR:

John R. P. French, Jr., Ph.D.
Senior Research Scientist
Institute for Social Research
University of Michigan
Ann Arbor, Michigan 48106

TITLE:

Job Demands and Worker Health: II

OBJECTIVES:

The specific aims of this research are 1) to identify families of jobs in terms of their stresses; 2) to discover the extent to which relationships between job demands and strain hold within occupations; 3) to discover the extent to which interactions between characteristics of the person and demands of the job as predictors of strain hold within all occupations; 4) to identify the ways in which social support differs from occupation to occupation; 5) to identify sets of stresses which may affect unique sets of strains; and 6) to coordinate the results with those of the 1972-73 Quality of Employment Survey.

DESCRIPTION:

This study will examine and test additional hypotheses relating occupational stresses (social-psychological work hazards), personality, and social support to risk factors in coronary heart disease and to status of job satisfaction and other indicators or job-related mental well-being.

To provide a theoretical framework for the research, a general model of the relationships between job demands, worker characteristics, social support and strain has been adopted.

Statistical analysis of relationships between job demands, characteristics of the person and strain will be conducted utilizing data from 2,019 male employees from over 100 work sites representing over 20 blue and white collar occupations.

PUBLICATIONS:

None

BIOLOGICAL AND ENVIRONMENTAL SAMPLING AND ANALYSIS

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00371-02

PRINCIPAL INVESTIGATOR:

James R. Rockwell, Jr.
Department of Dermatology
Cincinnati General Hospital
University of Cincinnati
Cincinnati, Ohio 45229

TITLE:

Occupational Hazards of Laser Material Processing

OBJECTIVES:

This project aims at determining the characteristics and defining the scope of the occupational hazards associated with the processing of a wide variety of materials by means of laser radiation.

DESCRIPTION:

There are four phases of this project which, to some degree, overlap in time:

1) The first phase is a survey of existing commercial laser systems used for materials processing comprising a literature search, project review, and exchanges of correspondence with laser manufacturers and users.

2) the second phase involves laboratory testing of equipment for reflected light hazards and the measurement of particulate and gaseous by-products produced as a consequence of laser irradiation of various materials such as metals, plastics, and possibly other materials such as synthetic fabrics.

3) The third phase is a field survey of exposures of laser operators to dusts produced by laser uses under actual plant conditions.

4) The final phase is the preparation of a laser safety and control program for laser operators. This includes sections on medical surveillance, area control, eye and skin hazards, respiratory hazards, and education and training.

PUBLICATIONS:

None

DERMATOLOGY

UNIVERSITY OF PENNSYLVANIA
Philadelphia, Pennsylvania

GRANT NUMBER: 5 R01 OH 00303-17

PRINCIPAL INVESTIGATOR:

M. H. Samitz, M.D.
University of Pennsylvania Hospital
Duhring Laboratory Building
Philadelphia, Pennsylvania 19104

TITLE:

Clinical and Laboratory Studies of Metal Sensitivity

OBJECTIVES:

This research project is designed to investigate the biochemical reactions of chromium, nickel, cobalt, and mercury ions with skin proteins, mucopolysaccharides, and synthetic polypeptides. Included are studies of the diffusion of metallic ions through the skin and investigations, in guinea pigs, of the immunologic properties of antigens prepared *in vitro*.

DESCRIPTION:

Both *in vitro* and *in vivo* (animal) studies are performed to elucidate the role of heavy metal ions in metallic sensitivity. Emphasis has been on investigations involving chromium although nickel, cobalt, and mercury are included. Some insights on protective chemical agents have been developed against industrial chromate hazards. These have been pursued with the aim of correlating information with the mechanism of allergic eczematous chromium dermatitis.

Studies in the diffusion of metal ions through human skin (obtained at autopsy) are made with radioactive metals. Radioactive tracers are also used to determine metal binding to proteins. Assays of trace metal content of skin, hair, and nails (obtained from industrial workers) are performed by means of neutron activation analytical techniques. Investigations are also made of the efficacy of barrier creams and metal inactivating agents in the protection against mercury, nickel, and chromium metal dermatitis. Clinical tests are made under field conditions. The investigators claim that data obtained from this research can provide guidelines for future efforts to study delayed allergy in man.

PUBLICATIONS:

Samitz, M. H.: Ascorbic Acid in the Prevention and Treatment of Toxic Effects from Chromates. Acta. Derm. (Stockholm) 50: 59-64 (1970).

UNIVERSITY OF PENNSYLVANIA

Schmunes, E., et al.: Techniques of Sensitization of Guinea Pigs with Chromium Salts--A Comparative Study. Environ. Res. 5: 127-134 (1972).

Schmunes, E., Sidney A. Katz, and M.H. Samitz: Chromium-Amino Acid Conjugates as Elicitors in Chromium-Sensitized Guinea Pigs. J. Inves. Derm. 60: (4) 193-196 (1973).

Samitz, M.H.: Prevention of Occupational Skin Diseases from Exposures to Chromic Acid and Chromates. Use of Ascorbic Acid. Section of Industrial Dermatology, Dept. of Dermatology, Univ. of Pennsylvania, School of Medicine, Philadelphia, Pennsylvania (1973).

Samitz, M.H., Sidney A. Katz, and A.W. Klein: Techniques of Sensitization of Guinea Pigs with Nickel Complexes. A Comparative Study (1973).

Samitz, M.H.: Prevention of Occupational Skin Diseases from Exposure to Chromic Acid and Chromates: Use of Ascorbic Acid. CUTIS 13: 569-574 (April 1974).

Katz, S.A., D.M. Scheiner, A.W. Klein, and M.H. Samitz: Chromium Complexes with Proteins Mucopolysaccharides and Their Relationship to Chromium Allergy in Sensitized Guinea Pigs. Environ. Res. 7: (2) 212-219 (April 1974).

Samitz, M. and S.A. Katz: Nickel Dermatitis Hazards from Prostheses. In Vivo and In Vitro Solubilization Studies. Brit. J. Derm. 92: 287-290 (1975).

UNIVERSITY OF WASHINGTON
Seattle, Washington

GRANT NUMBER: 5 R01 OH 00321-06

PRINCIPAL INVESTIGATOR:

John E. Milner, M.D.
Department of Environmental Health
and Community Medicine
University of Washington
Seattle, Washington 98105

TITLE:

In Vitro Studies of Occupational Dermatitis

OBJECTIVES:

This research is directed toward the development of in vitro tests describing cellular responses characterizing the delayed hypersensitivity skin reaction to dinitrofluorobenzene. The aim is to devise a practical method of diagnosing clinical contact hypersensitivity in vitro, thereby avoiding many of the inherent limitations and dangers of the standard patch test of applying suspected contact allergens to the skin of the patient.

DESCRIPTION:

The basic protocol of this project includes the lymphocyte transformation system of guinea pigs sensitized to dinitrofluorobenzene - skin protein conjugates. The endpoint being measured consists of counting the proportion of blast cells after appropriate incubation, in vitro, as well as incorporation of tritiated thymidine. Applications to human beings will be sought after guinea pig data are satisfactorily definitive.

PUBLICATIONS:

Milner, J.E.: In Vitro Lymphocyte Responses to Contact Hypersensitivity. J. Inves. Derm. 55: (1) 34-38 (1970).

Milner, J.E.: In Vitro Lymphocyte Responses to Contact Hypersensitivity. II. J. Inves. Derm. 56: (5) 349-352 (1971).

Milner, J.E.: In Vitro Lymphocyte Responses to Contact Hypersensitivity. III. J. Inves. Derm. 58: (6) 388-391 (1972).

Milner, J.E.: Prevention of Environmental Dermatitis. Post Grad. Med. 51: (1) 135-137 (1972).

Milner, J.E.: Occupational Dermatitis: In Vitro Studies. CUTIS 13: 620-623 (April 1974).

UNIVERSITY OF WASHINGTON

Milner, J.E.: In Vitro Lymphocyte Responses in Contact Hypersensitivity. IV. J. Inves. Derm. 62: 591-594 (1974).

Milner, J.E.: In Vitro Studies of Occupational Dermatitis. Final Progress Report (Covering period 07/01/68-08/30/74) pp. 1-4 (August 1974).

WAYNE STATE UNIVERSITY
Detroit, Michigan

GRANT NUMBER: 5 R01 OH 00410-05

PRINCIPAL INVESTIGATOR:

Donald J. Birmingham, M.D.
Department of Occupational & Environmental Health
Wayne State University
625 Mullett Street
Detroit, Michigan 48226

TITLE:

Environmental Injury and Repair of Epidermis

OBJECTIVES:

To Produce controlled injuries of the skin in humans with acids, bases, detergents, or other environmental chemicals. Attempts will be made to identify the injury and to follow the reactions to the injury (principally healing) by morphological methods which will include light and electron microscopy, radioautography, administration of ^{3H} thymidine and enzyme histochemistry.

DESCRIPTION:

Its substance concerns a light and electron microscopic analysis of the effects of a variety of common chemicals upon human skin. The chemicals which have been tested have been "pure alkali and acids," soaps, and "lipid solvents." The method in general involves exposure of human skin to the test substances for a series of time intervals. Biopsies are then made in order to describe what the investigators consider to be the progression of experimental alterations.

The long-range proposal presumes to study the effects of other environmental agents known to evoke contact dermatitis, and ultimately they propose to analyze and compare the effectiveness of various protective agents.

PUBLICATIONS:

Pinkus, H.: Morphokinetic der Epidermis. Archiv fur Dermatologische forschung 21 (1972).

Nagao, S., J.D. Stroud, T. Hamada, H. Pinkus, and D.J. Birmingham: The Effect of Sodium Hydroxide and Hydrochloric Acid on Human Epidermis. Acta. Derm. 52: 11-23 (1972).

Lupulescu, A.P., D.J. Birmingham, and H. Pinkus: An Electron Microscope Study of Human Epidermis After Acetone and Kerosene Administration. J. Inves. Derm. 60: (1) 33-45 (1973).

Lupulescu, A.P., H. Pinkus, and D.J. Birmingham: Effect of Acetone and Kerosene on Skin Ultrastructure, 30th Ann. Proc. Elec. Micro Soc. Amer. (1973).

UNIVERSITY OF CALIFORNIA MEDICAL CENTER
San Francisco, California

GRANT NUMBER: 5 R01 OH 00513-02

PRINCIPAL INVESTIGATOR:

Gerald A. Gellin, M.D.
Assistant Clinical Professor
Department of Dermatology
University of California Medical Center
San Francisco, California 94122

TITLE:

Detection of Environmental Depigmenting Substances

OBJECTIVES:

The aim of this proposal is to identify substances which "can and may produce leukoderm in man" by testing known depigmenting agents on guinea pigs. This work is predicated on the belief that a "practical and reliable model can be developed by a critical definition of experimental variables (animal, concentration, solvent)." The basic premise is that "agents already demonstrated to cause depigmentation in man should provide the basic materials to validate such an animal model."

DESCRIPTION:

This is a two-year screening project to investigate depigmenting chemicals in the black guinea pig. Various sequence regimens of administration, viz. I.P., I.D., and topical, over a period of several months, are to be employed. Chemicals to be included for study involve phenols and catechols currently used industrially and commercially, certain antioxidants and congeners, and certain quinones and their chemically-related compounds. Histologic examinations, light microscopy, and biopsy techniques would be employed in evaluating affects and loci of action.

PUBLICATIONS:

None

EPIDEMIOLOGY

CENTRO MALATTIE CARDIOVASCOLARI
Rome, Italy

GRANT NUMBER: 5 R01 OH 00362-10

PRINCIPAL INVESTIGATOR:

Vittorio Puddu, M.D.
Via Savoia 80
Rome, Italy

TITLE:

Death Rates Among Italian Railroad Employees

OBJECTIVES:

The principal aim of this continuing collection of epidemiologic and demographic data of Italian railroad workers is to study the relationship of physical activity to coronary heart disease in the workers.

DESCRIPTION:

Since 1963, these investigators have followed mortality among a cohort of over 172,000 Italian railroad workers, in order to see whether those with jobs requiring greater physical activity develop coronary heart disease (CHD). A five-year follow-up suggests that this may be the case but the differences are not large and those doing heavier work have a greater overall mortality. CHD is generally low in Italy. This investigation continues and increases the number and kinds of observations so as to: 1) establish an age-specific cohort mortality table, by cause of death, of the entire employee population of the Italian railroad system; 2) establish an age-specific cohort mortality table by level of physical activity, job responsibility, and socio-economic class; and 3) to compare the collected and analyzed data with comparable U.S. data. (Consultation and collaboration has been provided on a continuing basis by Dr. Ancel M. Keys and Dr. H.L. Taylor of the University of Minnesota).

PUBLICATIONS:

Menotti, A., V. Puddu, M. Monti, and H.L. Taylor: Cardiopatia Coronarica E Attivita Fisica Abituale. Studio Epidemiologico. Estratto da Defesa Sociale Aprile-Guigno 1972 Vol.II

HARVARD UNIVERSITY
Boston, Massachusetts

GRANT NUMBER: 5 R01 OH 00369-03

PRINCIPAL INVESTIGATOR:

John M. Peters, M.D.
Harvard University
665 Huntington Avenue
Boston, Massachusetts 02115

TITLE:

Epidemiology of Respiratory Disease in Firefighters

OBJECTIVES:

This project seeks to determine both the acute and chronic pulmonary effects of inhalation of gaseous combustion products and smoke in firefighters. The significance of this work resides in the fact that, in the United States, the number of full-time and volunteer firefighters approaches one million and that they are subjected to unknown quantities and severities of pulmonary irritants of varying frequencies. The health consequences of these exposures, especially the chronic effects of acute inhalation or the chronic effects of chronic intermittent, and low-level exposures have hitherto not been systematically explored.

DESCRIPTION:

The entire Boston Fire Department (approximately 1900 firemen) is the experimental group under survey in this essentially epidemiologic investigation with the Boston Police Department serving as the control group, under separate investigation and other support (Dr. Speizer). The screening techniques include pulmonary function tests, by means of a Stead-Wells spirometer using a fast paper speed (3.2 cm/sec.), for forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), and determined expiratory flow rates. In addition a questionnaire is employed to elicit demographic, occupational, and appropriate medical history information. The population is to be resurveyed annually. Also all firemen who are treated in the Boston City Hospital emergency room for smoke inhalation are evaluated and the information compared with the baseline data.

A personal air sampling unit is being devised to be worn by firemen. This is to provide information on personal exposures to CO, O_2, particulates, phosgene, hydrogen chloride, isocyanates, acrolein, sulfur dioxide, and other materials. The successful accomplishment of this research can be expected to result in significant and highly useful information on respiratory hazards to firemen.

HARVARD UNIVERSITY

PUBLICATIONS:

Sidor, R., and J.M. Peters: Differences in Ventilatory Capacity of Irish and Italian Firefighters. Amer. Rev. Resp. Dis. 108: 669-671 (1973).

Sidor R. and J.M. Peters: Fire Fighting and Pulmonary Function - An Epidemiologic Study. Amer. Rev. Resp. Dis. 109: 249-254 (1974).

Sidor R. and J.M. Peters: Prevalence Rates of Chronic Non-Specific Respiratory Disease in Fire Fighters. Amer. Rev. Resp. Dis. 109: 255-271 (1974).

Peters, J.M., G.P. Theriault, L.J. Fine, and D.H. Wegman: Chronic Effect of Fire Fighting on Pulmonary Function. New Eng. J. Med. 291: 1320-1322 (December 1974).

JOHNS HOPKINS UNIVERSITY
Baltimore, Maryland

GRANT NUMBER: 5 R01 OH 00449-02

PRINCIPAL INVESTIGATOR:

Genevieve M. Matanoski, M.D.
Department of Epidemiology
Johns Hopkins University
Baltimore, Maryland 21205

TITLE:

A Cohort Study of Cancer Mortality in Virologists

OBJECTIVES:

This project is directed toward testing the clinical observation that virologists appear to have an increased risk of dying of cancer.

DESCRIPTION:

This is a proposal for a two-year case-control study of a large group of physician virologists belonging to five medical societies. Physicians will be identified among lists of deceased members. Cancer deaths and controls will be selected from this group. The causes of death of physicians who have worked with oncogenic viruses will be noted and compared with those of physicians in clinical activities. Virologists and non-virologists are to be identified from lists of their publications. This study is expected to indicate whether there is, or is not, an increased risk of cancer from occupational exposure to viruses and could also suggest which particular groups of viruses may produce human disease.

PUBLICATIONS:

None

JOHNS HOPKINS UNIVERSITY
Baltimore, Maryland

GRANT NUMBER: 5 R01 OH 00465-04

PRINCIPAL INVESTIGATOR:

Genevieve M. Matanoski, M.D.
Department of Epidemiology
Johns Hopkins University
Baltimore, Maryland 21205

TITLE:

Current Trends in Survivorship of Radiologists

OBJECTIVE:

The overall objective of the project is to continue the study of mortality of radiologists in order to determine whether the more recent levels of exposure to radiation in the younger members of the specialty are still producing an excess of deaths from all causes, from leukemia, and from cancers of specific sites.

DESCRIPTION:

The life-shortening effect of ionizing radiation as an occupational hazard of exposed physicians has been indicated through studies of mortality rates of radiologists. Physicians from other specialities with a lower risk of exposure represent an optimum comparison population since both groups enjoy similar socio-economic and medical advantages which can prolong life. A previous study by Drs. Seltser and Sartwell utilizing such a population confirmed that radiologists had a lower life expectancy than other specialists.

PUBLICATIONS:

None

UNIVERSITY OF ILLINOIS AT THE MEDICAL CENTER
Chicago, Illinois

GRANT NUMBER: 5 R01 OH 00525-02

PRINCIPAL INVESTIGATOR:

Henry M. Gelfand, M.D., M.P.H.
Director, Epidemiology Program
School of Public Health
University of Illinois at the Medical Center
Post Office Box 6998
Chicago, Illinois 60680

TITLE:

Association of Leukemia with Agricultural Occupation

OBJECTIVES:

By means of a retrospective epidemiologic study, the investigators seek to investigate the association of leukemia with agricultural occupation, particularly occupational contact with poultry; and also propose to study the occurrence of human infection with Marek's Disease Virus (MDV), a DNA-herpes virus, wide-spread in poultry.

DESCRIPTION:

This is a three-year investigation using death certificates as a means of identifying deaths due to leukemia or lymphoma. Questionnaires and interviews with surviving family members will also be used. The maximum size of the proposed retrospective study comprises a case/control group of about 42,000 death certificates consisting of a detailed study group of 25,600 and a less detailed study sub-group of 11,400. Three general exposure categories may be considered: 1) adults, primarily males, with varying durations of direct occupational involvement; 2) adults, primarily females, with varying durations of indirect or part-time involvement; and 3) children, with shorter durations or indirect contact. The investigators hope to identify a dose-response relationship for leukemia.

PUBLICATIONS:

None

EQUIPMENT SAFETY

CORNELL UNIVERSITY
Ithaca, New York

GRANT NUMBER: 5 R01 OH 00424-02

PRINCIPAL INVESTIGATOR:

Gerald E. Rehkugler, Ph.D.
Associate Professor of Agricultural Engineering
Cornell University - 204 Riley-Robb Hall
Ithaca, New York 14850

TITLE:

Agricultural Tractor Operator Protection

OBJECTIVES:

This research aims at providing a test procedure for evaluating the performance of agricultural tractor operator roll-over protection systems (ROPS) that obviate the need for full-scale testing of all systems and tractor combinations.

DESCRIPTION:

This is an overall three-year project to develop a test procedure and evaluate its performance. By appropriate similitude analysis, scale model studies, and mathematical techniques, it is thought that a rational test system and evaluation procedure for ROPS can be developed. The method, when determined and developed, is expected to provide criteria for laboratory tests of ROPS and to establish the significance of and adaptations to soil and roll-over protection systems.

