U. S. Government

RESEARCH REPORTS

November 18, 1955
Vol. 24, No. 5

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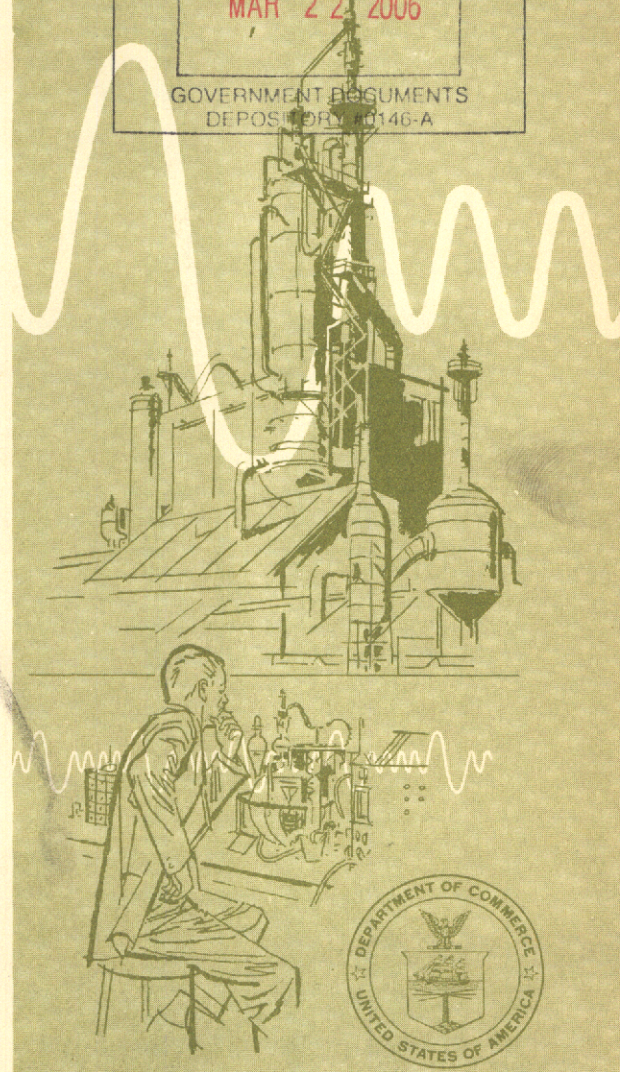

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OFFICE OF TECHNICAL SERVICES
John C. Green, *Director*

U. S. DEPARTMENT OF COMMERCE
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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

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Study of piezoelectric elements for the measurement of transient forces. (PB 111702) $1 177

CARTOGRAPHY

Development of graphic aids to air navigation, by John P. Kishler, Rolland H. Waters, Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. May 1951. 32f diagr, tables. Order from LC. Mi $3, enl pr $7.80. PB 118484

This report describes the first phase of an investigation directed toward the improvement of aeronautical charts. A prototype chart and a tabular navigation form have been developed, and procedures have been established for developing new navigational charts for all types of flight and aircraft. Chapter I discusses the historical development and need for improvement of present charts. Chapter II analyzes the features of existing cross-country aeronautical charts for high-altitude, high-speed navigation. Chapter III describes various studies conducted, and Chapter IV discusses the results of these studies. Chapter V presents conclusions and recommendations for future work. ONR report no. 641-05-1. DA 19-1. Contract N8onr 641-05.

Evaluation of a navigational form, by Robert J. Cramer, Rolland H. Waters, Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. Feb 1952. 31f graphs, tables (1 fold) Order from LC. Mi $3, enl pr $7.80. PB 118487

The evaluation is based primarily on the results of a questionnaire (Appendix A) given to pilots who used the form for cross-country flights of at least one hour's duration. The form is evaluated with regard to: 1. The degree to which the use of the form was understood. 2. The content, format and structure of the form. 3. The value of the form in pre-flight planning. 4. The value of the form in in-flight navigation. 5. The types of missions on which such a form could be used. ONR report no. 641-05-5. DA 19-5. Appendix A. Instructions for the use of the tabular navigational form. - Appendix B. Sample questionnaire. - Appendix C. Statistical analyses. Contract N8onr-641, T. O. 05.