PUBLICATIONS:

Davis, Denny C. and Gerald E. Rehkugler: SIMTRAC - A Computer Program for Simulating Tractor Motions. (Manual prepared by Dept. of Agric. Engrg, N.Y. State College of Agric. and Life Sciences, Ithaca, N.Y.). (February 1975).

ERGONOMICS

Biomechanics of Materials Handling

Shiftwork

UNIVERSITY OF ILLINOIS AT CHICAGO CIRCLE
Chicago, Illinois

GRANT NUMBER: 5 R01 OH 00514-02

PRINCIPAL INVESTIGATOR:

Albert B. Schultz, Ph.D.
Professor of Mechanical Engineering
Department of Materials Engineering
University of Illinois at Chicago Circle
Box 4348
Chicago, Illinois 60680

TITLE:

Back Injuries: Mechanical Stresses in the Human Spine

OBJECTIVES:

This research effort is directed toward: 1) an analysis of the three-dimensional force systems active on the spine during industrial handling and lifting tasks; 2) determination of the intervertebral joint stresses; and 3) recommendation of methods for handling and lifting of loads in industry.

DESCRIPTION:

This is a three-year proposal to investigate the previously established model of the three-dimensional force system acting on the spine by means of computer-generated conditions and changes in conditions. Thus, large numbers of "experiments" are to be performed with the results analyzed and "classified" as to which factors are significant in a given situation. Spinal muscle and abdominal pressure effects are also to be studied in this work.

PUBLICATIONS:

Schultz, A.B., D.R. Benson, and C. Hirsch: Force-Deformation Properties of Human Costo-Sternal and Costo-Vertebral Articulations. J. Biomech. 7: 311-318 (1974).

Schultz, A.B.: Mechanics of the Human Spine. Appd. Mech. Rev. 1487-1497 (November 1974).

Belytschko, T., R.F. Kulak, and A.B. Schultz: Finite Element Stress Analysis of An Intervertebral Disc. J. Biomech. 7: 277-285 (1974).

Schultz, A.B., D.R. Benson, and C. Hirsch: Force-Deformation Properties of Human Ribs. J. Biomech. 7: 303-309 (1974).

Andriacchi, T., A.B. Schultz, T. Belytschko, and J. Galante: A Model for Studies of Mechanical Interactions Between the Human Spine and Rib Cage. J. Biomech. 7: 497-507 (1974).

Kulak, R.F., A.B. Schultz, T. Belytschko, and J. Galante: Biomechanical Characteristics of Vertebral Motion Segments and Intervertebral Discs. Orth. Clin. N. Amer. 6: (1) 121-133 (January 1975).

TEXAS TECH UNIVERSITY
Lubbock, Texas

GRANT NUMBER: 1 R01 OH 00545-01

PRINCIPAL INVESTIGATOR:

M. M. Ayoub, BSME, MSIE, PHD
Department of Industrial Engineering
Texas Tech University
Lubbock, Texas 79409

TITLE:

Determination and Modeling of Lifting Capacity

OBJECTIVES:

This research is aimed at determining the lifting capacity of the industrial worker population for both males and females.

DESCRIPTION:

The underlying distribution of lifting capacities of the industrial population in at least three ranges of lifting will be used. Predictive models will be developed based on several individual human variables such as anthropometric measures, strength, posture, mobility task endurance measure, age, and sex as well as task variables such as the shape and size of the object or container handled, height of lift, distance of transport, and frequency of lift. This predictive ability will in later phases of the model be utilized to establish the relationship between medical incidences and the severity of the manual handling task.

PUBLICATIONS:

None

MONTEFIORE HOSPITAL AND MEDICAL CENTER
Bronx, New York

GRANT NUMBER: 2 R01 OH 00331-06

PRINCIPAL INVESTIGATOR:

Elliott D. Weitzman, M.D.
Department of Neurology
Montefiore Hospital & Medical Center
Bronx, New York 10467

TITLE:

Physiological Adaptation of Shift Workers

OBJECTIVES:

The objective of this research proposal is to define the adaptations of important physiological variables to acute and chronic time shifts in working medical interns and nurses. The variables include sleep-waking, body temperature, and a group of plasma hormones under hypothalamic-pituitary control. The required duty schedules of the subjects will not be experimentally manipulated so that they may serve as models for shift workers in other occupations.

DESCRIPTION:

The current phase of this research will study the minute-to-minute fluctuations of blood hormone levels in relation to the sleep-wake cycle in human beings. The specific projected study will be an investigation of the changes in brain waves, body temperature, and hormone secretion in shift workers, employing interns and nurses going on and off night duty at the hospital where the investigator and his laboratory are located. The hormones to be measured are cortisol, growth hormone, LH, and prolactin. Body temperature and EEG will be measured also, and an attempt will be made to obtain EEG's on days off, etc., using a portable tape recorder. Individuals will be studied when they go on night shifts for short periods of time, and the nurses will be studied when they go on night shifts for many weeks.

PUBLICATIONS:

Hellman, L., E.D. Weitzman, H. Roffwarg, D.K. Fukushima, K. Yoshida, and T.G. Gallagher: Cortisol is Secreted Episodically in Cushing's Syndrome. J. Clin. Endoc. & Metab. 30:(5) 686-689 (May 1970).

Weitzman, E.D., et al.: Acute Reversal of the Sleep-Waking Cycle in Man. Effect on Sleep Stage Patterns. Arch. Neuro. 22: 483-489 (June 1970).

MONTEFIORE HOSPITAL AND MEDICAL CENTER

Hellman, L., E.D. Weitzman, H. Roffwarg, D.K. Fukushima, K. Yoshida, B. Zumoff, and T.G. Gallagher: Effect of o,p'-DDD on Cortisol Secretory Pattern in Cushing's Syndrome. J. Clin. Endoc. & Metab. 31: (2) 227-230 (August 1970).

Sassin, J.F., et al.: Human Prolactin: 24-Hour Pattern with Increased Release During Sleep. Science 177: 1205-1207 (September 1972).

Gallagher, T.F., et al.: Hyperthyroidism and Cortisol Secretion in Man. J. Clin. Endoc. & Metab. 34: (6) 919-927 (June 1972).

Boyar, R., et al.: Twenty-Four Hour Pattern of Luteinizing Hormone Secretion in Normal Men with Sleep Stage Recording. J. Clin. Endoc. & Metab. 35: (1) 73-81 (July 1972).

Perlow, M.J., et al.: Release of Human Growth Hormone, Follicle Stimulating Hormone, and Luteinizing Hormone in Response to L-Dihydroxyphenylalanine (L-Dopa) in Normal Man. Dis. Nerv. Syst. 33: 804-810 (December 1972).

Pawel, M.A., et al.: The Temporal Relation Between High Release and Sleep Stage Changes at Nocturnal Sleep Onset in Man. Life Sciences 11: Part I, 587-593 (1972).

Tauber, E.S., et al.: Vestibular Stimulation During Sleep in Young Adults Arch. Neuro. 27: 221-228 (September 1972).

Weitzman, E.D., et al.: Persistence of the Twenty-Four Hour Pattern of Episodic Cortisol Secretion and Growth Hormone Release in Blind Subjects. Trans. of Amer. Neuro. Assoc. 97: (1972).

Boyar, R., et al.: Synchronization of Augmented Luteinizing Hormone Secretion with Sleep During Puberty. New Eng. J.O.M. 287: 582-586 (September 1972).

Boyar, R.M., et al.: Studies of Endocrine Function in Isolated Gonadotropin Deficiency. J. Clin. Endoc. & Metab. 36: (1) 64-72 (January 1973).

Sachar, E.J., et al.: Growth Hormone Responses to L-Dopa in Depressed Patients. Science 178: 1304-1305 (December 1973).

HEAD AND BODY PROTECTION

VILLANOVA UNIVERSITY
Villanova, Pennsylvania

GRANT NUMBER: 3 R01 OH 00300-03S1

PRINCIPAL INVESTIGATOR:

George N. Quam, Ph.D.
Department of Chemistry
Villanova University
Villanova, Pennsylvania 19085

TITLE:

Protection of Eyes, Face and Body Against High Impacts

OBJECTIVES:

The original aim of this research was the investigation of materials and their fabrication into shields for the protection of chemical laboratory and plant workers against impact injuries. Currently, the terminal phase of this research aims at developing and fabricating appropriate personal protective shields primarily for the protection of policemen, firemen, and other security officers against missile impacts.

DESCRIPTION:

Earlier work by this investigator established the merits of laminated layers of clear polycarbonate sheeting over that of single thicknesses of other recommended materials when fabricated into personal body shields.

This project is now concerned primarily with the investigation and testing of personally worn body and face armor and similar protective "devices" for effectiveness, comfort, and applicability to the functional need. Laminated materials such as, "polycarbonate-ballistic nylon-polycarbonate" are explored along with other plastics to determine the optimum combination for an all purpose police armor garment. Original testing equipment is used in this research.

PUBLICATIONS:

Quam, G.N.: Waste Disposal from Academic Laboratories. 17th Campus Safety Conference. University of California Santa Barbara, June 25, 1970, Published in N.S.C. Monograph No. 27 p. 1-7 (1970).

Quam, G.N. and J. Shea: An Investigation of High Impact Shields for Eyes and Face. Env. Con. & Sfty. Mgmt. (February 1971).

VILLANOVA UNIVERSITY

Quam, G.N.: Safety Shielding in the Chemical Laboratory, Sixth Middle Atlantic ACS Regional Meeting, Baltimore, Maryland (February 1971).

Quam, G.N. and J. Shea: Protection of Eyes and Face Against High Impact. Env. Con. & Sfty. Mgmt. 141: 24-25 (February 1971).

Quam, G.N. and J. Shea: XCI. An Investigation of High Impact Body Shields. Sfty. 49:(5) A295-A296 (May 1972).

Quam, G.N., et al.: High Impact Shields for Face and Body. National Safety News (September 1972).

Quam, G.N., J. Shea, and F. McLane: High Impact Shielding for Chemists. J. Chem. Educa. 50:(8) A405 (August 1973).

Quam, G. and J. Shea: CXI. Impact Resistance Tests of Contemporary Safety Glasses, Goggles, and Face Shields. J. Chem. Educa. 51: (2) A85-A87 (February 1974).

Quam, G.N.: Protection of Eyes, Face and Body Against High Impacts. Final Progress Report (July 31, 1974).

SNELL MEMORIAL FOUNDATION INCORPORATED
North Tarrytown, New York

GRANT NUMBER: 5 R01 OH 00301-03

PRINCIPAL INVESTIGATOR:

George G. Snively, M.D.
2315 Stockton Boulevard
Sacramento, California 95817

TITLE:

Head Protection of Industrial Workers

OBJECTIVES:

There is a threefold objective in this research: 1) to study the head protection afforded by present day helmets (hard hats); 2) to develop methods for realistically testing the afforded protection under dynamic conditions; and 3) to develop appropriate principles for head protection in industrial conditions which will afford superior protection especially from side or glancing blows.

DESCRIPTION:

Current protective headgear is designed on the premise that falling objects constitute the major industrial head hazards. There is evidence to the contrary. Consequently, determinations are made of the characteristics of industrial helmets with respect to accelerated impacts; attenuation properties; and impacts other than direct crown blows. Investigations are also made of head injuries in industrial situations so as to evaluate relationships inherent in injury site, magnitude of energy applied, and other factors involved.

Prototype helmets of various materials such as honeycombed aluminum, stainless steel, or formed polystyrene and other foams are investigated under dynamic conditions.

PUBLICATIONS:

Snively, G.G.: Racing Helmet Design, Testing & Standardization: The Snell Standards for Protective Headgear. Soc. of Automotive Engineers #700 600, Los Angeles, California p. 7-9 (August 27, 1970).

Snively, G.G.: Linear Acceleration of Impact Type. AGARD Conf. Proc. No. 88 (1971).

Snively, G.G.: Evaluation & Testing of Protective Headgear. AGARD Conf. Proc. No. 88 on Linear Acceleration of Impact Type. AGARD-CP-88-71 ppD41-7, NATO Meeting, Porto, Portugal (June 1971).

UNIVERSITY OF CALIFORNIA
LaJolla, California

GRANT NUMBER: 5 R01 OH 00404-02

PRINCIPAL INVESTIGATOR:

Alan M. Nahum, M.D.
225 West Dickinson
San Diego, California 92103

TITLE:

Prevention of Accidental Head Injury

OBJECTIVES:

The goal of this project is to reduce and/or prevent head injury resulting in pathophysiologic changes, either permanent or reversible.

DESCRIPTION:

The investigators are trying to correlate post-concussive states (ranging from minimal to severe) in primates with associated impact forces and physiologic parameters of brain function. By means of examinations of cadavers, the researchers are attempting to relate their findings to man. A principal function is the attempt to develop a reproducible experimental and mathematical model relating head injury with the various force parameters. An innovative technique that is employed is the implantation of a floating electrode within the primate brain. This is used to determine unit discharges from central locations so as to provide electroencephalographic information which is more informative than comparable information obtained from surface electrodes.

High speed motion picture photography is used to record kinematics of impact and permit calculations of rotational acceleration. After impact, physiologic and clinical measurements of depth and duration of concussion are made continuously. Recordings of impedence, EEG, intracranial pressure, and multiple unit activity continue. Skull x-rays are also obtained.

PUBLICATIONS:

None

OCCUPATIONAL RESPIRATORY DISEASES

AGRICULTURAL PULMONARY DISORDERS

BYSSINOSIS

COAL WORKERS' PNEUMOCONIOSIS

RESPIRATORY TRACT CARCINOMA

SILICOSIS

UNSPECIFIED

MARSHFIELD CLINIC FOUNDATION
Marshfield, Wisconsin

GRANT NUMBER: 5 R01 OH 00306-14

PRINCIPAL INVESTIGATOR:

Dean A. Emanuel, M.D.
Marshfield Clinic Foundation for
Medical Research and Education
510 North St. Joseph Avenue
Marshfield, Wisconsin 54449

TITLE:

Farmer's Lung - An Experimental Investigation

OBJECTIVES:

Research aims are directed principally toward: 1) the isolation and characterization of the etiologic agents (thermophylic actinomycetes) of farmer's lung disease; 2) the investigation of the cellular response in this hypersensitivity disease; 3) the determination of the disease incidence in the U.S. and Canada; 4) the description of an immune process in animals; and 5) the characterization of farmer's lung either as a true delayed hypersensitivity or perhaps a modified Arthus reaction. Secondary objectives include, 1) attempts to correlate the amount of rainfall during the haying season and the incidence of disease in the following Spring, and 2) the attempted characterization of the antigens in farmer's lung.

DESCRIPTION:

This is largely an experimental investigation to identify and characterize the causative organisms of farmer's lung disease and to describe the associated immunology. A fluorescent antibody technique which has been developed for the identification of Thermopolyspora polyspora, one of the agents involved in the disease, is being adapted for studying other similar organisms in the lung tissue of patients with farmer's lung disease. The incidence of sensitivity has been found to be 13 per cent, from a study of more than 1000 patients. Elucidation of environmental factors involved in farmer's lung disease should be very helpful in the development of effective preventive methods.

PUBLICATIONS:

Wenzel, F.J., D.A. Emanuel and P.M. Zygowicz: Simplified Serologic Test for Farmer's Lung. Am. J. Clin. Path. 49:(2) 183-185 (1968).

Emanuel, D.A.: Farmer's Lung - Historical Review and Current Concepts. (May 8, 1968).

MARSHFIELD CLINIC FOUNDATION

Hursma, J.R., D.A. Emanuel, F.J. Wenzel and R.L. Gray: Farmer's Lung in a 10 Year Old Girl. J. Ped. 75:(4) 704-706 (October 1969).

Gray, R.L., F.J. Wenzel, and D.A. Emanuel: Immunofluorescence Identification of Thermopolyspora polyspora, The Causation Agents of Farmer's Lung. Applied Micro. 17: (3) 454-456 (March 1969).

Wenzel, F.J., D.A. Emanuel, and R.L. Gray: Farmer's Lung, Its Geographic Distribution. J. Occup. Med. 12: 493-496 (December 1970).

Emanuel, D.A., et al.: Farmer's Lung. Conn's Current Diagnosis 3: Saunders, Philadelphia (1971).

Wenzel, F.J., D.A. Emanuel and R.L. Gray: Immunofluorescent Studies in Patients with Farmer's Lung. J. Allergy & Clin. Immuno. 48:(4) 224-229 (October 1971).

Emanuel, D.A., et al.: Farmer's Lung Disease. Hoard's Dairyman 117: 649 (1972).

Wenzel, F.J., et al.: A Simplified Hemogglutination Test for Farmer's Lung. Amer. J. Clin. Path. 57: (2) (February 1972).

Emanuel, D.A., F.J. Wenzel and B.R. Lawton: Pulmonary Mycotoxicosis. Chest 67: (3) 293-297 (March 1975).

Emanuel, D.A.: Farmer's Lung--An Experimental Investigation. Final Progress Report covering period 01/01/60-11/30/74.

ST. LOUIS UNIVERSITY
St. Louis, Missouri

GRANT NUMBER: 5 R01 OH 00398-02

PRINCIPAL INVESTIGATOR:

Raymond G. Slavin, M.D.
Associate Professor of Internal Medicine
Director of Section of Allergy & Immunology
St. Louis University School of Medicine
St. Louis, Missouri 63104

TITLE:

Pathogenesis of Allergic Pulmonary Aspergillosis

OBJECTIVES:

This project seeks to elucidate the mechanism for the pathogenesis of allergic bronchopulmonary aspergillosis (ABA). Since aspergillus is commonly found in compost piles, the investigators propose to examine organic farmers for possible sensitization to the aspergillus organism. An appropriate animal model for the disease is to be sought among monkeys, guinea pigs, and rats.

DESCRIPTION:

The overal investigaation is planned as a three-year project which is designed to include concurrent animal and human studies.

The attempt is to be made to test the hypothesis that pathogenesis of the disease, ABA, is linked to the coexistence and interaction in the sera of certain individuals of both (Type 1) non-precipitating reaginic antibody and (Type 3) precipitating antibody. Serum is to be obtained from three categories of patients, viz., 1) those with ABA, containing both antibodies; 2) those with aspergilloma, containing precipitating antibody only; and 3) those with allergic rhinitis and/or asthma, containing reaginic antibody only. Rhesus monkeys would be injected intravenously with portions of the individual sera and then challenged intratracheally with Aspergillus antigen. The nature and course of the response would be determined and followed by means of X-rays, and histological and immunofluorescent studies on lung biopsies. Other animals would be actively immunized by subcutaneous administration of Aspergillus fumigatis and precipitating antibody produced. Some animals would receive serum of atopic patients with immediate sensitivity to aspergillus and both groups would be "aerosolized" with aspergillus.

Prospective and retrospective clinical studies are proposed in farmers presumed to be exposed to aspergillus. Following the establishment of an animal model, attempts will be made to evaluate various treatment regimens.

PUBLICATIONS:

None

JOHN B. PIERCE FOUNDATION
New Haven, Connecticut

GRANT NUMBER: 5 R01 OH 00304-11

PRINCIPAL INVESTIGATOR:

Arend Bouhuys, M.D., Ph.D.
John B. Pierce Foundation Laboratory
290 Congress Avenue
New Haven, Connecticut 06519

TITLE:

Physiological Studies on Byssinosis

OBJECTIVES:

The investigation aims at: 1) elucidating the mechanism of bronchoconstriction in byssinosis; 2) identifying the pharmacologic agent responsible for the bronchoconstriction; 3) studying objectively medical preventive methods and treatment of byssinotic workers; 4) contributing to the technical prevention of the disease by the removal of dust from the mill atmosphere; and 5) performing a follow-up survey of hemp workers in Spain.

DESCRIPTION:

The approach to the problems is biochemical, physiologic and epidemiologic. Emphasis is put on studying long-term effects of byssinosis in cotton mill workers and attempting to correlate dust density with physiologic effects so that better control mechanisms may be affected. Although the precise chemical entity in cotton bracts responsible for bronchoconstriction has not been characterized, the pharmacologically active fraction has been isolated and associated with impaired pulmonary function. Biochemical characterization is being carried out. Carefully controlled studies have contributed to a better understanding of the problems involved and lead logically to the recognition of the need for additional pharmacologic work.

PUBLICATIONS:

Clement, J. and K.P. van de Woestijne: Pressure Correction in Volume and Flow Displacement Body Plethysmography. J. Appld. Phys. 27: 845-847 (1969).

Bouhuys, A., V.R. Hunt, B.M. Kim, and Z. Zopletal: Maximum Expiratory Flow Rates in Induced Bronchoconstriction in Man. J. Clin. Inves. 48: 1159-1168 (1969).

Dennis, M.W., J.S. Douglas, J.U. Cosby, J.A.J. Stolwijk, and A. Bouhuys: On-Line Analog Computer for Dynamic Lung Compliance and Pulmonary Resistance. J. of Appld. Phys. 26: 248-252 (1969).

JOHN B. PIERCE FOUNDATION

Bouhuys, A., R.L. Wolfson, J.D. Brain, D.W. Horner, and E. Zuskin: Byssinosis in Cotton Textile Workers. Ann. Int. Med. 71: 257-269 (1969).

Bouhuys, A., A. Barbero, R.S.F. Schilling, and K.P. van de Woestijne: Chronic Respiratory Disease in Hemp Workers. Am. J. Med. 46: 526-537 (1969).

Ziskin, E., I. Zolle, D.V. Proctor, S. Permutt, and A. Bouhuys: Exposure to 131 I-Labeled Viscose Rayon Fibers. Arch. Envir. Hlth. 19: 648-653 (1969).

Jaeger, M. and A. Bouhuys: Loop Formation in Pressure vs. Flow Diagrams Obtained by Body Plethysmographic Techniques. Prog. Resp. Res. 4: 116-130 (1969).

Bouhuys, A.: Byssinosis in Textile Workers. Int'l. Conf. on Pneumo., Johannesburg, South Africa (1969).

van de Woestijne, K.P. and A. Bouhuys: Spirometer Response and Pressure Correction Body Plethysmography. Prog. Resp. 4: 64-74 (1969).

Bouhuys, A., R.S.F. Schilling, and K.P. van de Woestijne: Cigarette Smoking Occupational Dust Exposure and Ventilatory Capacity. Arch. Env. Hlth. 19: 793-797 (1969).

Zuskin, E., R.L. Wolfson, G. Harpel, J.W. Welborn, and A. Bouhuys: Byssinosis in Carding and Spinning Workers. Prevalence in the Cotton Textile Industry. Arch. Envir. Hlth. 19: 666-673 (1969).

Douglas, J.S., and A. Bouhuys: Bronchoconstrictor Responses and Anesthesia in Guinea Pigs. Clin. Res. 17: 617 (1969).

Douglas, J.S., M.W. Dennis, Zuskin, E., and A. Bouhuys: Quantitative Determination of Effects of Bronchoactive Agents in Spontaneously Breathing Guinea Pigs. 4th Int'l. Congr. on Pharm., Basel, Switzerland (July 14-18, 1969).

Bouhuys, A. and J.M. Peters: Control of Environmental Lung Disease. New Eng. J. Med. 283: 573-582 (September 10, 1970).

Bouhuys, A. and K.P. van de Woestijne: Respiratory Mechanics and Dust Exposure in Byssinosis. J. Clin. Inves. 49: 106-118 (1970).

Bouhuys, A.: Airway Dynamics and Bronchoactive Agents in Man. Airway Dynamics: Physiology and Pharmacology. Chas. C. Thomas, Springfield, Illinois, p. 262-282 (1970).

Dennis, M.W. and J.S. Douglas: Control of Bronchomotor Tone in Spontaneously Breathing, Unanesthetized Guinea Pigs. Chas. C. Thomas, Springfield, Illinois p. 253-262 (1970).

Bouhuys, A.: Byssinosis in the Textile Industry. Arch. Env. Hlth. 21: 475-478 (October 1970).

JOHN B. PIERCE FOUNDATION

Bouhuys, A.: Byssinosis in the United States. Trans. of Nat'l. Conf. on Cotton Dust and Health (May 2, 1970).

Bouhuys, A.: Control of Environmental Lung Disease. New Eng. J. Med. 283: 573-582 (September 10, 1970).

Bouhuys, A. and K.P. van de Woestijne: Mechanical Consequences of Airway Smooth Muscle Relaxation. J. Appld. Phys. 30: (5) 670-676 (May 1971).

Bouhuys, A., J.S. Douglas, and A.R. Guyatt: Pharmacological Modification of Histamine-Mediated Airway Responses. J. Clin. Inves. 50:(6) ABSTRACT (June 1971).

Piscitelli, D.M., and A. Bouhuys: Histamine Release from Human Lung by a Component of Cotton Bracts. Fed. Proc. 30:(2) ABSTRACT (March-April 1971).

Popa, V., J.S. Douglas, and A. Bouhuys: Anaphylaxis and Response to Histamine, Acetylcholine, and Propranolol in Guinea Pigs. Fed. Proc. 30: (2) ABSTRACT (March-April 1971).

Popa, V., J.S. Douglas, and A. Bouhuys: Airway Responses to Antigen, Histamine Acetycholine, and Propranolol in Actively Sensitized Guinea Pigs. Chest 60: (3) 301 (September 1971).

Bouhuys, A: Byssinosis - Airways Responses Caused by Inhalation of Textile Dusts. Arch. Env. Hlth. 23: 405-407 (December 1971).

Bouhuys, A.: Industrial Workers Needs in Environmental Health, AIHA Conf. ABSTRACT (May 24-28, 1971).

Douglas, J.S., M.W. Dennis, P. Ridgway, and A. Bouhuys: Airway Dilatation and Constriction in Spontaneously Breathing Guinea Pigs. J. Pharm. & Exper. Therap. 180: (1) (September 13, 1971).

Hitchcock, M., D.M. Piscitelli, and A. Bouhuys: Histamine Release from Human Lung by 48/80 and Methyl Piperonylate. Proc. Int'l. Union of Phys. Sci. IX: XXV Int'l. Cong. of Physiological Sciences.

Hitchcock, M., P. Ridgway, and A. Bouhuys: Effect of Adrenergic Drugs on Adenosine 3'5'Cyclic-Monophosphate ($_c$AMP) Phosphodiesterase from Guinea Pig Lung. Fifth Int'l. Cong. on Pharm. (July 23-28, 1972).

Douglas, J.S., M.W. Dennis, P. Ridgway, and A. Bouhuys: Airway Constriction in Guinea Pigs: Interaction of Histamine Autonomic Drugs. J. Pharm. & Exper. Therap. 184: (1) (September 5, 1972).

Muus, P., A.J. Lewis, J.S. Douglas, and A. Bouhuys: Contenu en histamine du poumon du rat et sa liberation par le 48-80: Variations en fonction de l'age et du sexe. J. Physiol. (Paris) 65: 459-460 (1972).

JOHN B. PIERCE FOUNDATION

Hitchcock, M.: Selective and Non-Selective Histamine Release from Rat, Guinea Pig, and Human Lung. Comp. Gen. Pharm. 1973 (4) 81-90 (September 1972).

Hitchcock, M., M.W. Schneider: Alteration of Adenyl Cyclase (AC) and Phyphodiesterase (PDE) Activities During Histamine Release from Guinea Pig Lung. Pharm. Fed. Proc. 32: 744 ABSTRACT 2984 (1973).

Merino, V.L., R.L. Lombart, R. F. Marco, A. B. Carnicero, F.G. Guillen, and A. Bouhuys. Arterial Blood Gas Tensions and Lung Function During Acute Responses to Hemp Dust. Amer. Rev. Resp. Dis. 107: 809-815 (1973).

Zuskin, E., A.J. Lewis, and A. Bouhuys: Inhibition of Histamine-Induced Airway Constriction by Ascorbic Acid. J. Allergy & Clin. Immuno. 51: (4) 218-226 (April 1973).

Hitchcock, A.: Adenosine 3'5'-Cyclic Monophosphate Phosphodiesterase in Guinea Pig Lung - Properties and Effect of Adrenergic Drugs. Biochem. Pharm. 22: 959-969 (1973).

Hitchcock, M., D.M. Piscitelli, and A. Bouhuys: Histamine Release from Human Lung by a Component of Cotton Bracts. Arch. Envir. Hlth. 26: (April 1973).

Guyatt, A.R., J.S. Douglas, E. Zuskin, and A. Bouhuys: Lung Static Recoil and Airway Obstruction in Hemp Workers with Byssinosis. Amer. Rev. Resp. Dis. 108: 1111-1115 (1973).

Bouhuys, A., C.A. Mitchell, R.S.F. Schilling, and E. Zuskin: A Physiological Study of Byssinosis in Colonial America. Trans N.Y. Acad. Sci. Series II, 35:(7) 537-546 (November 1973.)

Hitchcock, M.: Selective and Non-Selective Histamine Release from Rat, Guinea Pig, and Human Lung. Comp. Gen. Pharm. 4: 81-90 (1973).

Orehek, J., J.S. Douglas, A.J. Lewis, and A. Bouhuys: Prostaglandin Regulation of Airway Smooth Muscle Tone. Nature Biology 245: (142) 84-85 (September 19, 1973).

Hitchcock, M.: In Vitro Histamine Release from Human Lung as A Model for the Acute Response to Cotton Dust. Ann. N.Y. Acad. Sci. 221: 124-131 (February 28,1974).

Douglas, J.S., E. Zuskin, and A. Bouhuys: Relationship Between In Vivo Breathing Induced by Textile Dust Extracts in Vitro Histamine Release from Pigs. Amer. Rev. Resp. Dis. 109: 712 (1974).

Bouhuys, A.: Breathing--Physiology, Environment and Lung Disease. Byssinosis 17: 416-440 (1974).

GEORGIA INSTITUTE OF TECHNOLOGY
Atlanta, Georgia

GRANT NUMBER: 3 R01 OH 00460-01S
5 R01 OH 00460-02

PRINCIPAL INVESTIGATOR:

James M. Bradford, Jr., Ph.D.
Assistant Professor of Mechanical Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332

TITLE:

Byssinosis and Small Airways Disease

OBJECTIVES:

The aims of this research are: 1) to investigate the relationship between small airways disease and cotton dust exposure in a non-byssinotic population; 2) to correlate the incidence of small airways disease with respirable dust levels in a cotton textile mill; and 3) to estimate the site of the obstruction (large versus small airways) in a byssinotic population. The significance of this research lies in the proposition that small airways disease may be the earliest, and possibly reversible, lesion of chronic obstructive pulmonary disease (COPD).

DESCRIPTION:

This is to be a three-year study of approximately 600 employees from a group of approximately 10 cotton mills located in Georgia and Eastern Alabama. Employees will be selected from high, low, and no dust level areas. Workers will be tested for three different functions with the results to be entered into an on-site minicomputer. Spirometry to measure change in $FEV_{1.0}$ and flow volume, single breath oxygen test, and maximum expiratory flow volume measurements (curves) using air and helium-oxygen mixtures will be performed. Medical histories will be obtained by questionnaire. The data are to be analyzed statistically, by means of multi-variant techniques. The investigators anticipate that the results of this work may provide new insights into the pathogenesis of chronic obstructive lung disease.

PUBLICATIONS:

None

UNIVERSITY OF MISSOURI
Columbia, Missouri

GRANT NUMBER: 5 R01 OH 00511-03

PRINCIPAL INVESTIGATOR:

Kaye H. Kilburn, M.D.
N424 Medical Center
University of Missouri
Columbia, Missouri 65201

TITLE:

Prevalence, Pathogenesis and Control of Byssinosis

OBJECTIVES:

This research is directed toward three principal objectives, viz., 1) the extraction and isolation of the active ingredient of cotton textile dust responsible for byssinosis; 2) *in vitro* testing of chemotaxis; and 3) leucocyte recruitment assay in human beings.

DESCRIPTION:

Although this is technically a renewal project for a three-year period, it is essentially a new one because of the move of the principal investigator from another institution to his current affiliation.

These investigations will involve *in vitro* studies, research in animal models, and finally test studies in human beings. Of the eight test materials to be used, primarily the flavonals and quinones will be used. Two separate and distinct agents from cotton have been shown to have biological activity. Pure chemicals from commercial sources, namely gossypol, quercetin, and various hydroxy-benzenes will also be used. Extractives from cotton trash will be studied. Fractionation of cotton extracts will be followed by means of a simple animal bioassay.

PUBLICATIONS:

Merchant, J.A., et al.: Evaluation Before and After Exposure - The Pattern of Physiological Response to Cotton Dust. Ann. N.Y. Acad. Sci. 38-43 (1974).

Kilburn, K.H.: 3.8 Effects of Tobacco Smoke on Biological Systems. Scan. J. Resp. Dis. Suppl. 97: 63-78 (1974).

Merchant, J.A., J.C. Lumsden, K.H. Kilburn, V.H. Germino, J.D. Hamilton, W.S. Lynn, H. Byrd, and D. Baucom: Preprocessing Cotton to Prevent Byssinosis. Brit. J. of Industrial Med. 30: 237-247 (1973).

Lynn, W.S., S. Munoz, J.A. Campbell, and P.W. Jeffs: Chemotaxis and Cotton Extracts. Ann. N.Y. Acad. Sci. 221: 163-173 (1974).

Kilburn, K.H.: Acute Bronchitis Due to Cotton Plant Polyphenols. Ann. N.Y. Acad. Sci. 221: 335-339 (February 28, 1974).

Merchant, J.A., et al.: Intervention Studies of Cotton Steaming to Reduce Biological Effects of Cotton Dust. Brit. J. Indus. Med. 31: 261-274 (1974).

UNIVERSITY OF NOTRE DAME
Notre Dame, Indiana

GRANT NUMBER: 5 R01 OH 00342-04

PRINCIPAL INVESTIGATOR:

Morris Pollard, Ph.D.
Lobund Laboratory
University of Notre Dame
Notre Dame, Indiana 46556

TITLE:

Effects of Environmental Pollutants in Germ-Free Rodents

OBJECTIVES:

This project seeks to examine, in lungs of germ-free rats, effects of silica dust, coal dust, and combinations of these dusts and to compare the results with those observed in commercially-bred animals and in germ-free animals on non-sterile environments.

DESCRIPTION:

This is a collaborative effort with Lobund and the Division of Laboratories and Criteria Development (NIOSH) in Cincinnati, Ohio. Comparative studies are performed using germ-free rats maintained in a sterile environment, commercially-bred rats which have endemic infectious diseases, and germ-free rats maintained in a non-sterile environment. Animals are subjected to silica and coal dusts separately and in combination. Lung reactions are investigated. This work has specific relevance to "black lung" problems as well as the tentatively-held view that infection is suspect as an important factor in the pathogenesis of pneumoconiotic fibrosis.

PUBLICATIONS:

Reddy, B.S. and M. Pollard: Effect of Germ-Free Status on Hepatic Xanthrene Oxidase Activity and on Bone Mineral Composition During Development and Senescence in Rats. J. Nutrit. 102: 299-305 (1972).

Pollard, M. and N. Sharon: Irradiation Induced Lesions in Germ-Free Rats. J. Nat'l. Can. Inst. 47: 229-234 (1971).

Pollard, M.: Effects of Environmental Pollutants in Germfree Rodents. Final Progress Report (covering period 02/01/73-07/31/74).

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00356-04

PRINCIPAL INVESTIGATOR:

Robert T. Christian, Ph.D.
Kettering Laboratory
College of Medicine
University of Cincinnati
Cincinnati, Ohio 45219

TITLE:

Cellular Response to Coal Dust in Vitro and CWP

OBJECTIVES:

The purpose of this research is the determination of: 1) the fractions of coal mine dust which are cytotoxic; 2) the mechanism of cellular injury by the cytotoxic fractions; and 3) the relationship between the toxic processes and coal workers' pneumoconiosis (CWP).

DESCRIPTION:

This is an investigation in vitro at the cellular level using growing cell cultures and coal mine dust obtained from NIOSH. Part of the purpose of these studies is to develop a screening test to determine which fractions of coal mine dust are cytotoxic and then to investigate how the cytotoxicity is responsible for cellular injury.

Coal mine dust fractions are inoculated on primary and continuous-line human and other mammalian cell lines. Observations are then made of cell morphology, growth, and synthesis of collagen. Alveolar macrophages and primary lung cells are used to determine effects of the test materials on host defense mechanisms. Techniques of cytochemistry, phagocytosis, and bactericidal potential are employed as is time-lapse cinematography. Stimulation and inhibition of interferon are studied.

The effects on collagen production of the test materials on cultures of fibroblasts are determined. Tissue cultures are exposed to certain toxic fractions and then tested for syntheses of DNA and RNA using standard techniques.

PUBLICATIONS:

Christian, R.T., et al.: Cellular Response to Coal Mine Dust in Vitro. ABSTRACT In Vitro 7:(4) (1972).

MOUNT SINAI SCHOOL OF MEDICINE
New York, New York

GRANT NUMBER 2 R01 OH 00320-08

PRINCIPAL INVESTIGATOR:

Irving J. Selikoff, M.D.
Environmental Sciences Laboratory
Mount Sinai School of Medicine
Fifth Avenue and 100 Street
New York, New York 10029

TITLE:

Relation of Smoking to Neoplasia in Asbestos Workers

OBJECTIVES:

The aim of this project is to: 1) determine the risk factors of asbestos exposure to life, and support from the smoking factor, 2) the relationship of cigarette smoking to pleural and peritoneal mesothelioma, 3) the relationship of smoking and asbestos to gastrointestinal cancer, 4) the diminished risk factor of lung cancer in asbestos workers who have given up smoking, and 5)the value of smoking prevention educational programs.

DESCRIPTION:

Using a well-defined cohort of asbestos workers, information will be obtained on the following problems: lung cancer deaths among non-smoking asbestos workers (to determine whether asbestos alone, without cigarette smoking increases the risk of bronchogenic carcinoma); the relationship of cigarette smoking to pleural and peritoneal mesothelioma; its relation to pulmonary fibrosis; interaction between smoking and gastrointestinal neoplasms; and relationships of cigarette smoking to other neoplasms among asbestos workers. There are strong suggestions in the findings that there is a real and important association between cigarette smoking and the development of lung cancer in asbestos workers.

PUBLICATIONS:

Selikoff, I.J. and E.C. Hammond: III Community Effects of Non-Occupational Environmental Asbestos Exposure. Am. J. Pub. Hlth. 58: (9) 1658-1666 (September 1968).

Selikoff, I.J.: Asbestos. Environment II:(2) 1-7 (March 1969).

Langer, A.M., I. Rubin, and I.J. Selikoff: Electron Microprobe Analysis of Asbestos Bodies. Pneu., Proc. Int'l. Conf., Johannesburg, p. 57-69 (1969).

MOUNT SINAI SCHOOL OF MEDICINE

Selikoff, I.J. and E.C. Hammond: Asbestos Bodies in the New York City Population in Two Periods of Time. Pneumo., Proc. Int'l. Conf., Johannesburg, p. 99-105 (1969).

Hammond, E.D. and I.J. Selikoff: The Effects of Air Pollution - Epidemiological Evidence. Pneumo., Proc. Int'l. Conf., Johannesburg, p. 368-373 (1969).