Evaluation of two experimental charts designed for navigation in high-speed, high-altitude aircraft, by John E. Murray, Rolland H. Waters, Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. May 1952. 101f photos, fold. col. maps, graphs, tables. Order from LC. Mi $5.70, enl pr $18.30. PB 118488

This study compares the XJN and XDA charts. Procedure included readability tests under daylight and night lighting conditions, and questionnaires designed to elicit pilots' opinions as to which chart they preferred. In one set of readability tests, the World Aeronautical Chart (WAC) was included. Results indicated that both experimental charts were superior to the WAC in presenting information for cross-country missions in jet aircraft. ONR report no. 641-05-6. DA 19-6. Contract N8onr-641, T. O. 05.

Navigational form for cross-country flight, by Robert J. Cramer, Rolland H. Waters, Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. May 1951. 26f tables (2 fold). Order from LC. Mi $2.70, enl pr $6.30. PB 118485

This report describes the development of a tabular form on which all the information needed to execute a routine cross-country flight in single-operator jet aircraft can be organized and presented. ONR report no. 641-05-3. DA 19-3. Contract N8onr-641-05.

Specifications for a navigation chart for use in high speed, high altitude aircraft (experimental chart XDA), by Edward W. Bishop, Rolland H. Waters, Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. May 1951. 29f table. Order from LC. Mi $2.70, enl pr $6.30. PB 118483

A job analysis of navigation procedures followed by pilots of high speed, high altitude aircraft was pre-

pared using information obtained from interviews and a questionnaire. Additional information was obtained from (a) an analysis of the effect of operational characteristics of high altitude aircraft upon the task of navigating them and (b) a study to determine the objects which would be visible at high altitude. Complete cartographic specifications are contained in the appendix. DA 19-2. Contract N8-onr-641, T. O. 05.

Use of mathematical and meteorological data in aeronautical chart construction, by Rolland H. Waters and Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. May 1951. 37f map, diagrs, graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 118486

ONR report no. 641-05-04. DA 19-4.
1. Charts, Aeronautical - Preparation 2. Cartography - Methods 3. Contract N8onr-641-05.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Application of high frequency oscillators. Rates of neutralization (nitro-aci conversion) of nitroparaffins. Technical report no. 4 under Contract N6onr-23225, Project no. NR 051-318, by Philip J. Elving and Julian Lakritz. Michigan. University. Dept. of Chemistry, Ann Arbor, Mich. Oct 1954. 22p diagr, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 118135

1. Oscillometers - Design 2. Oscillators, High frequency - Circuits 3. Oscillators, High frequency - Uses 4. Hydrolysis - Methods 5. Nuclear chemistry 6. Paraffins - Nitro derivatives - Neutralization 7. Contract no. N6onr-23225, Project NR 051-318.

Cleavage of β-oxypropionitriles with lithium aluminum hydride, by Louis M. Soffer and Elizabeth W. Parrotta. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1953. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 118283

Dept. of the Army project no. 503-02-001. ORD project no. 1B3-0110.
1. Propionitrile, β-Alkoxy - Derivatives 2. Lithium aluminum hydride - Reactions 3. n-Propylamine - Production 4. APG BRL R 884.

Configurational changes in protein molecules subjected to various chemical and physical stimuli. Final report under Contract Nonr-803(00), NR 124-141, by Joseph F. Foster, Melvin Sterman and Ann Pellecer. Iowa State College, Ames, Iowa. 1954. 9p. Order from LC. Mi $1.80, ph $1.80. PB 118112

Research will be continued in the Dept. of Chemistry, Purdue University.
1. Proteins - Structure 2. Proteins - Reactions 3. Contract Nonr-803(00), NR 124-141, Final report.

Heats of adsorption of polar molecules on carbon surfaces. II: Ammonia and methylamine, by R. A. Beebe and R. M. Dell. Amherst College. Dept. of Chemistry, Amherst, Mass. Aug 1954. 30p graphs. Order from OTS. 75 cents. PB 111708

Isotherms in the temperature range from -78° to -22°C have been measured for ammonia on representative members of a series of carbon blacks graphitized at successively higher temperatures up to 2700°; and heats of adsorption for ammonia on these blacks have been calorimetrically determined at -78°. A limited number of experiments have been done with methylamine. Contract N8onr-66902, Project NR-358-151. For Part I see PB 115854. ONR TR 5.