Selikoff, I.J., E.C. Hammond, and J. Churg: Mortality Experiences of Asbestos Insulation Workers - 1943/1968. Pneumo., Proc. Int'l. Conf., Johannesburg, p. 180-186 (1969).

Langer, A.M. and I.J. Selikoff: Chrysotile Asbestos in Lungs of Residents of New York City. Procs. of 2nd Int'l. Clean Air Congress, p. 161-164 (1971).

Langer, A.M., V. Baden, E.C. Hammond and I.J. Selikoff: Inorganic Fibers, Including Chrysotile, in Lungs at Autopsy: Preliminary Report. Inhaled Particles III, Proc. Int. Symp. 2: London 683-694 (1971).

Selikoff, I.J., E.C. Hammond and H. Heimann: Critical Evaluation of Disease Hazards Associated with Community Asbestos Air Pollution. Proc. 2nd Int'l. Clean Air Congress, p. 165-171 (1971).

Langer, A.M., I.J. Selikoff, and A. Saster: Chrysotile Asbestos on the Lungs of Persons in New York City. Arch. Env. Hlth. 22: 348-361 (March 1971).

Selikoff, I.J., et al.: Asbestos Exposure to Coke Oven Operators. J. Occ. Med. 13: (10) 496-497 (October 1971).

Selikoff, I.J.: Asbestos. Our World in Peril: An Environment Review. p. 362-373 (1971).

Selikoff, I.J.: Recent Perspectives in Occupational Cancer. AMBIO 4: (1) 14-17 (1975).

Selikoff, I.J.: Epidemiology of Gastrointestinal Cancer. Environ. Hlth. Perspec. 9: 299-305 (1974).

Thomas, L.B., et al.: Vinyl-Chloride-Induced Liver Disease - From Idiopathic Portal Hypertension (Banti's Syndrome) to Angiosarcomas. New E.g. J. Med. 292: 17-22 (1975).

Miller, A., et al.: "Nonspecific" Interstitial Pulmonary Fibrosis - Associate with Asbestos Fibers Detected by Electron Microscopy. New Eng. J. Med. 292: 91-93 (1975).

Nicholson, W.J., et al.: Mortality Experience of a Cohort of Vinyl Chloride-Polyvinyl Chloride Workers. Ann. N.Y. Acad. Sciences 246:225-230 (1975).

MOUNT SINAI SCHOOL OF MEDICINE

Miller, A., et al.: Changes in Pulmonary Function in Workers Exposed to Vinyl Chloride and Polyvinyl Chloride. Ann. N.Y. Acad. Sciences 246: 42-52 (1975).

Lilis, R., et al.: Prevalence of Disease Among Vinyl Chloride and Polyvinyl Chloride Workers. Ann. N.Y. Acad. Sciences 246: 22-41 (1975).

Hammond, E. Cuyler, and I.J. Selikoff: Two Deaths of a Rare Cancer. Occup. Hlth. Nursing (September 1974) p. 17-19.

Selikoff, I.J.: Asbestos Criteria Document Highlights. Amer. Soc. Sfty. Engrs. 26-33 (March 1974).

TULANE UNIVERSITY SCHOOL OF MEDICINE
New Orleans, Louisiana

GRANT NUMBER: 5 R01 OH 00387-03

PRINCIPAL INVESTIGATOR:

Morton M. Ziskind, M.D.
Department of Medicine
Tulane University School of Medicine
1430 Tulane Avenue
New Orleans, Louisiana 70112

TITLE:

Accelerated Silicosis in Sandblasters

OBJECTIVES:

The aim of this investigation is to characterize the accelerated form of the disease (as contrasted with the classical chronic form) in terms of its clinical course, roentgenographic, pulmonary functional, pathologic and immunologic features and their relationship to intensity and duration of exposure.

DESCRIPTION:

This is essentially a clinical investigation of "accelerated" or rapidly progressive occupational silicosis. Populations of silicosis sufferers which are investigated are screened by means of a standard interview, chest x-ray, and basic pulmonary function studies. Epidemiologic data are collected and correlated with occupational exposures and diagnoses. An extensive follow-up of subjects is contemplated.

PUBLICATIONS:

Samimi, B., H. Weill and M. Ziskind: Respirable Silica Dust Exposure of Sandblasters and Associated Workers in Steel Fabrication Yards. Arch. Env. Hlth. 29: AMA 61-66 (August 1974).

Bailey, W.C., M. Brown, H.A. Buechner, H. Weill, H. Ichinose, and M. Ziskind: Silico-Mycobacterial Disease in Sandblasters. Amer. Rev. Resp. Dis. 110: 115-125 (1974).

Weill, H.: Workshop on the Chest X-Ray as an Epidemiologic Tool. Nat'l. Heart & Lung Institute Div. of Lung Diseases, New Orleans, Louisiana (March 25-26, 1974).

Jones, R.N., M. Warwick, and M. Ziskind: Autoimmune Disorders in Accelerated Silicosis. ABSTRACT FORM (1974).

Ziskind, M.M.: Accelerated Silicosis in Sandblasters. Final Progress Report (covering period 06/01/71-08/31/74).

WEST VIRGINIA UNIVERSITY
Morgantown, West Virginia

GRANT NUMBER: 5 R01 OH 00360-05

PRINCIPAL INVESTIGATOR:

Robert Burrell, Ph.D.
Department of Microbiology
West Virginia University Medical Center
Morgantown, West Virginia 26506

TITLE:

Immune Injury in Occupational Respiratory Diseases

OBJECTIVES:

The overall aim is the elucidation of the underlying mechanisms responsible for producing immune injury in occupationally-related chronic pulmonary disease. This project aims at development of simpler methods of assessing impairment in pulmonary function due to immune injury in an experimental model of hypersenitivity pneumonitis (EHP). Also to be continued is the investigation of long-term effects of passive administration of anti-lung serum on normal pulmonary structure and function.

DESCRIPTION:

This is a three-year renewal project to be performed primarily in animals (rabbits). Human beings are also to be surveyed for immune responses to selected antigen. Ten principal tasks are identified: 1) by means of the Corning blood gas apparatus, blood gas determinations are to be made in the development of simpler methods of assessing pulmonary functional changes due to immune injury; 2) rabbits are to be used to study experimental hypersensitivity pneumonitis. Immunized animals will have their pulmonary function checked following aerosol challenges; 3) determination of effects of aerosol challenge in "decomplemented" previously immunized rabbits; 4) expand studies of passive transfers of sensitivity; 5) study the effects of differences of antigen, (soluble vs. cellular), and route of immunization upon type of tissue reaction and/or physiologic impairment in experimental hypersensitivity pneumonitis; 6) finish the study of effects of long-term administration of anti-lung serum on normal lung function. This is to be done in mice; 7) continue survey of appropriately selected patients with various forms of chronic pulmonary disease, particularly CWP, for cell mediated reactivity to soluble lung connective tissue antigen; 8) to transfer passively, cell mediated immunity to soluble lung connective tissue to normal recipients, and study these recipients for histopathologic changes in lung; 9) determine if SCT sensitivity has potentiation of a chronic infection such as tuberculosis; and 10) study the effect of adding humoral antibody to the test system in 9), if the results of 9) are positive.

WEST VIRGINIA UNIVERSITY

PUBLICATIONS:

Burrell, R. and C. C. Cate: The Effect of Lung Reactive Antibodies on the Pathogenesis of Tuberculosis. Clin. & Exper. Immuno. 9: (6) 809-819 (1971).

Burrell, R., D.K. Flaherty, P.B. DeNee, J.L. Abraham, and A.H. Gelderman: The Effect of Lung Antibody on Normal Lung Structure and Function. Amer. Rev. Resp. Dis. 109: 106-113 (1974).

Burrell, Robert: COMMENTARY: Immunological Reflections on Asbestos. Environ. Hlth. Perspec. 9: 297-298 (1974).

Cate, Charles C. and Robert Burrell: Lung Antigen Induced Cell-Mediated Immune Injury in Chronic Respiratory Diseases. Amer. Rev. Resp. Dis. 109: 114-123 (1974).

PHYSICAL AGENTS

NOISE

NON-IONIZING RADIATION

VIBRATION

UNIVERSITY OF MINNESOTA
Minneapolis, Minnesota

GRANT NUMBER: 5 R01 OH 00350-05

PRINCIPAL INVESTIGATOR:

W. Dixon Ward, Ph.D.
University of Minnesota
Box 461 Mayo Memorial Building
Minneapolis, Minnesota 55455

TITLE:

Damage-Risk Criteria for Intermittent Noise Exposures

OBJECTIVES:

The fundamental aim of this research is to test the validity of the equal energy concept in the formulation of damage-risk criteria for intermittent noise exposure.

DESCRIPTION:

This is a three-year renewal project in normal-hearing young adult human beings (20 students) to clarify the existing situation in which it is observed that exposure to intermittent noise does not produce the same amount of hearing impairment as a steady-state noise. Human beings are to be exposed for different time periods to various noise levels and patterns, some of unspecified intensity, for different duty-cycles. Temporary threshold shifts (TTS) are to be measured under a variety of noise administration regimens and patterns. Effects of pure tones on TTS are to be compared with those of different frequency bands of noise. The resultant data are hoped to be used to establish equal damage-exposure contours.

PUBLICATIONS:

Ward, W.D.: The 'Safe' Workday Noise Dose. Noise, Shock & Vibration Conference, Monash University, Melbourne, p. 19-28 (1974).

Ward, W.D.: Studies of Asymptotic TTS. Paper to be presented May 5-9 at Aerospace Medical Panel Specialist Meeting sponsored by AGARD (NATO) in Canada, 1975.

STATE UNIVERSITY OF NEW YORK UPSTATE MEDICAL CENTER
Syracuse, New York

GRANT NUMBER: 5 R01 OH 00364-04

PRINCIPAL INVESTIGATOR:

Donald Henderson, Ph.D.
Upstate Medical Center
Department of Otolaryngology
750 East Adams Street
Syracuse, New York 13210

TITLE:

The Effects of Impulse Noise on Auditory System

OBJECTIVES:

The aim of this research is the determination of the relationships of impulse noise stimuli having various duty cycle patterns and hearing damage risk.

DESCRIPTION:

This is a three-year renewal project in experimental animals (chinchillas). The isomorphism of the chinchilla TTS and the human TTS are to be determined in the hope of establishing a basis for generalizing to human beings. Plans also include exploration of behavioral conditioning methods and the attempt to use the acoustic reflex as improved methods for detecting hearing loss resulting from impulse noise. Hearing damage is to be evaluated with electron microscopy technology (cochlea hair cell examination) as well as through audiologic hearing evaluation technology. Audiologic measurements will include pure tone threshold, oto-admittance, and difference thresholds for intensity and frequency. Temporary threshold shift (TTS) studies are to be performed to validate or invalidate the "equal energy" concept as promulgated in the OSH Act of 1970.

PUBLICATIONS:

Hamernik, R.P., et al.: Impulse Noise: Some Electrophysiological and Anatomical Effects. Seventh International Congress on Acoustics, Budapest, p. 381-384 (1971).

Eames, B.L., et al.: The Role of the Middle Ear in Acoustic Trauma from Impulses. State University of New York ABSTRACT (1973).

Salvi, R.J., et al.: Cochlear Nucleus Neurons Response to TTS Producing Noise. State University of New York. ABSTRACT (1973).

Henderson, D., et al.: Evoked Response Audibility Curve of the Chinchilla. State University of New York. ABSTRACT (1973).

STATE UNIVERSITY OF NEW YORK UPSTATE MEDICAL CENTER

Henderson, D., et al.: Audiometric and Anatomical Correlates of Impulse Noise Exposure. State University of New York. ABSTRACT (1973).

Hamernik, R.P., et al.: Impulse Noise Trauma: A Study of Histological Susceptibility. State University of New York. ABSTRACT (1973).

Henderson, D., et al.: Audiometric and Histological Effects of Exposure to 40 U-Sec High Level Impulses. State University of New York. ABSTRACT (1973).

Sitler, R., et al.: The Temporary and Permanent Threshold Shifts Produced by Three Levels of Impulse Noise. State University of New York ABSTRACT (1973).

Henderson, D., et al.: A Comparison Between Hair Cell Losses and Permanent Threshold Shifts Produced by Three Levels of Impulse Noise. State University of New York. ABSTRACT (1973).

Hamernik, R.P., et al.: Cochlear Degeneration Following Impulse Noise Exposure. State University of New York. ABSTRACT (1973).

Salvi, R., D. Henderson, and R. Hamernik: Differential Response of Neurons in the Cochlear Nucleus to TTS-Producing Tones. Presented at 86th Meeting of the Acoustical Society of America in Los Angeles, California (October 30 - November 2, 1973).

Woodford, C., D. Henderson, R. Hamernik, and A. Feldman: Threshold Duration Function of the Acoustic Reflex in Man. Audiology 14: 53-62 (1975).

Henderson, D., R. Hamernik, and R. Sitler: Audiometric and Histological Correlates of Exposure to 1-MSEC Noise Impulses in the Chinchilla. J. Acous. Soc. Am. 56: (4) 1210-1221 (October 1974).

NORTH CAROLINA STATE UNIVERSITY
Raleigh, North Carolina

GRANT NUMBER: 5 R01 OH 00417-02

PRINCIPAL INVESTIGATOR:

Franklin D. Hart, Ph.D.
Professor of Mechanical Engineering
Director, Center for Acoustical Studies
North Carolina State University
3182 Broughton Hall
Raleigh, North Carolina 27607

TITLE:

Noise Control Research on Wood Planers

OBJECTIVES:

The principal aim of this proposal is to investigate the two main noise-generating sources in wood planers with the view to devising means of controlling (decreasing) the noise in both the cutting and idling modes of the machines.

DESCRIPTION:

The two main noise-generative sources are: 1) Noise incident to board vibration resulting from cutting heads striking and shaving wood boards, and 2) Aerodynamic noise resulting from the high speed rotation of the cutting head when the machine is idling.

The investigator proposes to devise an experimental rig which would include a compact wood-plane enclosure to suppress board vibration in both the "in-feed" and "out-feed" operations. Investigations of aerodynamic planer noise are to be approached by analytic study of the physics and engineering parameters connected with rotating cutter heads isolated from the machines. Such factors as blade geometry, speed, air flow, and air flow pathway are to be investigated. The results are to be applied to noise suppression devices and methodology in other woodworking machinery in the furniture and other industries.

PUBLICATIONS:

None

NORTH CAROLINA STATE UNIVERSITY
Raleigh, North Carolina

GRANT NUMBER: 5 R01 OH 00442-02

PRINCIPAL INVESTIGATOR:

Paul D. Emerson, B.S., M.E.
Associate Professor
School of Textiles
North Carolina State University
P. O. Box 5006
Raleigh, North Carolina 27607

TITLE:

Coordinated Textile Industry Noise Reduction Program

OBJECTIVES:

This research proposal seeks to ascertain, and develop where necessary, information needed by the manufacturing and machinery sectors of the textile industry to implement maximum possible noise reductions.

DESCRIPTION:

By means of random sampling (300 mills) of approximately 7000 textile mills located in the United States, survey data are to be obtained on noise levels in continuous filament and staple yarn manufacturing, weaving, knitting, non-woven, tufting, dyeing, and finishing operations. Noise control measures currently in effect will be observed. Computer analysis of the data is planned. A compilation of data analyses and noise control information, including successful noise control practices, from industry and from the noise research program at the School of Textiles of North Carolina State University will be made and published in the form of a manual or handbook of noise control and made available to the textile industry.

PUBLICATIONS:

None

DUKE UNIVERSITY MEDICAL CENTER
Durham, North Carolina

GRANT NUMBER: 1 R01 OH 00534-01

PRINCIPAL INVESTIGATOR:

Myron L. Wolbarsht, Ph.D.
Department of Ophthalmology
Duke University Medical Center
Post Office Box 3802
Durham, North Carolina 27710

TITLE:

Safe Ocular Levels for Near IR Occupational Exposures

OBJECTIVES:

The safe range of exposures to IR irradiation in the region from 700-2000 nm and power levels at which frank cataract formation occurs will be determined. The possible etiology of cataracts following exposure to infrared radiation in the region from 700-2000 nm by examining the lens for leakage of proteins or the presence of abnormal molecules (or changes in concentration of normally occurring molecules) following exposure to the infrared will be investigated.

DESCRIPTION:

It has been stated that infrared radiation has no direct effect on the lens but is absorbed by the iris and that it is the heat derived from the iris which subsequently affects the lens. This research proposes 1) to establish infrared exposure safety levels for cataract formation, and 2) to determine by optical methods what molecular changes occur in the lens as a result of such irradiation. The investigator believes that infrared radiation acts directly on the lens, pointing out that melanin does not absorb in the near infrared (greater than 800) and, therefore, chronic exposure of infrared would not be likely to heat the iris and indirectly cause the lens opacification.

PUBLICATIONS:

None

UNIVERSITY OF TEXAS
Austin, Texas

GRANT NUMBER: 5 R01 OH 00470-02

PRINCIPAL INVESTIGATOR:

Douglas D. Reynolds, Ph.D.
Department of Architectural Engineering
University of Texas at Austin
Austin, Texas 78712

TITLE:

Vibration Characteristics of the Hand and Arm

OBJECTIVES:

This proposal is designed to investigate the effects on the hand and arm of vibration resulting from hand-held or hand-directed power, and other, mechanical tools. The ultimate objective is to correlate the medical findings in Raynaud's phenomenon (and other related disorders of the hand) to the mechanical and vibration response characteristics of the hand.

DESCRIPTION:

This is a project proposal for a three-year investigation using the mechanical impedance measurement technique to measure the system parameters that describe the response characteristics of the hand and arm under the influence of tool-induced vibration. Objective as well as subjective information will be collected. Objectively, the investigator will observe operator, size, the manner in which a tool is held, tightness of clasp of tool handle, area of hand in which a tool is held, percent of total hand area needed to hold or control a tool, and size of a tool handle. Subjectively, the operator will be asked to describe response characteristics to a tool vibration input. Test results and subjective responses will be correlated.

PUBLICATIONS:

None

UNIVERSITY OF DAYTON RESEARCH INSTITUTE
Dayton, Ohio

GRANT NUMBER: 5 R01 OH 00479-02

PRINCIPAL INVESTIGATOR:

Gregory J. Landrum, B.A.
University of Dayton Research Institute
300 College Park Avenue
Dayton, Ohio 45469

TITLE:

Effects of Vibration on Human Comfort and Performance

OBJECTIVES:

This investigation is directed at the safe testing of human volunteer subjects in a man-carrying vibration machine for the purpose of improving and refining human vibration standards.

DESCRIPTION:

In this two-year project, it is planned to construct a device for testing, in selected, healthy, young men, the effects of specific low frequency vibration levels in the range of from 1 to 80 Hz. The vibration intensities recommended in the ISO Exposure Limits will not be exceeded. A subjective severity scale will be used to measure the effects. It is also proposed to examine selected but undefined performance and evaluate results of electro-physiological tests performed for various vibration levels.

PUBLICATIONS:

None

PHYSICAL AND CHEMICAL ANALYSIS

MASSACHUSETTS DEPARTMENT OF LABOR AND INDUSTRIES
Boston, Massachusetts

GRANT NUMBER: 5 R01 OH 00309-16

PRINCIPAL INVESTIGATOR:

Leonard D. Pagnotto, M.S.
39 Boylston Street
Boston, Massachusetts 02116

TITLE:

Factors Affecting the Excretion of Industrial Poisons

OBJECTIVES:

This very practically oriented investigation seeks to correlate industrial exposures to noxious materials with analytical determinations of corresponding metabolic products which may be found in the urine. This is directed toward the industrial health hazards for which data are either lacking or are unreliable.

DESCRIPTION:

In this applied laboratory and field program, urine is studied as the indicator fluid in industrial toxin exposures. Foundry workers' urine is examined for excretion of lead, zinc, and copper as compared with the urine of appropriate control populations not exposed to the metals. Similarly, metabolic products of such industrial chemicals as trichloroethylene, methyl ethyl ketone, acetone, and other organic solvents are investigated in urine and correlated with temporal occupational exposures. Stainless steel welders' urine is examined for excretion of nickel and other metals. The developed results can serve useful purposes in control and elimination of recognized industrial poison hazards.

PUBLICATIONS:

Elkins, H. B.: Exposure Tests in Industrial Toxicology. J. Int'l. Union of Pure and Appld. Chem. 18: 143-150 (1969).

Pagnotto, L. D. and C. B. Killian: Measurement of Tritiated Organic Compounds in the Presence of Tritiated Water in Urine. Am. Indus. H. Assn. J. 30: 407-412 (August 1969).

Elkins, H. B. and L. D. Pagnotto: The Specific Gravity Adjustment in Urinalysis. Arch. Env. Hlth. 18: 996-1001 (June 1969).

Holland, H. D.: Benzene Exposure of Furniture Strippers. Report: Commonwealth of Mass., Dept. of Labor & Industries, Div. of Occup. Hyg., Boston (July 1971).

MASSACHUSETTS DEPARTMENT OF LABOR AND INDUSTRIES

Cuzacq, G., M. Comproni, and H.L. Smith: Mercury Contamination in Dental OH Office. J. Mass. Dental Soc. (Fall 1971).

Ratney, R.S., D.H. Wegman, and H.B. Elkins: In Vivo Conversion of Methylene Chloride to Carbon Monoxide. Arch. Env. Hlth. 28: 223-226 (April 1974).

Elkins, H.B. and L.D. Pagnotto: Factors Affecting the Excretion of Industrial Poisons. Final Progress Report (Covering period 09/01/71-08/31/74).

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00415-02

PRINCIPAL INVESTIGATOR:

Joseph A. Caruso, Ph.D.
Assistant Professor
Department of Chemistry
University of Cincinnati
Cincinnati, Ohio 45221

TITLE:

Ultra-Sensitive Methods of Trace Metal Analysis

OBJECTIVES:

The principal aim of this proposal is the demonstration of a non-flame atomization or sampling device to activate zinc and copper atoms for analysis in a conventional atomic absorption spectrometer and atomic fluorescence instrument. The larger, long-term goal is the development of highly-sensitive, more accurate analytical procedures for using very small samples for trace metal determinations in biological media.

DESCRIPTION:

The investigator proposes to adapt to a conventional atomic absorption spectrometer, and to an atomic fluorescence instrument, a non-flame sampler utilizing a tantalium strip as the sampling area. It is claimed that non-flame samplers permit sample sizes as small as from 1 to 50 microliters. These, however, have not been accomplished as yet with biological fluid and tissue samples. Less chemical pretreatment (decreased potential contamination) of samples with consequent greater analytic sensitivity and specificity for the sought trace metal is a claim for the proposed methods. Lowering of detection limits to an anticipated 10^{-12} grams of metal is a desired (and apparently achievable goal).

If successful, the application of these simple and inexpensive techniques to the determination of ultra-small quantities of trace metals in biological media, especially at the cellular level, may contribute to the development of new areas of research in trace-metal activity in living organisms and in man.

PUBLICATIONS:

None

PHYSIOLOGY

Heat Stress

Respiratory

UNIVERSITY OF PITTSBURGH
Pittsburgh, Pennsylvania

GRANT NUMBER: 5 R01 OH 00308-19

PRINCIPAL INVESTIGATOR:

Paul C. Magee
University of Pittsburgh
130 DeSoto Street
Pittsburgh, Pennsylvania 15213

TITLE:

Evaluation of Stresses of Exposure to Heat

OBJECTIVES:

The long-range objectives are threefold: 1) to acquire better quantitative understanding of the factors determining the physiologic stresses resulting from exposure to hot environments and physical activity; 2) to relate the physical stresses so determined for man to the physiologic strains and overstrains resulting from exposure; and 3) to apply the generated information to the solution of health problems of populations at risk because they work or reside in hot climates.

DESCRIPTION:

This project deals essentially in generating information in the broad area of thermal physiology. There is both a practical as well as theoretical component to the effort. Practically, the role and influence of clothing in modifying thermal exchanges is investigated, whereas, on a theoretical level, consideration is devoted to studying the interrelationships which obtain between local and general stimuli and associated responses to thermal loads.

During the current phase of this project, industrial exposures to intermittent high heat levels are simulated in controlled environmental chamber laboratory settings. Physiologic responses such as body temperatures, heart rate, sweating, and sensations of fatigue are measured.

Heat tolerance of individuals is also tested by means of a new approach which involves exposure of persons, engaged in moderate work, to increasing graduated levels of ambient humidity. Responses are recorded as affected by age, sex, state of health, and acclimatization.

PUBLICATIONS:

Kamon, E. and H.S. Belding: Heat Uptake and Dermal Conductance in Forearm and Hand When Heated. J. Appld. Physiol. 24: 277-281 (1968).

Belding, H.S.: Work in Hot Environments. In Industrial Hygiene Highlights. Pittsburgh - Industrial Hygiene Foundation of America. p. 214-228 (1968).

UNIVERSITY OF PITTSBURGH

Kamon, E. and H.S. Belding: Dermal Blood Flow in the Resting Arm During Prolonged Leg Exercise. J. Appld. Phys. 26: 317-320 (1969).

Belding, H.S., et al.: Health Factors Involved in Working Under Conditions of Heat Stress. WHO Tech. Rpt. Series #412 32 pgs. (1969).

Belding, H.S., E. Kamon, and G. Larson: Physiologic Cost of Load Carrying (Under Comfortable and Hot Conditions). Amer. Indus. Hyg. Assn. J. 30: 104 (1969).

Belding, H.S.: The Search for a Universal Heat Stress Index in Physiological and Behavioral Temperature Regulation. J.D. Hardy & A.P. Gagge, editors. Thomas, Springfield, Illinois Chapt. 13: 193-212 (1970).

Kamon, E.: Negative and Positive Work in Climbing a Laddermill. J. Appld. Physiol. 29: 1-5 (1970).

Kamon, E. and H.S. Belding: The Physiological Cost of Carrying Loads in Temperate and Hot Environments. Hum. Fac. 13: 153-161 (1971).

Belding, H.S.: Engineering Approach to Analysis and Control of Heat Exposures. Indus. Env. Hlth. 271-280 (1972).

Belding, H.S.: Biophysical Principles of Acclimatization to Heat. Phys. Adapt. 9-21 (1972).

Kamon, E.: Relationship of Physiological Strain to Change in Heat Rate During Work in the Heat. Amer. Indus. Hyg. Assoc. J. 701-708 (November 1972).

Belding, H.S. and E. Kamon: Evaporative Coefficients for Prediction of Safe Limits in Prolonged Exposures to Work Under Hot Conditions. Fed. Proc. 32: (5) 1598-1601 (May 1973).

Ramanathan, N.L. and H.S. Belding: Physiologic Evaluation of the WBGT Index for Occupational Heat Stress. Am. Indus. Hyg. Assoc. J. 34: (9) 375-383 (Septemter 1973).

Pandolf, K.B. and E. Kamon: Respiratory Responses to Intermittent and Prolonged Exercise in a Hot-Dry Environment. Life Sci. 14: 187-198 (1974).

PENNSYLVANIA STATE UNIVERSITY
University Park, Pennsylvania

GRANT NUMBER: 1 R01 OH 00583-01

PRINCIPAL INVESTIGATOR:

Eliezer E. Kamon, Ph.D.
Noll Laboratory for Human Performance Research
Pennsylvania State University
University Park, Pennsylvania 16802

TITLE:

Evaluation of Stresses of Exposure to Heat

OBJECTIVES:

The broad objectives of this effort are: 1) to follow the physiologic strain in man exposed to various levels of heat stress; 2) to use the findings with respect to the physiological mechanisms that underlie the adjustments to work in the heat for the development of a strain predictor: and 3) to provide a predictive formula for heat strain and for a recommended pattern of work-rest that will ensure the well-being of workers exposed to hot conditions.

DESCRIPTION:

During this one-year project, the following three studies will be undertaken: 1) apply our understanding of the physiological responses to heat to the scheduling of work-rest under heat stressing ambient conditions; 2) define the safe limits of exposures to high ambient air temperatures and suggest predictive formulae for men or women at risk, and 3) further test the heat stress meter designed under past work in the project.

PUBLICATIONS:

None

TEXAS TECH UNIVERSITY
Lubbock, Texas

GRANT NUMBER: 1 R01 OH 00497-01

PRINCIPAL INVESTIGATOR:

Jerry D. Ramsey, Ph.D.
Associate Professor
Department of Industrial Engineering
Texas Tech University
Lubbock, Texas 79409

TITLE:

Temperature - Time Effects on Sedentary Job Performance

OBJECTIVES:

This proposal seeks to provide precise data from controlled experiments to support or refute NIOSH criteria for "unimpaired mental performance" in hot environments.

DESCRIPTION:

This is a one-year study of results of psychomotor tests in healthy young men subjected to temperature/humidity conditions above and below those now included in the Hot Environments criteria document. In the environmental chamber, a series of experiments will be conducted on five sedentary tasks (multiplication, motor coordination, reaction time, tracking, and monitoring tasks). Seven temperature levels (between 80° F and 110° F WBGT) and work periods between 15 and 120 minutes will be imposed. Task performance scores are to be statistically analyzed for all temperature-time combinations. Oral and rectal body temperatures will be measured as functions of environmental temperature and time on task.

PUBLICATIONS:

None

UNIVERSITY OF ROCHESTER
Rochester, New York

GRANT NUMBER: 5 R01 OH 00334-05

PRINCIPAL INVESTIGATOR:

Juraj Ferin, Ph.D.
University of Rochester
Department of Radiation Biology & Biophysics
Rochester, New York 14620

TITLE:

Air Pollutants and Lung Clearance of Particles

OBJECTIVES:

This project is designed to investigate the normal mechanisms of clearance of particles from the respiratory tract and the influence of various airborne factors and some drugs on clearance. The information developed is anticipated to be useful in determining the biological effects of air pollutants.

DESCRIPTION:

Investigation in animals, under controlled conditions, are conducted with test aerosols of specific particulate sizes and other characteristics. Measurements are made, immediately on exposure and at later times, of amounts deposited and their location in the respiratory tract.

The amount of the test aerosol deposited is determined chemically in the case of TiO_2 and SiO_2 and by radioisotopic methods in the case of $Fe_2{}^{59}O_3$.

By means of the TiO_2 test system in which animals (rats) are exposed and then serially sacrificed, variations in alveolar clearance are investigated. This system which has been developed by the investigator, has been used to determine the effect (suppressive) of a number of air pollutants such as sulfur dioxide, amosite, and chrysotile on lung clearance. The use of papain to induce emphysema has also demonstrated a suppressive effect. The investigator's thesis that impairment of the alveolar clearance mechanism could result in retention of harmful substances in the lung is an interesting but not unique idea. It remains to be established.

Histologic examinations are performed using both light and electron microscopy and the electron microprobe. The materials under investigation include asbestos, coal and cement dusts, cigarette smoke and various irritant vapors. Drugs of interest are those which affect the reticuloendothelial system.

UNIVERSITY OF ROCHESTER

PUBLICATIONS:

Ferin, J.: Papain-Induced Emphysema and the Elimination of TiO_2 Particulates from the Lungs. AIHA J. 32: 157-162 (March 1971).

Ferin, J.: Emphysema in Rats and Clearance of Dust Particles. University of Rochester, New York (1971).

Ferin, J.: Observations Concerning Alveolar Dust Clearance. Ann. N.Y. Acad. Sci. 200: 66-72 (December 1972).

Ferin, J. and L.J. Leach: The Effect of SO_2 on Lung Clearance of TiO_2 Particles in Rats. Amer. Indus. Hyg. Assn. J. 260-263 (June 1973).

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00357-04

PRINCIPAL INVESTIGATOR:

Eula B. Mattheis, Ph.D.
Department of Environmental Health
University of Cincinnati
Kettering Laboratory
Cincinnati, Ohio 45219

TITLE:

Fate of Inhaled Coal Dust

OBJECTIVES:

The long-term goal of this research is the assessment of the relative importance of dust concentration, metal content, free silica, and organic extractable material on the observed differences in prevalence of CWP in Appalachian vs. Utah coal mines. A secondary goal is to provide more scientific evidence for the hypothesized role of alveolar macrophages in pulmonary disease.

DESCRIPTION:

This is a two-year renewal of an ongoing project. Experimental procedures (inhalation studies) are to be performed in rabbits and *in vitro* with the results assessed in terms of the specific aims which are stated as seeking answers to the following questions: 1) Are the particles of coal not cleared actually the smaller, more metallic (and more siliceous) ones? Are Pennsylvania and Utah coals comparable?; 2) What is the biochemical evidence (via their energy of lysosomal enzymes) to support the hypothesis that macrophages play a central role in CWP? Are there qualitative or quantitative biochemical differences between the two coal exposures?; 3) What is the pulmonary response to fractions of coal? (Can it be predicted from the tissue culture assay?) Concentration of effort is to be directed to aims (1) and (3).

PUBLICATIONS:

None

UNIVERSITY OF PITTSBURGH
Pittsburgh, Pennsylvania

GRANT NUMBER: 2 R01 OH 00367-04

PRINCIPAL INVESTIGATOR:

Yves C. Alarie, Ph.D.
Department of Occupational Health
Graduate School of Public Health
University of Pittsburgh
Pittsburgh, Pennsylvania 15261

TITLE:

Respiratory Tract Irritants; Mechanisms and Tolerance

OBJECTIVES:

The overall objective of this research proposal is to establish the mechanisms by which one category of "respiratory tract irritants," i.e., the "sensory irritants" or "upper respiratory tract irritants," exert their action and to delineate the importance of reflex reactions when they are retained in the upper respiratory tract. The aim of the present investigation is fourfold: 1) to continue the study of sensory irritation of the upper respiratory tract by various airborne chemicals and to correlate their irritant property with their chemical structure; 2) to determine the in vitro reactivity of these chemicals with SH groups; 3) to determine the mechanism of desensitization and why this appears with some but not all irritants; and 4) to study the effects of sensory irritation in animals with pulmonary impairment.

DESCRIPTION:

The investigator has developed a simple method of measuring the degree of sensory irritation of the upper respiratory tract to airborne chemicals. Mice are exposed to various concentrations of aerosols or vapors of the chemicals and the decrease in respiratory rate during the exposure is measured. Since the decrease is related to the concentration, the irritant potency of chemicals can be graded and compared according to an RD_{50} value, i.e., the concentration necessary to reduce respiratory rate by 50% from control. The decrease in the respiratory rate has been demonstrated to be a reflex response from stimulation of the trigeminal nerve endings in the upper respiratory tract. Tolerance or desensitization results from repeated exposures to some chemical irritants. This mechanism is studied by following a fixed regime of exposure and recovery.

PUBLICATIONS:

Alarie, Yves C.: Sensory Irritation of the Upper Airways by Airborne Chemicals. Tox. & Appld. Pharm. 24: 279-297 (1973).

NEW YORK UNIVERSITY MEDICAL CENTER
New York, New York

GRANT NUMBER: 5 R01 OH 00396-02

PRINCIPAL INVESTIGATOR:

Edward D. Palmes, Ph.D.
New York University Medical Center
Institute of Environmental Medicine
550 First Avenue
New York, New York 10016

TITLE:

Aerosol Deposition in Human Subjects

OBJECTIVES:

This endeavor is directed toward providing a rational understanding of the underlying dynamics of inhaled aerosols as relatable to industrial dust exposures. More specifically, the effort is aimed at determining the fate of aerosols inhaled by human beings.

DESCRIPTION:

This project has essentially a biphasic character: 1) an investigation of the influence of physiologic and anatomic factors on deposition of aerosols in the human respiratory tract, and 2) the development of a simple, rapid screening procedure for measuring aerosol deposition in human populations, under conditions applicable to those in working environments. The rationale of the principal direction of this project resides in the reasonable concept that any given particle of known size and shape is deposited in a shorter time if it is confined in a smaller rather than larger space.

The investigation is carried out by using breath-holding and single breath techniques in human subjects. A new type of apparatus is also used with newly developed procedures to study steady-state breathing of aerosols. Presumably these techniques and procedures are useful in screening procedures such as may be employed for emphysema and other respiratory diseases and conditions.

PUBLICATIONS:

None

TOXICOLOGY AND PATHOLOGY

PAN AMERICAN HEALTH ORGANIZATION
Washington, D.C.

GRANT NUMBER: 5 R01 OH 00313-10

PRINCIPAL INVESTIGATOR:

Humberto Torloni, M.D.
Pan American Health Organization
525 23rd Street, N.W.
Washington, D.C. 20037

TITLE:

Manganese Poisoning - A Metabolic Disorder

OBJECTIVES:

These investigations of the metabolic role of manganese are directed toward: 1) developing an understanding of the factors involved in manganese poisoning in miners; 2) delineating common characteristics of manganism and Parkinson's Disease; 3) promoting a rationale for effective biochemical therapy for both manganism and Parkinson's Disease.

DESCRIPTION:

This project effectively combines basic experimental sciences with clinical investigations. The effective utilization of the pharmaceutical, L-DOPA (3,4-dihydroxy-L-phenylalanine), and 5-hydroxytryptophan in the experimental treatment of Parkinsonism offers promise in the treatment of manganese poisoning in human beings. Experiments are performed in laboratory animals to evaluate the effect of manganese on drug response as well as to study the dynamics of absorption of manganese oxide and manganese salts in healthy and in anemic animals. Chemical balance studies are performed in hospitalized miners on various therapeutic regimens including apomorphine, which has been demonstrated to be effective in the temporary improvement of miners. Alpha-methyl-DOPA-hydrazine is being investigated as a potentiator of the therapeutic effects of L-DOPA.

PUBLICATIONS:

Cotzias, G.C., K. Horiuchi, S. Fuenzalida and I. Mena: Chronic Manganese Poisoning Clearance of Tissue Manganese Concentrations with Persistence of the Neurological Factor. Neurology 18:(4) 336-382 (April 1968).

Papavasiliou, P.S., S.T. Miller, and G.C. Cotzias: Role of Liver in Regulating Distribution and Excretion of Manganese, Am. J. Phys. 221:(1) 211-216 (July 1968).

Papavasiliou, P.S., S.T. Miller, and G.C. Cotzias: Functional Interactions Between Biogenic Amines, 3,5-Cyclic AMP and Manganese. Nature 220:(5172) 74-75 (October 5, 1968).

Cotzias, G.C.: Metabolic Modification of Some Neurologic Disorders, J.A.M.A. 210:(7) 1255-1262 (November 17, 1969).

Mena, I., K. Horiuchi, K. Burke and G.C. Cotzias: Chronic Manganese Poisoning Individual Susceptibility and Absorption of Iron. Neurology 19:(10) 1000-1006 (October 1969).

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Mena, I.: Perspectivas de la L. Dopa en la Enfermedad de Parkinson, ACTAS I^{O} SIMPOSIO SUDAMERICANO SOBRE EL ESTADO ACTUAL DEL TRATAMIENTO EN LA ENFERMEDAD DE PARKINSON Y PARKINSONISMO, 54-59 (1970).

Court, J., J.C. Kase, E. Palacious, and I. Mena: Tratamiento del Parkinsonismo Con L-Dopa. Rev. Med. Chili 99: 399-401 (1971).

Mena, I.: Levodopa, Involuntary Movements and Fusaric Acid. J.A.M.A. 218: (12) 1829 (December 20, 1971).