Infrared investigations relating to the structure of polypeptides and proteins, by A. D. E. Pullin, Richard M. Badger and Hector Rubalcava. California Institute of Technology. Gates and Crellin Laboratories of Chemistry, Pasadena, Calif. Oct 1954. 96p graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 118337

Contents: Normal coordinate treatment of the vibrations of the peptide group with the use of a mechanical model, by Richard M. Badger. - Polarized infrared spectrum of α-glycine, by A. D. E. Pullin. - Investigation of the spectrum of silk fibroin, by A. D. E. Pullin and Richard M. Badger. - Summary of information relating to the direction of change of dipole moment in the characteristic amide and peptide vibrations. - Measurement of infrared extinction coefficients and dichroic ratios of solids, by A. D. E. Pullin. - Structure in the 3μ region of the spectra of associated amides and carboxylic acids, by Richard M. Badger and Hector Rubalcava. - Infrared spectrum and structure of collagen, by Richard M. Badger and A. D. E. Pullin (Reprinted from Journal of Chemical Physics, vol. 22, p. 1142, Jun 1954). - The infrared association spectra of amides in solution and their relation to the spectra of polypeptides, by Richard M. Badger, and Hector Rubalcava (Reprinted from Proceedings of the National Academy of Sciences, vol. 40, no. 1, pp. 12-17, Jan 1954). Contract N6ori-102, T. O. VI, Project NR 055-199, Technical report no. 8. CIT GAL TR 8.

Reactivation in oxygen of CWS charcoals to Aug 4, 1944, by T. F. Young. Chicago. University, Chicago, Ill. Sep 1944. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118206

1. Charcoal - Activation 2. Charcoal - Oxidation 3. NDRC Div 10-323 4. OSRD 4104 5. Contract OEMsr-586.

Structure of metal carbonyls. Part 1: Dicobaltoctacarbonyl, by R. K. Sheline. Florida. University. Dept. of Chemistry, Gainesville, Florida. Jun 1954. 16p diagrs, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 118438

The infrared spectrum from 2.5 - 15 μ and the visible and ultraviolet spectra from 2100 - 7000 A were obtained for dicobaltoctacarbonyl. The presence of a strong band at 1858 cm^{-1} in the infrared spectrum and the shoulder at 2800 A in the ultraviolet spectrum indicate the presence of bridging carbonyl groups in the molecule. It was concluded that the most probable structure of dicobaltoctacarbonyl is that of two trigonal bipyramids joined at an edge. Present data were insufficient to distinguish between two such structures. Aeronautical Research Laboratory. Contract no. AF 33(616)-368, Project no. 7080. Task no. 70306 "Structures of metal carbonyls". Results here reported have been published in Journal of the American Chemical Society, vol. 76, no. 13, p. 3373-3376, July 1954. AAF WADC TR 54-578, Part I.

Agricultural Chemicals

Plant regulators: Data from preliminary screening tests. Available free from Chemical-Biological Coordination Center, National Research Council, 2101 Constitution Ave., Washington 25, D. C.

No. 2: In cooperation with United States Department of Agriculture, Agricultural Research Service, Horticultural Corps Research Branch, Basic Studies of Plant Growth and Plant Development Unit, Plant Industry Station, Beltsville, Md. Jun 1955. 48p tables. PB 118468

1. Plants - Growth regulators 2. Biological chemistry 3. NRC CBCC no. 2 4. NRC 384.

No. 3: Tests conducted by Crops Division, Camp Detrick, Frederick, Md. Jun 1955. 8p tables. PB 118469

1. NRC 384 2. NRC CBCC no. 3.

No. 4: Tests conducted by the Department of Horticulture, Michigan State College, East Lansing, Mich. Jun 1955. 24p tables. PB 118470

1. NRC 384 2. NRC CBCC no. 4.

No. 5: Tests conducted by the Pineapple Research Institute of Hawaii, Honolulu, Hawaii. Jun 1955. 3p tables. PB 118471

1. NRC 384 2. NRC CBCC no. 5.

No. 1 was issued as Positive data series no. 1, with title: "Compounds active as fungicidal agents." Aug 1954.