Fernandez, O.: Modificaciones en la Absorcion de Citrato Ferroso Fe En La Rata Por El Uso De Atropina. Rev. Med. Chile 99: 808-811 (1971).

Orrego, H.: Effects of Anticholinergic Agents on the Intestinal Absorption of Fe Ferrous Citrate. Amer. J. Dig. Diseases 16:(9) 789-795 (September 1971).

Mena, I.: La Barrera Hematoencefalica y Los Oligoelmentos: Manganeso. Rev. Med. Chile 100: 171 (1972).

Mena, I.: Susceptibility to Cold in Newborns of Levodopa-treated Rats. Nature 239: 285-287 (September 1972).

Mena, I.: Low Survival of Offsprings of Levodopa Treated Rats. ABST. Intersociety 77-82; Fed. Proc. 31: 224 (ABST. 77) (1972).

Mena, I., G. Lopez, K. Horiuchi, and L. Aranda: La Barrera Hematoencefalica Y Los Oligoelementos: Manganeso. Rev. Med. Chile 100: 171-174 (1972).

Gillespie, N.G., I. Mena, G.C. Cotzias, and M.A. Bell: Diets Affecting Treatment of Parkinsonism with Levodopa'. J. of Amer. Dietetic Assoc. 62:(5) 525-528 (May 1973).

Cotzias, G.C., I. Mena, and P.S. Papvasiliou: Overview of Present Treatment of Parkinsonism with L-DOPA. Adv. Neuro. 2: 265-277 (1973).

Mena, I. and G.C. Cotzias: Inhibition of Cerebral Effects of Levodopa by Protein Intake. ABST. FASEB (1973).

Mena, I., G.C. Cotzias, F.C. Brown, P.S. Papavisiliou, and S.T. Miller: Defective Release of Growth Hormone in Parkinsonism Improved by Levodopa. New Eng. J. Med. (February 8, 1973).

Papavasiliou, P.S., G.C. Cotzias, I. Mena, and M. Bell: Oxybate Sodium for Parkinsonism. J.A.M.A. 224:(1) 130 (April 2, 1973).

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Cotzias, G.C., P. Papavasiliou, I. Mena, L.C. Tang, and S.T. Miller: Manganese and Catecholamines. Advances in Neurology 5: 235-243 (1974).

Cotzias, G.C., L.C. Tang, and I. Mena: Effects of Inhibitors and Stimulators of Protein Synthesis on the Cerebral Actions of L-DOPA. Neurosciences Research 5: 97-108 (1973).

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Mena, I., G.C. Cotzias, P. Papavasiliou, J. Mendez, and F.C. Brown: Chronic Treatment with L-DOPA and Growth Hormone Release. Advances in Neurology 5: 471-476 (1974).

Mena, I.: The Role of Manganese in Human Disease. Anals of Clinical and Laboratory Science 4:(6) 487-491 (1974).

Mena, I., M.A. Bell, and D.W. Potter: Ergometry in the Clinical Evaluation of Parkinsonism. Archives of Phy. Med. and Rehab. 55: 246-250 (June 1974).

Mena, I.: Manganese Poisoning. 12 pages. BNL 17864.

Mena, I.: Manganese Poisoning: A Metabolic Disorder. Final Progress Report (1974).

Mena, I. and George C. Cotzias: Protein Intake and Treatment of Parkinson's Disease with Levodopa. New Eng. J. Med. 292: 181-184 (January 23, 1975).

Mena, I., K.Z. Horiuchi, J. Court, and G. Lopez: Decarboxylation of DL-DOPA Studied by $^{14}CO_2$ Analysis in Parkinsonian and Manganic Patients. Dynam. Stud. with Radioisotopes in Med. 1974 I: 483-488 (1974).

HARVARD UNIVERSITY
Boston, Massachusetts

GRANT NUMBER: 5 R01 OH 00315-12

PRINCIPAL INVESTIGATOR:

Sheldon D. Murphy, Ph.D.
Harvard University
665 Huntington Avenue
Boston, Massachusetts 02115

TITLE:

Biochemical and Physiologic Response to Toxic Stress

OBJECTIVES:

The overall objective of this project is to increase understanding of effects of, and physiological responses to, the toxic action of a variety of chemicals such as some hepatotoxic organic solvents, irritants, neurotoxins, and cholinesterase inhibitors. More specifically, the aim is to determine, in experimental animals, the nature of the stresses imposed by exposure to toxic chemicals and the animal's capacity to adapt to its environment as a consequence.

DESCRIPTION:

This is a four-phase experimental investigation of toxic stress and its consequent biochemical and physiologic responses. Phase 1 is a characterization of the properties of liver alkaline phosphatase after the administration of various toxic agents. Phase 2 is the comparison of effects of adrenocortical hormones (and of the adrenal gland itself) on acute toxicity, hepatotoxicity, and metabolism of aliphatic halogenated hydrocarbons. Phase 3 is the exploration of the relationship between anticholinesterase action of organophosphate insecticides and increased adrenocortical activity. Phase 4 is an investigation of drug effects and associated stress upon acrylamide neurotoxicity and an attempt to obtain biochemical "markers" to peripheral neuropathy.

PUBLICATIONS:

Murphy, S.D., and S. Malley: Stress-Inducible Liver Enzymes in Rats Given Hepatotoxic Chemicals. Tox. Applied Pharm. 12: 317-318 (1968).

Szor, R.J. and S.D. Murphy: Effects of Phenobarbitol and Dexamethasone on the Adrenocortical Response of Rats to Toxic Chemicals and Other Stress. Tox. Applied Pharm. 14: 615-616 (1969).

Murphy, S.D.: Some Relationships Between Effects of Insecticides and Other Stress Conditions. Ann. of N.Y. Acad. of Sci. 160: 366-377 (June 1969).

Murphy, S.D. and S. Malley: Effect of Carbon Tetrachloride on Induction of Liver Enzymes of Acute Stress or Corticosterone. Tox. & Applied Pharm. 15: 117-130 (1969).

Szor, R.J.: Phenobarbitol and Dexamethasone Inhibition of the Adrenocortical Response of Rats to Toxic Chemicals and Other Stresses. Tox. & Applied Pharm. 17: 761-773 (1970).

Szor, R.J. and S.D. Murphy: Relationships Between Toxic Chemical Stress and Circadian Changes in Adrenocortical Activity. Fed. Procs. 29: (1970).

Jenkins, L.J., M.J. Trabulus, and S.D. Murphy: Biochemical Effects of 1,1-Dichloroethylene in Rats: Comparison with Carbon Tetrachloride and 1,2-Dichloroethylene. Tox. & Applied Pharm. 23: 501-510 (1972).

Jaeger, R.J. and S.D. Murphy: Duration of Action, Distribution and Metabolism of Pentobarbital or Hexobarbital After 1,1-Dichloroethylene, Corticosterone or Acrolein. Fed. Proc. 32:(3) 320 ABST (March 1973).

Jaeger, R.J., M.J. Trabulus, and S.D. Murphy: The Interaction of Adrenalectomy, Partial Adrenal Replacement Therapy and Starvation with Hepatotoxicity and Lethality After 1,1-Dichloroethylene Intoxication. Tox. & Applied Pharm. 25:(3) (July 1973).

Moffitt, A.E. and S.D. Murphy: Effect of Excess and Deficient Copper Intake on Rat Liver Microsomal Enzyme Activity. Biochem. Pharm. 22: 1463-1476 (1973).

Jaeger, R.J., M.J. Trabulus, and S.D. Murphy: Biochemical Effects of 1,1-Dichloroethylene in Rats: Dissociation of Its Hepatotoxicity From a Lipoperoxidative Mechanism. Tox. & Applied Pharm. 24: 457-467 (1973).

Kaplan, M.L., S.D. Murphy, and F.H. Gilles: Modification of Acrylamide Neuropathy in Rats by Selected Factors. Tox. & Applied Pharm. 24: 564-579 (1973).

Jaeger, R.J., R.B. Conolly, and S.D. Murphy: Diurnal Variation of Hepatic Glutathione Concentration and its Correlation with 1,1-Dichloroethylene Inhalation Toxicity in Rats. Res. Commun. in Chem. Path. & Pharm. 6:(2) 465-471 (1973).

Jaeger, R.J. and S.D. Murphy: Alterations of Barbiturate Action Following 1,1-Dichloroethylene, Corticosterone, or Acrolein. Archives internationales de Pharmacodynamie et de Therapie. 205:(2) 281-292 (October 1973).

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Richardson, R.J. and S.D. Murphy: The Effect of Glutathione Depletion on the Renal Deposition of Methylmercury in Rats. Tox. & Applied Pharm. 29: 137 (July 1974).

Jaeger, R.J., R.B. Conolly, and S.D. Murphy: Inhalation Toxicity Studies on Halogenated Hydrocarbons. The Pharm. 16:(2) 216 (1974).

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Moffitt, A.E. and S.D. Murphy: Effect of Excess and Deficient Copper Intake on Hepatic Microsomal Metabolism and Toxicity of Foreign Chemicals. Trace Sub. in Envir. Hlth. 7: 205-210 (1974).

Richardson, R.J. and S.D. Murphy: Neurotoxicity Produced by Intracranial Administration of Methylmercury in Rats. Tox. & Applied Pharm. 29: 289-300 (1974).

UNIVERSITY OF FLORIDA
Gainesville, Florida

GRANT NUMBER: 5 R01 OH 00316-10

PRINCIPAL INVESTIGATOR:

Kenneth C. Leibman, Ph.D.
University of Florida College of Medicine
Department of Pharmacology & Therapeutics
Gainesville, Florida 32601

TITLE:

Metabolism of Hydrocarbons and Related Toxicants

OBJECTIVES:

The investigator has, as his goal, the systematic study of the metabolic reactions of the carbon-carbon double bond and the effects of substituents on vicinal carbon atoms. The aim is to permit the prediction of the qualitative and quantitative aspects of metabolic reactions of double bonds in compounds more structurally complex than the ones studied.

DESCRIPTION:

This is a rather straightforward investigation in vitro of the ability of various biological systems (e.g., rat microsomal NADP-requiring systems) to oxidize the test substances enzymically to primary oxidation products, such as epoxides and glycols. Investigations in vitro of other biological systems are similarly carried out. Compounds of interest, initially, are styrene, indene, dihydronaphthalene, heptachlor, and aldrin. Structure - function correlations are sought in the developed data.

PUBLICATIONS:

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Leibman, K.C. and E. Ortiz: Oxidation of Cycloalkenes in Liver Microsomes. Biochem. Pharm. 20: 232-236 (1971).

Leibman, K.C. and R.W. Estabrook: Effects of Extraction with Isooctane Upon Properties of Liver Microsomes. Molec. Pharm. 7: (1) 26-32 (January 1971).

UNIVERSITY OF FLORIDA

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Chapman, S.D. and K.C. Leibman: The Effects of Chlordane, DDT, and 3-Methylcholanthrene Upon the Metabolism and Toxicity of Diethyl-4-Nitrophenyl Phosphorothionate (Parathion). Tox. & Appld. Pharm. 18: 977-987 (1971).

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Naeger, L.L., et al.: Mechanisms of Decaborane Toxicity. Tox. & Appld. Pharm. 22: 517-527 (1972).

Deyrup, C.L., et al.: Metabolism of Cyclohexanone in Mammalian Liver. Volun. Abstracts. 5th International Congr. Pharm. 57: (1972).

Herschleb, W.P., et al.: Microsomal Metabolism of Butadiene. Fed. Proc. 31: 559 (1972).

Leibman, K.C.: Metyrapone and Other Modifiers on Microsomal Drug Metabolism. Drug. Metab. & Disposition 1: (1) 184-189 (1973).

Leibman, K.C. and E. Ortiz: Mammalian Metabolism of Terpenoids: 1. Reduction and Hydroxylation of Camphor and Related Compounds. Drug. Metab. & Disposition 1: (2) 543 (1973).

HARVARD UNIVERSITY
Boston, Massachusetts

GRANT NUMBER: 5 R01 OH 00322-07

PRINCIPAL INVESTIGATOR:

John M. Peters, M.D.
665 Huntington Avenue
Boston, Massachusetts 02115

TITLE:

Health Hazards of the Di-Isocyanates

OBJECTIVES:

The general goals of this project are: to investigate the relationship between exposure to diisocyanates (toluene diisocyanate) and the development of acute and chronic respiratory disease; to define the patho-physiological lesion involved and to determine the toxic mechanism related to the exposure; to identify hypersensitive workers; and to define "safe" exposure levels.

DESCRIPTION:

This is a prospective monitoring study of workers exposed to diisocyanates and the attempt to correlate findings with past work history and future work experience. The investigations are interested, in addition to developing the information indicated in the objectives, in the possible effects of chronic diisocyanate exposure, the interrelationships, if any, with smoking, and in carrying out various immunological studies to see whether or not sensitized workers demonstrate the presence of antibodies. Non-occupational exposures are also of interest. The permanence or reversibility of chemical changes and changes in ventilatory capacity are also studied.

PUBLICATIONS:

Peters, J.M., R.L.H. Murphy, L.D. Pagnotto, and W.F. van Ganse: Acute Respiratory Effects in Workers Exposed to Low Levels of Toluene Diisocyanate (TDI). Arch. Env. Hlth. 16: 242-247 (May 1968).

Peters, J.M., R.L.H. Murphy, and B.G. Ferris: Ventilatory Function in Workers Exposed to Low Levels of Toluene Diisocyanate (TDI): A Six Month Follow-Up. Brit. J. Indus. Med. 26: 115 (1969).

Peters, J.M., J. Mead, and W.F. van Ganse: A Single Flow Volume Device for Measuring Ventilatory Function in the Field. Am. Rev. Resp. Dis. 99: 617-622(1969).

Peters, J.M., R.L.H. Murphy, L. Pagnotto, and J.L. Whittenburger: Respiratory Impairment in Workers Exposed to "Safe" Levels of Toluene Diisocyanate (TDI) Arch. Env. Hlth. 20: 364-368 (March 1970).

Peters, J.M.: Cumulative Pulmonary Effects in Workers Exposed to Toluene Diisocyanate. Proc. Royal Soc. of Med. 63: (4) 372-375 (Section Of Occupational Medicine 14-17). (April 1970).

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00337-06

PRINCIPAL INVESTIGATOR:

Harold G. Petering, Ph.D.
Kettering Laboratory
University of Cincinnati
Eden and Bethesda Avenues
Cincinnati, Ohio 45219

TITLE:

A Study of Mechanics of Occupational Cadmium Toxicity

OBJECTIVES:

This investigation, which originally was directed toward understanding the toxicity of cadmium and its interrelationships with copper and zinc metabolism, has been expanded to include iron metabolism. In addition, effects of concurrent administration of lead compounds and/or metal-binding ligands in air, tobacco smoke, or in certain drug preparations are also studied. The rationale behind this research is the belief that excessive occupational and environmental exposure to cadmium may lead to chronic diseases of the respiratory, cardiovascular, and hematopoietic systems and to other pathologies in man. The disease states of particular interest are: cadmium-induced hypertension, skin alterations, lung pathology, aberrations in lipid metabolism and cell respiration, and the chelation of zinc, copper, and cadmium with certain drugs or other ligands.

DESCRIPTION:

Using rats as the experimental animals, investigations of cadmium toxicity are performed in which the intakes of copper and zinc are carefully controlled at suboptimal and excessive levels. The effect of both quality and quantity of protein on cadmium toxicity, are also examined, including especially the significance of sulfur-containing amino acids in protein metabolism. Biochemical and pathologic studies which include complete tissue and blood analyses, some representative metalloenzyme determinations, respiratory activity and oxidative phosphorylation, and potassium transport in liver tissues, are carried out. The project includes study of gross pathology, organ histology, and electron microscopy of selected tissues.

Continuing experimental procedures in rats have shown that cadmium administration elevates systolic blood pressure and effects some of the metabolic relationships as well as the utilization of zinc and copper. Some of these effects were found to be mitigated by increasing the dietary intake of zinc or copper. The most obvious pathologic lesions due to cadmium intake, were found in focal emphysema of the lung, loss of capillaries of skin and testes, and focal atrophy of testes.

UNIVERSITY OF CINCINNATI

PUBLICATIONS:

Sell, J.E. and H.G. Petering: Effect of Buffer System on Carbonic Anhydrase Activity in the Presence of EDTA or Peptone. Proc. of 2nd Central Regional Meeting of Amer. Chem. Soc., Columbus, Ohio ABSTRACT No. 16, p. 27 (June 3-5, 1970).

Petering, H.G., M.A. Johnson, K.L. Stemmer: Studies of Zinc. Metabolism in the Rat. Arch. Env. Hlth. 23: 93-101 (1971).

Petering, H.G.: Studies in Zinc Metabolism IV Interactions of Zinc and Cadmium. Preliminary Reports in Department of Environmental Health, University of Cincinnati, Annual Report (1971).

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Petering, H.G.: Direct Determination of Cadmium and Lead in Diluted Plasma Preliminary Reports in the Department of Environmental Health, University of Cincinnati, Annual Report (1971).

Petering, H.G.: In Vitro Distribution of Cadmium and Lead in Rat's Blood. Preliminary Reports in Department of Environmental Health, University of Cincinnati, Annual Report (1971).

Petering, H.G., D.W. Yeager, and S.O. Witherup: Trace Metal Content of Hair. I. Zinc & Copper Content of Human Hair in Relation to Age and Sex. Arch. Env. Hlth. 23: 202-208 (September 1971).

Murthy, L., J.R.J. Sorenson, and H.G. Petering: Effect of Cadmium on Ceruloplasmin (Copper Oxidase) Activity in Rats. Presented at FASEB (1972).

Warkany, J., and H.G. Petering: Congenital Malformations of the Central Nervous System in Rats Produced by Maternal Zinc Deficiency. Teratology 5: 319-334 (June 1972).

Murthy, L., E. O'Flaherty, and H.G. Petering: Effect of Dietary Levels of Copper and Zinc on Serum Lipids of Rats. Paper presentation at 9th International Congress of Nutrition, Mexico City (1972).

Menden, E.E., V.J. Elia, L.W. Michael, and H.G. Petering: Distribution of Cadmium and Nickel of Tobacco During Cigarette Smoking. Envir. Sci. & Tech. 6: 830-832 (September 1972).

Murthy, L., E.O'Flaherty, and H.G. Petering: Studies on Trace Metal Metabolism. Effect of Dietary Zinc and Copper on Lipid Metabolism of the Rat. Taken from Annual Report, Pg. 58, Department of Environmental Health, University of Cincinnati, (1972).

UNIVERSITY OF CINCINNATI

Miller, M.L., J.R.J. Sorenson, H.G. Petering, and L. Murthy: Studies on Trace Metal Metabolism - Light and Electron Microscopic Study of Cadmium Induced Changes in the Interstitium of the Lung. Annual Report, Department of Environmental Health, University of Cincinnati, pg. 69 (1972).

Murthy, L., H.G. Petering, and J.R.J. Sorenson: Studies on Trace Metal Metabolism. The Effect of Cd and Pb on Copper Metabolism. Department of Environmental Health, University of Cincinnati, Annual Report, pg. 62 (1972).

Eller, P.M., L.W. Michael, H.G. Petering: Clinical Determination of Elements by Atomic Absorption Spectrophotometry. Paper presentation at ACS 5th Central Regional Meeting, Cleveland, Ohio (May 13-15 (1973).

Rice, D.P., L. Murthy, T. Shirley, E. Menden, and H.G. Petering: The Impact of Low Level Cadmium Feeding on Blood Chemicals in Male, Sprague-Dawley Rats. Presented at 7th Annual Conference on Trace Substances, Columbia, Missouri (1973).

Klauder, D.S., L. Murthy, and H.G. Petering: Effect of Dietary Intake of Lead Acetate on Copper Metabolism in Male Rats. Trace Sub. Env. Hlth. VI:131-136 (1973).