Plastics and Plasticizers

Determination of brittle-point temperature by the vibrating reed test, by Harold Siegler. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Mar 1955. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 118429

The vibrating reed test and the drop test were performed on both cellulose acetate-butyrate and on T-2 propellant. The glassy temperature of cellulose acetate-butyrate decreased as the testing speed increased. The maximum dissipation factor temperature of this plastic was much higher than its glassy temperature. The maximum dissipation factor temperature of T-2 propellant was independent of frequency, although a true brittle temperature should increase as the frequency is increased. No maximum dissipation factor temperature was found for a number of propellants. Although one batch of T-2 propellant exhibited a maximum dissipation factor temperature, a second batch of the same nominal composition did not show this maximum. Dept. of the Army project 517-06-002. Ordnance project TU2-2Q. PA TR 2150.

Development of transparent materials which reduce effects of precipitation static in aircraft, by M. U. Cohen and G. A. Dalin. Balco Research Laboratories, Newark, N. J. Mar 1952. 107p drawings, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 118281

This report discusses methods of laying a transparent electrically conductive film on plastic airplane canopies to conduct to the aircraft frame the static charges developed on the canopies by friction with air, dust, snow, etc., during flight. The types of film studied include metal oxides, metals, phosphors, polyelectrolytes, electrolytes dispersed in waxes, and electrolytes dispersed in non-polar polymers. Preliminary studies indicate that the monobutyl ester of orthophosphoric acid in polymethyl methacrylate and analogous systems merit further detailed investigation. AAF WADC TR 52-36. Contract AF 33(038)-12240.

Fungus resistance of plastics. Tenth quarterly report, May 15, 1953 to Sep 30, 1954, by S. Ruggeri, D. Day, P. Rizzuto and D. Flaumenhaft. Lacquer and Chemical Corporation. Alaka Research Laboratories, Brooklyn, N. Y. Sep 1954. 124p graph, tables. Order from LC. Mi $6.30, ph $19.80. PB 118316

Additional molding materials and other special items have been tested by Petri dish and the moist chamber methods designated by the Bureau of Ordnance. Data previously collected is tabulated under 1) discussion and evaluation of results of

routine tests, and 2) procedural testing. Contract NOrd 11215, 10th quarterly report.

Research and development of high strength reinforced plastics for ordnance use, by J. D. Robinson. Fnglander Co., Inc. Plastics Division, Chicago, Ill. Mar 1954. 53p photos, graphs, tables. Order from OTS. $1.50. PB 111721

Glass fibers have been reacted with a wide variety of chemicals in the form of a mist surrounding the hot fibers immediately as they issue from the bushing. The treated fibers have been tested in laminates for evaluating their properties. The physical chemical properties of the fibers and their relation with plastics have been studied. This study of glass fiber reinforced plastics has endeavored to establish facts which will permit the production of more useful products and explain the failure of structures in the past when subjected to only moderate loading. Contract NOrd 13462, Final report.

Paints, Varnishes and Lacquers

Adsorption studies on polyvinyl acetate and polyvinyl butyral wash primers. Progress report for period Feb 1-Jul 31, 1954 under Contract Nonr-1129(00). Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N. Y. Jul 1954. 46p graphs, tables. Order from OTS. $1.25. PB 111701

Investigation is divided into the following phases: (a) characterization of parent polyvinyl acetates (PVAc) used for the polyvinyl butyral (PVB) preparation; (b) characterization of the PVB and comparison with the parent polymer; (c) characterization of the PVB recovered from the wash primer; (d) study of the reactions in which the resin participates; (e) study of the adsorption of PVAc, PVB, and related resins on solid surfaces, before and after the Vybond or wash primer process. For other reports under this Contract see PB 114559, PB 114390, PB 115877.

Phosphating materials and process, by L. O. Gilbert. U. S. Arsenal, Rock Island, Ill. May 1954. 87p photos, drawings, diagrs, tables. Order from OTS. $2.25. PB 111726

This report describes the mechanical equipment, cleaning operations, processing solutions, processing procedures, and the chemical control methods required for the application of these protective black finishes in the production of ordnance materiel. Supersedes RIAL 45-1552 (PB 32864). RIAL R 54-2906.

Preparation of aluminum panels for improved paint durability, by T. Rice. U. S. Arsenal, Rock Island, Ill. Jun 1955. 18p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 118442

This report describes tests of three methods of preparing aluminum test panels for application of organic coatings; by solvent spray cleaning, alkaline solution cleaning, and phosphoric acid metal treatment, the latter two including a chromic acid rinse. Excess oil and grease were removed from panels by scrubbing with naphtha and any ink stencils were removed with lacquer thinner before the panels were prepared by any of the above three methods. The coated panels were subjected to water immersion, salt spray, and outdoor exposure tests. Panels were examined for blistering, gloss, sheen, and adhesion. Dept. of the Army project no. 593-14-007. Ordnance project no. TB 4-771F, Report no. 4. RIAL R 55-1947.

Room temperature dipping compounds. U. S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Order separate parts described below from LC, giving PB number of each part ordered.

Project TB-672B. Second report: Development of cold dip strippable compounds. Oct 1951. 23p tables. Mi $2.70, ph $4.80. PB 118331

Several film forming materials combined with various plasticizers, resins, and inhibitors were dissolved in volatile solvents and examined for possible Ordnance application as room temperature dipping compounds. APG LSD 121.

Project no. TB 4-670C. Second report: Investigate Jan C-149 when cut with volatile solvents as cold dip compounds. Dec 1947. 15p tables. Mi $2.40, ph $3.30. PB 118332

It is found that solutions of JAN-C-149 compounds will not give adequate film thickness at dipping temperatures between 70°-100° F. Formulations and raw materials used in the manufacture of acceptable JAN-C-149 compounds vary sufficiently so as to render the use of a single system for preparing cold cuts impossible. APG LSD 82.

Analytical Chemistry

Control method of chemical analysis of barium titanate, by W. Zimmerman, III, S. Zerfoss, and P. H. Egli. U. S. Naval Research Laboratory. Aug 1955. 26p drawing, diagrs, graphs, tables. Order from OTS. 75 cents. PB 111780

As a part of the effort to improve the quality and reproducibility of $BaTiO_3$ ceramics, a procedure for the analysis of $BaTiO_3$ for both major and minor constituents is presented. The Brush Laboratories Co., the Titanium Alloy Manufacturing Division of the National Lead Co., and the Naval Research Laboratory have had experience in titanate analysis and have cooperated in this joint contribution. Gravimetric and volumetric analysis is

used for the major constituents and the principal minor constituents. Flame photometry is used for minor constituents which are particularly difficult to analyze by more normal analytical procedures. Spectrography is used for the less common minor constituents and as a check that no major unsuspected impurity is present. NRL R 4591.

Evaluation of methods and equipment for the adsorption and neutralization of nitrogen dioxide by sodium carbonate, sodium dichromate, and potassium permanganate, by Joseph W. Fleming and Gordon L. Marine. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Jan 1955. 60p photos, drawings, graphs, tables. Order from OTS. $1.50. PB 111638

The object of the work described in this report is to conduct tests on a pilot-plant scale which will produce sufficient data to make possible the specification of the equipment, materials, and operating conditions necessary for the removal of the toxic, gaseous, nitrous oxides formed from the decomposition of fuming nitric acid. The three chemical reagents tested were Na_2CO_3, $Na_2Cr_2O_7$, and acid, neutral, and basic $KMnO_4$ solutions. The tests were carried out to determine which of the three is the most efficient absorption agent, and to provide data necessary for the design of absorption equipment. Project 4-17-06-001. CC CRL R 439.

Miscellaneous Chemicals

Chemical action of halogenated agents in fire extinguishing, by Frank E. Belles. U. S. National Advisory Committee for Aeronautics. Sep 1955. 28p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118371

The action of halogenated fire-fighting agents is discussed in terms of chain-breaking reactions between agent and active particles (atoms and free radicals). Literature data on flammability peaks of n-heptane-agent-air mixtures are roughly correlated by reactivities assigned to halogen and hydrogen atoms in agent molecules. The value of hydrogen in agents is discussed. A method for the estimation of rate constants for the reaction of agent with active particles is described, and the rate constant for methyl bromide is obtained. NACA TN 3565.

DETERIORATION STUDIES

Field facilities for environmental research of the Naval Research Laboratory, by Allen L. Alexander and B. W. Forgeson. U. S. Naval Research Laboratory. Jul 1955. 41p photos, fold drawings, maps, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 118297

Describes facilities in the Panama Canal Zone for study and evaluation of equipment and material designed for service in the tropics. Gives history, background, and detailed descriptions of the Tropical Exposure Site and of the Corrosion Laboratory. NRL R 4557.