Elia, V.J., E.E. Menden, and H.G. Petering: Cadmium and Nickel--Common Characteristics of Lettuce Leaf and Tobacco Cigarette Smoke. Env. Ltrs. 4:(4) 317-324 (1973).

Book, R., L. Murthy, T. Shirley, and L. Srivastava: Effects of Cadmium on Glucose Tolerance and Serum Insulin Zinc and Copper in Male Rats. Presented at FASEB (1973).

Elia, V.J., P.M. Eller, and H.G. Petering: Determination of Cadmium and Nickel in Mainstream and Sidestream Smoke of Cigarettes. Department of Environmental Health, University of Cincinnati, Annual Report, P. 196 (1973).

Srivastava, L., L. Murthy, and H.G. Petering: Relationship of Zinc and Copper to Hormones in Female and Male Rats. Department of Environmental Health, University of Cincinnati, Annual Report, Pg. 32, (1973).

Finelli, V.N. and L. Murthy: Aminolevulinate Dehydrase Activity in Blood of Cadmium-Fed Rats. Department of Environmental Health, University of Cincinnati, Annual Report, Pg. 86 (1973).

Eller, P.M. and H. G. Petering: Trace Metal Content of Coal Worker's Hair. Department of Environmental Health, University of Cincinnati, Annual Report, pg. 186, (1973).

Miller, M.L., L. Murthy, and H.G. Petering: Effects of Dietary Manipulations of the Hepatocytes of Male Rats: Copper, Zinc and Cadmium. Department of Environmental Health, University of Cincinnati, Annual Report, pg. 40 (1973).

UNIVERSITY OF CINCINNATI

Sorenson, J.R.J., L. Murthy, and H.G. Petering: Cadmium-Induced Hypertension in Male Sprague-Dawley Rats. Department of Environmental Health, University of Cincinnati, Annual Report, Pg. 93 (1973).

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Klauder, D.S., L. Murthy, and H.G. Petering: Effect of Dietary Intake of Lead Acetate on Copper Metabolism in Male Rats. II. Levesl of Lead and Copper in Liver and Kidney. Department of Environmental Health, University of Cincinnati, Annual Report, Pg. 67 (1973).

Miller, M.L., L. Murthy, and J.R.J. Sorenson: Interstitium of the Male Rat Lung After Exposure to Cadmium. Department of Environmental Health, University of Cincinnati, Annual Report, Pg. 75 (1973).

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Nord, P.J., M.P. Kadaba, and J.R.J. Sorenson: Mercury in Human Hair; A Study of the Residents of Los Alomas, N.W., and Pasadena, Calif., by Cold Vapor Atomic Absorption Spectrophotometry. Arch. Env. Hlth.27 : 40-44 (July 1973).

Eller, P.M. and H.G. Petering: Anodic Stripping Voltammetry As An Analytical Method in Biochemical Studies. Presented at Eastern Analytical Symposium. N.Y. (November 16, 1973).

Murthy, L., E.E. Menden, H.G. Petering: Atomic Absorption Determination of Zinc, Copper, Cadmium, and Lead in Tissues Solubilized by Aqueous Tetramethylammonium Hydroxide. Analyt. Biochem. 53:(2) 367-372 (June 1973).

Michael, L.W., T.J. MacDonald, P.M. Eller, and H.G. Petering: Atomic Absorption Spectroscopy of Selected Elements of Clinical Interest, ABSTRACT, Presented at Soc. for Appld. Spectrometry, Miami, Florida (October 18, 1973).

Warkany, J., and H.G. Petering: Congenital Malformations of the Brain Produced by Short Zinc Deficiencies in Rats. Amer. J. Mental Deficienty 77: (5) 645-653 (1973).

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Sorenson, J.R.J., E.G. Melby, P.J. Nord, and H.G. Petering: Interferences in the Determination of Metallic Elements in Human Hair; An Evaluation of Zinc, Copper, Lead, and Cadmium, Using Atomic Absorption Spectrophotometry. Arch. Envir. Hlth. 27: 36-40 (July 1973).

Sorenson, J.R.J., E.G. Melby, P.J. Nord, and H.G. Petering: Cadmium, Copper, Lead, Mercury and Zinc Concentrations in the Hair of Individuals Living in the United States. Interface 2:17 (1973).

Finelli, V.N., L. Murthy, and W.B. Peirano: δ- Aminolevulinate Dehydrase A Zinc Dependent Enzyme. Biochem. & Biophys. Res. Commun. 60:(4) 1418-1424 (1974).

Choudhury, H., L. Srivastava, L., L. Murthy, and H.G. Petering: Adrenal-Gonadal Relationships to Dietary Zinc and Copper in Male Rats. FASEB ABSTRACT (1974).

Srivastava, L.S., L. Murthy, and H.G. Petering: Effects of Gonadectomy and Adrenalectomy to Dietary Zinc and Copper in Male Rats., Center for the Study of the Human Environment of the University of Cincinnati, Annual Report, p. 22-24 (1974).

Christian, R.T., E.E. Menden, and H.G. Petering: The Biological Effects of Metal Ligand Fractions Isolated From Bituminous Coal Dust. Center for the Study of the Human Environment of the University of Cincinnati, Annual Report, p. 111-116 (1974).

Miller, M.L., L. Murthy, and J.R.J. Sorenson: Fine Structure of Connective Tissue After Ingestion of Cadmium. Observation on Interstitium of Male Rat Lung. Arch. Path. 98: 386-392 (December 1974).

Sorenson, J.R.J., I.R. Campbell, L.B. Tepper, and R.D. Lingg: Aluminum in the Environment and Human Health. Envir. Hlth. Perspec. 8: 3-95 (August 1974).

O'Flaherty, E.J., L. Murthy, and H.G. Petering: The Influence of Dietary Manganese and Chromium on Serum Ceruloplasmin Activity, Copper and Zinc in Male Rats. FASEB (ABSTRACT) (1974).

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Petering, H.G.: The Effect of Cadmium and Lead on Copper and Zinc Metabolism. Trace Element Metabolism in Animals-2, Edited by W.G. Hoekstra, J.W. Suttie, H.E. Ganther and W. Mertz, University Park Press Baltimore, Published in the United Kingdom by Butterworths, London. (1974).

Miller, M.L., L. Murthy, C.R. Basom, and H.G. Petering: Alterations in Hepatocytes After Manipulation of the Diet: Copper, Zinc, and Cadmium Interactions. Am. J. Anat. 141: 23-40 (1974).

UNIVERSITY OF CINCINNATI

Finelli, V.N., L. Murthy, and H.G. Petering: Blood δ-Amino Levulinic Acid Dehydrase, A Zinc Requiring Enzyme. Center for the Study of Human Environment of the University of Cincinnati, Annual Report, p. 26-28 (1974).

Murthy, L. and H.G. Petering: Effects of Lead and Cadmium on Copper and Zinc Metabolism in Male Rats. Center for the Study of the Human Environment of the University of Cincinnati, Annual Report, p. 33-35 (1974).

Murthy, L., and H.G. Petering: Sex Differences with Respect to the Accumulation of Oral Cadmium in Rats. Center for the Study of the Human Environment of the University of Cincinnati, Annual Report, p. 36-38 (1974).

Petering, H.G., and E.E. Menden: Isolation of Ligand Fractions from Pennsylvania Bituminous Coal Dust. Center for the Study of the Human Environment of the University of Cincinnati, Annual Report, p. 106-110 (1974).

UNIVERSITY OF WASHINGTON
Seattle, Washington

GRANT NUMBER: 5 R01 OH 00340-06

PRINCIPAL INVESTIGATOR:

Nedd Robert Frank, M.D.
Department of Preventive Medicine
University of Washington
Seattle, Washington 98105

TITLE:

Respiratory Effects of Inhaled Gases and Aerosols

OBJECTIVES:

The two major objectives of this research are: 1) to elucidate the effects, *in vivo*, exerted by irritant gases and particles (SO_2 and a NaCl aerosol) on the lungs and; 2) to explore the use of mitochondria as sensitive indicators of biochemical toxicity. Studies on the effects of ozone are also planned.

DESCRIPTION:

This is a three-year renewal project to be performed in guinea pigs and also in human beings. Animals will be exposed acutely and semi-chronically to combinations of SO_2 and NaCl aerosol at high and low relative humidities (RH). Body weight and flow resistance will be measured periodically. Lungs will be studied by light and electron microscopy, following the exposure periods. Ten human volunteers (non-smoking), aged 20-25 years, will be studied on three separate occasions. Flow rate, tidal volume, flow resistance, dynamic compliance, transpulmonary pressure, functional residual capacity, vital capacity, and maximum expiratory flow rate will be measured following exposure for 30 minutes to: a) clean air at high RH; b) SO_2 + NaCl at low RH; and c) SO_2 + NaCl at high RH.

In a second part of this research, the effects of ozone at the sub-cellular level, particularly mitochondria of the ciliated epithelium will be investigated in normal rabbits and in rabbits subjected to various exposure regimens of SO_2 and NaCl aerosol combinations.

PUBLICATIONS:

Yokoyama, E., R. Yoder, and N.R. Frank: Distribution of ^{35}S in the Blood and Its Excretion in Urine of Dogs Exposed to $^{35}SO_2$. Arch. Env. Hlth. 22: 389-395 (March 1971).

Frank, N.R., J.P. Flesch, and J.D. Brain: Effect of Ozone on Elastic Behavior of Excised Lungs of Dogs. Env. Res. 4:(4) 343-354 (October 1971).

UNIVERSITY OF WASHINGTON

Frank, N.R., et al.: Comparative Sensitivity of Four Methods for Measuring Changes in Respiratory Flow Resistance in Man. J. Appld. Phys. 31:(6) 934-938 (December 1971).

Frank, N.R.: Clean and Dirty Lungs. Air and Water Pollution, Colorado Assoc. Univ. Press, Boulder, Colorado (1972).

McJilton, C., et al.: Ozone Uptake Model for the Respiratory System. American Industrial Hygiene Conference, San Francisco (ABSTRACT) (May 14-19, 1972).

Watanabe, S.: Functional and Structural Effects of Low Concentrations of Ozone in Cats. American Industrial Hygiene Conference, San Francisco (May 14-19 1972).

Yokoyama, E., et al.: Respiratory Uptake of Ozone in Dogs. Arch. Env. Hlth. 25: 132-138 (August 1972).

McJilton, C., N.R. Frank, and R. Charlson: Role of Relative Humidity in the Synergistic Effect of a Sulfur Dioxide-Aerosol Mixture on the Lung. Amer. Assoc. for the Advan. of Sci. 182: 503-504 (November 2, 1973).

Watanabe, S., N.R. Frank, and E. Yokoyama: Acute Effects of Ozone on Lungs of Cats. I. Functional. Amer. Rev. Resp. Dis. 108: 1141-1151 (1973).

Boatman, E.S., S. Sato, and N. R. Frank: Acute Effects of Ozone on Cat Lungs. II. Structural. Amer. Rev. Resp. Dis. 110: 157-169 (1974).

Richmond, V.L.: In Vitro Hydrolase and Phyagocytic Activities of Alveolar Macrophages. J. Lab. & Clin. Med. 83:(5) 757-767 (May 1974).

Boatman, E.S. and N.R. Frank: Morphologic and Ultrastructural Changes in the Lungs of Animals During Acute Exposure to Ozone. Chest 65:(4) 9S-11S, Supplement, 16th Aspen Lung Conference (April 1974).

UNIVERSITY OF CINCINNATI
Cincinnati, Ohio

GRANT NUMBER: 5 R01 OH 00347-05

PRINCIPAL INVESTIGATOR:

Phyllis D. Kaplan, Ph.D.
University of Cincinnati
Eden and Bethesda Avenues
Cincinnati, Ohio 45219

TITLE:

Biological Interactions of Environmental Metals

OBJECTIVES:

The aim of this research is the elucidation of the nature of the molecular interactions of cadmium with a variety of intracellular constituents. This effort is expected to shed light on both the toxicologic mechanism of action of cadmium and its detoxification.

DESCRIPTION:

This is a two-year renewal project to be continued in rats. The investigation is essentially a study of cadmium distribution in rat lung tissue following inhalation.

Particular emphasis will be placed on the study of the nature of metallic lung constituent interactions. This is to be accomplished by means of such techniques as nuclear magnetic resonance and electron paramagnetic resonance. Information to be developed includes: oxidation state of the metal, type of binding ligands, degree of binding of Cd coordination sites, reversibility of binding and competition with other endogenous metals. It is hoped to correlate the basic chemical information to be obtained with known toxicologic data.

PUBLICATIONS:

Blackstone, M., et al.: An Improved Method for the Direct Determination of Cadmium in Biological Materials by Atomic Absorption Spectrophotometry. Report from University of Cincinnati College of Medicine (1972).

Blackstone, M., et al.: Subcellular Distribution of Cadmium Within the Lung and Kidney After Cadmium Oxide Inhalation Exposure. Report from University of Cincinnati College of Medicine (1972).

Kaplan, P.D., M. Blackstone, and N. Richdale: The Distribution and Retention of Selected Metals in Rat Tissue After Inhalation of Cadmium Oxide Aerosols. (1974).

STANFORD UNIVERSITY
Palo Alto, California

GRANT NUMBER: 5 R01 OH 00352-06

PRINCIPAL INVESTIGATOR:

Eugene D. Robin, M.D.
Department of Medicine
Stanford University
School of Medicine
Palo Alto, California 94305

TITLE:

Lung Cell Function in Health and Disease

OBJECTIVES:

This biochemical and physiological project, which is an extension of the earlier metabolic investigations in alveolar macrophage (AM), is directed toward elucidation of some of the mechanisms of respiratory physiology. The stated ultimate goal is the provision of approaches "aimed at the prevention, diagnosis, treatment, and rehabilitation of lung disease."

DESCRIPTION:

This is a five-year renewal project to be carried out in animals (mice, rats, rabbits, and dogs) and in vitro, using recognized biochemical and physical techniques including radionuclides. The procedural plan is divided into five major subsections. In the first, the investigators plan to use measurement of reduced and oxidized glutathione to estimate the free NADP+/NADPH ratio in AM in control cells, phagocytizing AM's, and after in vitro exposure of these cells, to hypoxia and oxidant gases. In the second portion, they plan to examine energy metabolism in AM's (aerobic cells) as compared to peritoneal macrophages and would determine the influence of in vivo chronic hypoxia and hyperoxia on metabolism and ultrastructure. The third section would involve measurement of Ca++ transport in alveolar macrophages and Ca++ transport from blood or alveolas into pulmonary lymph. In the fourth series of experiments, continuation of "enzyme implantation into alveolar macrophages" would be pursued. They would expose AM's to rate-limiting glycolytic enzymes and measure lactate ion production as compared to macrophages exposed to heat-inactivated enzymes. In the fifth and final portion, the possible protective effect of Vitamin E and glycerol against oxidant gases would be examined.

PUBLICATIONS:

Mintz, S. and E.D. Robin: Redox State of Free Nicotinamide-Adenine Nucleotides in the Cytoplasm and Mitochondria of Alveolar Macrophages. J. Clin. Inves. 50: 1181-1186 (June 1971).

STANFORD UNIVERSITY

Robin, E.D., J.D. Smith, A.R. Tanser, J.S. Adamson, J.E. Millen, and B. Packer: Ion and Macromolecular Transport in the Alveolar Macrophage. Biochem. Biophys. Acta. 241: 117-128 (1971).

Simon, L.M., S. Axline, B.R. Horn and E.D. Robin: Macrophage Bioenergetic Adaptations, ABSTRACT (1971).

Simon, L.M., J. Theodore, and E.D. Robin: Enzymatic Difference in Macrophage Energy Metabolism, ABSTRACT (1971).

Theodore, J., J. Acevedor and E.D. Robin: Enzyme Implantation: Acquisition of "de novo" Uricase Activity by Alveolar Macrophages (AM). Draft (1972).

Simon, J.R., S. Mintz, G. Freeman, J. Theodore, and E.D. Robin: Effects of NO_2 on Redox State of Alveolar Macrophages. ABSTRACT (1972).

Theodore, J., et al.: Cation Transport and Energy Metabolism in the Nucleated Erythrocyte of the Dogfish Shark, Squalus Acanthias. Comp. Biochem. Physiol 42A: 639-654 (1972).

Theodore, J., et al.: Implantation of Exogenous Enzymatic Activity in Isolated Alveolar Macrophages. Sci. 178: 1302-1304 (December 22, 1972).

Acevedo, J.C., et al.: Effect of Intrapulmonary Water Instillation on Pulmonary Lymph Flow and Composition. Amer. J. Physiol. 223: (6) 1433-1437 (December 1972).

Robin, E.D., et al.: Capillary Leak Syndrome with Pulmonary Edema. Arch. Internal Med. 130: 66-71 (July 1972).

UNIVERSITY OF CALIFORNIA
Berkeley, California

GRANT NUMBER: 2 R01 OH 00368-04

PRINCIPAL INVESTIGATOR:

Robert C. Spear, Ph.D.
Environmental Health Sciences
University of California-Berkeley
Berkeley, California. 94720

TITLE:

Occupational Exposure to Organophosphorous Compounds

OBJECTIVES:

This research is designed to identify and assess the biochemical and other parameters of organophosphorous pesticide toxicity in agricultural field workers and to develop effective methodologies and procedures to modify or prevent poisoning among field workers who enter pesticide-treated workplaces (fields, vineyards, and orchards).

The objectives of this project are to discover 1) variations in the physical and chemical nature of the pesticide residues in the field in various regions of the nation; 2) to further develop and verify techniques for meaningful correlations of the environmental sampling of pesticide residues to work exposures through the measurement of cholinesterase changes and the excretion of the dialkyl phosphate and phenolic metabolites of the applied pesticide in the urine of the exposed worker; 3) to determine the effects of specific environmental variables upon the chemical composition and physical availability of pesticide residues.

DESCRIPTION:

The research project is divided into four parts: First, there will be a work practices survey aimed at defining the work practices, hygienic conditions and demographic data on the work force that may influence the residue intoxication hazard in a particular crop and geographic region. Second, there is to be an experimental residue decay study involving a study of the decay of foliar residues of one or more pesticides on a particular crop under replicated, carefully controlled conditions. Third, a cross sectional study will focus on the decay of foliar residues in groves or vineyards that have received commercial applications of a pesticide under normal agricultural conditions. Fourth, using students as pickers, there is to be a human exposure study, with blood cholinesterase being monitored by the University of California group, and 24 hour urines being monitored by the University of Miami group for alkyl phosphate and its metabolites and relationships being drawn between these data and exposure data.

UNIVERSITY OF CALIFORNIA

PUBLICATIONS:

Popendorf, W.J. and R.C. Spear: Preliminary Survey of Factors Affecting the Exposure of Harvesters to Pesticide Residues. Submitted to J. Amer. Indus. Hyg. Assn. (October 1973).

Leffingwell, J.T., R.C. Spear and D. Jenkins: Ethion and Zolone Residues of Grape Foliage in the Central Valley of California. Submitted to Arch. Env. Contam. & Tox. pp. 1-25 (December 1973).

Jacobsen, P.L., R.C. Spear, and E. Wei: Parathion and DFP Toxicity in Partially hepatectomized Rats. Tox. & Applied Pharm. 26: 314-317 (1973).

Jacobsen, P.L., R.C. Spear, and E. Wei: Short Communications; Parathion and Diisopropylfluorophosphate (DFP) Toxicity and Applied Pharm. 26: 314-317 (1973).

Leffingwell, J., R.C. Spear, and D. Jenkins: The Persistence of Ethion and Zolone Residues on Grape Foliage in the Central Valley of California. Arch. of Env. Contam. & Tox. 3: (1) 40-54 (1975).

NORTHWEST INDUSTRIAL MEDICAL CLINIC, INC., P.S.
INSTITUTE OF ENVIRONMENTAL MEDICINE AND PHYSIOLOGY
Seattle, Washington

GRANT NUMBER 1 R01 OH 00448-01

PRINCIPAL INVESTIGATOR:

J. Leon Sealey, M.D.
President and Medical Director
Northwest Industrial Medical Clinic, Inc., P.S.
Institute of Environmental Medicine and Physiology
1500 1st Avenue, South
Seattle, Washington 98134

TITLE:

Aseptic Bone Necrosis Survey in Compressed Air Workers

OBJECTIVES:

This brief study is directed toward the determination, by roentgenographic examinations, of the incidence of bone injury or joint disruption in compressed air workers.

DESCRIPTION:

This epidemiologic investigation of more than 100 men who had had pre-employment x-ray examinations before exposure to hyperbaric work in the Seattle area and periodic x-rays taken semi-annually while employed, is expected to yield highly useful data on the incidence of subsequent work-related aseptic bone necrosis. The current investigation of the cohort of previously exposed men, five to six years after exposure, includes follow-up x-ray examinations for the purpose of: 1) determining the incidence of later occurrence of aseptic bone necrosis and 2) evaluating the effectiveness of the Washington State Decompression Regulations. X-rays of shoulders, hips, and knees are taken, studied, and classified according to the criteria of the British Medical Research Council Panel on Decompression. Although no control subjects are involved this deficiency is obviated by the dose categorization of the exposure data, the gradation of which appears to be such that a dose-effect relationship can be anticipated if a sizable number of late sequelae are identified. The absence of significant detectable late effects in this survey would be interpretable only if few or no persons are lost to follow-up.

PUBLICATIONS:

Sealey, J. Leon: Aseptic Bone Necrosis Survey in Compressed Air Workers. Final Progress Report (covering period 06/01/73-12/31/74).

UNIVERSITY OF ROCHESTER
Rochester, New York

GRANT NUMBER: 5 R01 OH 00472-02

PRINCIPAL INVESTIGATOR:

Frank A. Smith, Ph.D.
Associate Professor
Department of Radiation Biology & Biophysics
University of Rochester
School of Medicine & Dentistry
Rochester, New York 14642

TITLE:

Exposures of Mixtures of Airborne Contaminants

OBJECTIVES:

This research aims at investigating the biological effects of concurrent exposures to mixed airborne contaminants such as hydrogen fluoride (HF), particulate fluoride (insoluble rock phosphate), or soluble triple superphosphate, each at their TLV concentrations. The agents selected are those encountered in the mining and processing of rock phosphate to produce phosphoric acid and phosphate fertilizers. This study is intended to elucidate the possible synergistic or additive effects of mixed contaminant exposures and to indicate possible safety margins.

DESCRIPTION:

This is a three-year project in which guinea pigs are to be used as experimental animals to test experimentally the effects of mixed airborne contaminant exposures at the calculated threshold limit values (TLV). The work is predicated on the assumption that the effects of the different agents are additive. Exposed animals and controls will be sacrificed prior to examination for skeletal changes detectable by x-ray, skeletal storage of fluoride, excretion of fluoride in urine, plasma fluoride levels, and histological changes induced in the respiratory tract and other organs.

PUBLICATIONS:

None

TEMPLE UNIVERSITY SCHOOL OF DENTISTRY
Philadelphia, Pennsylvania

GRANT NUMBER: 5 R01 OH 00518-02

PRINCIPAL INVESTIGATOR:

Martin F. Tansy, Ph.D.
Professor and Chairman
Department of Physiology and Biophysics
Temple University School of Dentistry
3223 N. Broad Street
Philadelphia, Pennsylvania 19140

TITLE:

Gastric Response to Inhaled Methyl Methacrylate Vapor

OBJECTIVES:

The proposal seeks to investigate the toxicity, in rats, of inhaled vapors of methyl methacrylate.

DESCRIPTION:

This is a one-year study of both acute and chronic toxicity effects in rats of inhaled vapor of methyl methacrylate, a chemical widely used in dental laboratories. It is proposed to study acute gastric secretomotor effects and the mechanisms responsible for the effects and also to determine the histopathology and mortality connected with chronic long-term exposure (at the TLV) to the chemical.

PUBLICATIONS:

None

DEMONSTRATIONS

SOUTHERN RESEARCH INSTITUTE
Birmingham, Alabama

GRANT NUMBER: 2 R01 OH 00456-02

PRINCIPAL INVESTIGATOR:

Charles E. Bates, Ph.D.
Head, Metallurgy Section
Southern Research Institute
2000 Ninth Avenue, South
Birmingham, Alabama 35205

TITLE:

Better Foundry Hygiene Through Permanent Mold Casting

OBJECTIVE:

The objective of the proposed work is to demonstrate and measure the reductions which can be achieved in noise, general particulate, free silica and chemical emissions by producing castings in permanent metal molds instead of sand molds. The magnitude of the hygiene improvements will be determined by characterizing emissions from the permanent mold casting process and comparing these with emissions generated during the production of sand castings.

DESCRIPTION:

Recent developmental research on the production of gray and ductile iron castings in permanent molds has suggested that it is possible to make a quantum jump in foundry cleanliness with this method of production. This is a direct result of eliminating dust entrainment during unloading, handling, mulling, transferring, molding, pouring, shakeout, cooling, and reprocessing the molding sand with associated additives such as Southern and Western bentonite, seacoal, wood flour, pitch, iron oxide and possibly a number of organic additives. Furthermore, sand adheres to the casting, which necessitates subsequent shot blasting, chipping and grinding.

PUBLICATIONS:

None

NORTH CAROLINA STATE UNIVERSITY
Raleigh, North Carolina

GRANT NUMBER: 1 R01 OH 00494-01A1

PRINCIPAL INVESTIGATOR:

J. Ronald Bailey, Ph.D.
Assistant Professor
Center for Acoustical Studies
North Carolina State University
Post Office Box 5801
Raleigh, North Carolina 27607

TITLE:

Punch Press Noise Reduction Demonstration

OBJECTIVES:

This demonstration project aims at developing information to implement maximum possible noise reduction in presses used in metalforming and in punching operations.

DESCRIPTION:

This is a one-year demonstration proposal which will use standard noise control methods including mufflers, damping materials, tool designs, isolation, enclosures, barriers, and absorption. The effects would be evaluated by a jury of industry experts. Innovative concepts would be sought. Publication is planned of effective methodology and devices primarily for the benefit of assisting companies with limited engineering capabilities to meet OSHA standards.

PUBLICATIONS:

None

RESEARCH MEETINGS

STATE OF NEW YORK UPSTATE MEDICAL CENTER
Syracuse, New York

GRANT NUMBER: 1 R13 OH 00556-01

PRINCIPAL INVESTIGATOR:

Donald Henderson, Ph.D.
Department of Otorhinolaryngology
S U N Y Upstate Medical Center
750 East Adams Street
Syracuse, New York 13210

TITLE:

The Effect of Noise on Hearing: Critical Issues

OBJECTIVES:

The last comprehensive published conference on the effects of noise was held in 1968. Since that time, important new phenomena have been discovered which may be of great importance in establishing a more scientific base for future noise guidelines. Because of the diversity of disciplines now working on noise related problems, there is a need for an interdisciplinary forum to discuss the critical issues involved in developing a scientifically based damage risk criteria. Authorities from otology, physiology, psychoacoustics, audiology, engineering and public health will deliver state-of-the-art essays on key questions concerning the generation of noise standards. The proceedings of the symposium will be published.

WESTERN INDUSTRIAL HEALTH CONFERENCE
Los Angeles, California

GRANT NUMBER: 1 R13 OH 00575-01

PRINCIPAL INVESTIGATOR:

Rufus J. Walker, M.D.
c/o Pacific Telephone Company
177 East Colorado Boulevard
Pasadena, California 91105

TITLE:

18th Annual Western Industrial Health Conference

OBJECTIVES:

The general objective is to provide program enrichment for the Western Industrial Health Conference with the purpose of providing members of the Occupational Health Care professions with information which will allow them to better serve the labor force in industry. As a part of providing the program enrichment, special attention will be given to the effects of energy conservation measures on health protection in the industrial environment.

RESEARCH GRANTS IN FISCAL YEAR 1975

GRANT NUMBER	INSTITUTION AND PRINCIPAL INVESTIGATOR	PROJECT PERIOD	FY 1975 AWARD
3 R01 OH 00300-03S1	Villanova University Quam, G. N.	08/01/72-07/31/74	---
5 R01 OH 00301-03	Snell Memorial Fdn., Inc. Snively, G.C.	02/01/70-05/31/76	---
5 R01 OH 00303-17	Univ. of Pennsylvania Samitz, M. H.	12/01/72-11/30/75	38,838
5 R01 OH 00304-11	John B. Pierce Foundation Bouhuys, A.	11/01/72-10/31/75	76,836
5 R01 OH 00306-14	Marshfield Clinic Foundation Emanuel, D. A.	12/01/71-11/30/74	---
5 R01 OH 00308-19	Univ. of Pittsburgh Magee, P.	11/01/72-10/31/75	12,768
5 R01 OH 00309-16	Mass. Dept. of Labor and Industries Pagnotto, L.	09/01/71-08/31/74	---
5 R01 OH 00313-10	Pan Amer. Hlth. Orgn. Torloni, H.	11/01/70-07/31/74	---
5 R01 OH 00315-12	Harvard University Murphy, S. D.	01/01/72-12/31/75	71,788
5 R01 OH 00316-10	Univ. of Florida Leibman, K. C.	01/01/71-12/31/75	44,484
2 R01 OH 00320-08	Mt. Sinai Sch. of Medicine Selikoff, I. J.	07/01/74-06/30/79	74,056
5 R01 OH 00321-06	Univ. of Washington Milner, J. E.	05/01/71-08/30/74	---
5 R01 OH 00322-07	Harvard University Peters, J. M.	10/01/71-09/30/76	42,614
2 R01 OH 00331-06	Montefiore Hospital and Medical Center Weitzman, E. D.	07/01/74-06/30/76	71,737
5 R01 OH 00334-05	Univ. of Rochester Ferin, J.	12/01/72-11/30/74	---

RESEARCH GRANTS IN FISCAL YEAR 1975

GRANT NUMBER	INSTITUTION AND PRINCIPAL INVESTIGATOR	PROJECT PERIOD	FY 1975 AWARD
5 R01 OH 00337-06	Univ. of Cincinnati Petering, H. G.	09/01/72-08/31/75	79,971
5 R01 OH 00340-06	Univ. of Washington Frank, N. R.	11/01/73-10/31/76	82,640
5 R01 OH 00342-04	Univ. of Notre Dame Pollard, M.	06/01/71-07/31/74	---
5 R01 OH 00346-03	University of Miami Wiener, E. L.	02/01/71-08/31/74	---
5 R01 OH 00347-05	Univ. of Cincinnati Kaplan, P. D.	04/01/74-03/31/76	45,866
5 R01 OH 00350-05	Univ. of Minnesota Ward, W. D.	04/01/74-03/31/77	50,861
5 R01 OH 00352-06	Stanford University Robin, E. D.	05/01/74-04/30/79	97,507
5 R01 OH 00356-04	Univ. of Cincinnati Christian, R.	06/01/72-06/30/75	47,350
5 R01 OH 00357-04	Univ. of Cincinnati Mattheis, E. B.	08/01/73-07/31/75	32,880
5 R01 OH 00360-05	West Virginia University Burrell, R.	06/01/74-05/31/76	38,946
5 R01 OH 00362-10	Centro Malattie Cardio-vascolari Puddu, V.	08/01/71-07/31/76	3,500
5 R01 OH 00364-04	Upstate Medical Center Henderson, D.	05/01/74-04/30/77	94,992
2 R01 OH 00367-04	Univ. of Pittsburgh Alarie, Y. C.	10/01/74-09/30/77	50,448
2 R01 OH 00368-04	Univ. of California Spear, R. C.	03/01/75-02/28/77	70,680
5 R01 OH 00369-03	Harvard University Peters, J.M.	10/01/72-09/30/77	34,673

RESEARCH GRANTS IN FISCAL YEAR 1975

GRANT NUMBER	INSTITUTION AND PRINCIPAL INVESTIGATOR	PROJECT PERIOD	FY 1975 AWARD
5 R01 OH 00371-02	Univ. of Cincinnati Rockwell, J. R.	10/01/72-01/31/75	---
5 R01 OH 00387-03	Tulane Univ. Sch. of Med. Ziskind, M.	06/01/71-08/31/74	---
5 R01 OH 00396-02	New York Univ. Med. Center Palmes, E. D.	08/01/72-07/31/75	---
5 R01 OH 00398-02	St. Louis University Slavin, R. G.	04/01/74-03/31/77	28,909
5 R01 OH 00404-02	Univ. of California Nahum, A. M.	01/01/72-02/29/76	26,207
5 R01 OH 00410-05	Wayne State University Birmingham, D. J.	09/01/72-08/31/75	---
5 R01 OH 00415-02	Univ. of Cincinnati Caruso, J.	03/01/74-02/29/76	17,181
5 R01 OH 00417-02	North Carolina State Univ. Hart, F. D.	04/01/74-06/30/76	52,577
3 R01 OH 00423-01S1	Univ. of Michigan French, J. R. P.	05/01/74-09/30/75	14,184
5 R01 OH 00424-02	Cornell University Rehkugler, G. E.	05/01/74-04/30/77	36,453
1 R01 OH 00432-01	New York Univ. Med. Center Tichauer, E. R.	06/01/73-09/30/74	---
5 R01 OH 00442-02	North Carolina State Univ. Emerson, P. D.	04/01/74-03/31/77	124,581
1 R01 OH 00448-01	Northwest Industrial Medical Clinic, Inc., P. S. Sealey, J. L.	06/01/73-12/31/74	---
5 R01 OH 00449-02	Johns Hopkins University Matanoski, G. M.	03/01/74-02/29/76	21,085
2 R01 OH 00456-02	Southern Research Institute Bates, C. E.	02/01/75-10/31/75	19,983

RESEARCH GRANTS IN FISCAL YEAR 1975

GRANT NUMBER	INSTITUTION AND PRINCIPAL INVESTIGATOR	PROJECT PERIOD	FY 1975 AWARD
3 R01 OH 00460-01S1	Georgia Institute of Tech.	05/01/74-04/30/77	9,111
5 R01 OH 00460-02	Bradford, J. M.		81,284
5 R01 OH 00465-04	Johns Hopkins University Matanoski, G. M.	03/01/74-02/29/76	31,890
5 R01 OH 00470-02	University of Texas Reynolds, D. D.	09/01/73-08/31/76	26,194
5 R01 OH 00472-02	University of Rochester Smith, F. A.	05/01/74-04/30/77	38,333
5 R01 OH 00479-02	University of Dayton Landrum, G. J.	05/01/74-04/30/76	69,299
1 R01 OH 00494-01A1	North Carolina State Univ. Bailey, J. R.	04/01/74-09/30/75	---
1 R01 OH 00497-01	Texas Tech University Ramsey, J. D.	03/01/74-08/31/75	---
5 R01 OH 00511-03	University of Missouri Kilburn, K. H.	04/01/74-03/31/77	50,699
5 R01 OH 00513-02	Univ. of California Gellin, G. A.	05/01/74-04/30/76	28,089
5 R01 OH 00514-02	University of Illinois Schultz, A. B.	04/01/74-03/31/76	64,638
5 R01 OH 00518-02	Temple University Tansy, M. G.	05/01/74-04/30/76	6,788
5 R01 OH 00525-02	University of Illinois Gelfand, H. M.	04/01/74-03/31/77	79,307
1 R01 OH 00534-01	Duke Univ. Med. Center Wolbarsht, M. L.	09/01/74-08/31/76	29,530
1 R01 OH 00545-01	Texas Tech University Ayoub, M. M.	03/01/75-02/28/77	50,283
1 R13 OH 00556-01	Upstate Medical Center Henderson, D.	10/01/74-09/30/75	28,396

RESEARCH GRANTS IN FISCAL YEAR 1975

GRANT NUMBER	INSTITUTION AND PRINCIPAL INVESTIGATOR	PROJECT PERIOD	FY 1975 AWARD
1 R01 OH 00563-01	University of Michigan French, J. R. P.	03/01/75-02/29/76	65,136
3 R09 OH 00568-01S1	Univ. of California Culver, B. D.	07/01/74-06/30/76	41,746
1 R13 OH 00575-01	Western Industrial Health Conference Walker, R. J.	09/01/74-05/31/75	4,450
1 R01 OH 00583-01	Pennsylvania State Univ. Kamon, E. E.	11/01/74-10/31/75	42,232
		TOTAL	$2,252,000

RESEARCH & DEMONSTRATION GRANTS SUMMARY BY PROGRAM AREA

PROGRAM AREA	NO. OF ACTIVE GRANTS	FISCAL YEAR 1975 SUPPORT NO.	AMOUNT
BEHAVIORAL & MOTIVATIONAL FACTORS	4	2	$ 79,320
BIOLOGICAL & ENVIRONMENTAL SAMPLING AND ANALYSIS	1	0	---
DERMATOLOGY	4	2	66,927
EPIDEMIOLOGY	5	5	170,455
EQUIPMENT SAFETY	1	1	36,453
ERGONOMICS			
Biomechanics of Materials Handling	2	2	114,921
Shiftwork	1	1	71,737
HEAD AND BODY PROTECTION	3	1	26,207
OCCUPATIONAL RESPIRATORY DISEASE			
Agricultural Pulmonary Diseases	2	1	28,909
Byssinosis	3	4	217,930
Coal Workers' Pneumoconiosis	2	1	47,350
Respiratory Tract Carcinoma	1	1	74,056
Silicosis	1	0	---
Unspecified	1	1	38,946
PHYSICAL AGENTS			
Noise	4	4	323,011
Non-Ionizing Radiation	1	1	29,530
Vibration	2	2	95,493
PHYSICAL & CHEMICAL ANALYSIS	2	1	17,181
PHYSIOLOGY			
Heat Stress	3	2	55,000
Respiratory	4	2	83,328
TOXICOLOGY & PATHOLOGY	12	10	580,671
DEMONSTRATION	2	1	19,983
RESEARCH MEETINGS	2	2	32,846
CHAIRMAN	1	2	41,746
TOTALS	64	49	2,252,000

RESEARCH & DEMONSTRATION GRANTS DISTRIBUTION BY REGION

REGION	NUMBER OF GRANTS	TOTAL AMOUNT
I	5	$ 225,911
II	9	343,967
III	9	242,995
IV	8	361,550
V	15	566,673
VI	4	76,477
VII	2	79,608
VIII	0	---
IX	7	268,679
X	3	82,640
FOREIGN	2	3,500
	64	$2,252,000

RESEARCH & DEMONSTRATION GRANTS DISTRIBUTION BY STATES

STATE	NUMBER OF INSTITUTIONS	NUMBER OF PROJECTS	FY '75 AMOUNT
Alabama	1	1	19,983
California	3	6	268,679
Connecticut	1	1	76,836
Florida	2	2	44,484
Georgia	1	1	90,395
Illinois	1	2	143,945
Indiana	1	1	---
Louisiana	1	1	---
Maryland	1	2	52,975
Massachusetts	2	4	149,075
Michigan	2	3	79,320
Minnesota	1	1	50,861
Missouri	2	2	79,608
New York	7	10	343,967
North Carolina	2	4	206,688
Ohio	2	7	292,547
Pennsylvania	5	6	151,074
Texas	2	3	76,477
Washington	2	3	82,640
West Virginia	1	1	38,946
Wisconsin	1	1	---
Foreign	2	2	3,500
	43	64	$2,252,000

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