ELECTRICAL MACHINERY

Electronics

Analysis and design of dense electron beams, by R. P. Anand. Ohio State University. Dept. of Electrical Engineering, Columbus, Ohio. Apr 1955. 26p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 118245

Problems associated with the design of high density and high perveance electron guns are discussed and a number of important techniques for the analysis of such guns are briefly reviewed. Among the analog methods, the modified electrolytic trough due to Musson-Ganon, the elastic membrane technique, and the resistor network are described. Numerical methods such as relaxation and iteration procedures are discussed. Technical note no. 1 under Contract no. AF 18(600)-980. OSURF Proj 580. OSR TN 55-156.

Change of length of ionic crystals due to X-ray irradiation, by Lan-Ying Lin. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Jun 1955. 79p drawings, diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 118378

Potassium chloride and sodium chloride crystals at room temperature both in air and in helium atmosphere were irradiated for times up to three hours with x-rays from a molybdenum target tube passing through a beryllium window. The crystals were placed in a thermostated enclosure regulated to 0.01°C, and 2-1/4 inches from the x-ray tube beryllium window. The change in length of the largest dimension of the crystal was measured during the irradiation by a capacitance type dilatometer with sensitivity 10^{-8} cm. Technical report no. 3 under Contract AF 18(600)-561. OSR TN 55-103.

Color centers in calcium fluoride crystals, by A. Smakula. Massachusetts Institute of Technology. Laboratory for Insulation Research. Sep 1954. 20p graphs, tables. Order from OTS. 50 cents. PB 111724

Synthetic calcium fluoride crystals of various quality were colored by 2.5 Mev electrons, calcium vapor, and low energy electrons. Impurities and imperfections of the crystals were compared by ultraviolet transmission, density, ionic conductivity,

and spectroanalysis. The best crystals show good transmission in the near and far ultraviolet, high density, low ionic conductivity, and have a low yield of color centers. Four absorption bands are observed. It is concluded that these bands are caused by electrons and/or holes trapped in lattice imperfections and not by chemical impurities as has been suggested. MIT LIR TR 86. Contract N5ori-07801, NR 017 421. Contract DA 19-020-ORD-3429.

Deparisitage des chemins de fer alimentes en courant monophase a 15000V (Elimination of interference (parasitic frequencies) produced by electrical railways powered by 15,000 volt monophase current), by Jean Meyer de Stadelhofen. Translated and edited by F. A. Raven. May 1955. 42p photos, diagrs, graphs, table. Mi $3.30, ph $7.80. PB 118271

The case deals with determination of the radio reception improvement factor which may be produced by simple anti-interference devices which can be readily obtained, which are cheap to install, and efficient in the range of frequencies in which Swiss national transmitters operate. Translated from International Electrical Engineering Commission. Special International Committee on Radio - Electric Interference. Report no. R. I. (Suisse) 29. NAVSHIPS T 588. STS 215.

Discontinuities in open-wire lines, by Ronold King. Harvard University. Cruft Laboratory. Jul 1954. 62p diagrs, graphs, tables. Order from OTS. $1.75. PB 111700

Conventional transmission-line theory takes no account of variations in the parameters of the transmission line or of coupling between conductors near a junction or termination. A first-order correction may be made for this omission by introducing junction-zone networks of lumped series and shunt elements which may be evaluated for each discontinuity. Following the general theory developed in earlier work junction-zone networks are obtained for a bend, a shunt T-junction and series T-connections with applications to certain types of antennas in an otherwise uniform two-wire line or single-wire line over an image plane. Contract N5ori-76, T. O. I, NR-071-012. HU CL TR 200.

Effect of defects on lattice vibrations, by Elliott W. Montroll and Renfrey B. Potts. Maryland. University. Physics Dept., College Park, Md. Jul 1955. 67p diagrs. Order from LC. Mi $3.90, ph $10.80. PB 118203

The theory of the effect of localized defects such as impurities, holes, and interstitials on the vibrations of crystal lattices is developed. Although most of the analysis is concerned with one dimensional chains, the general approach to defects in three dimensional lattices is outlined through the example of a simple cubic lattice with nearest neighbor interactions. Technical report no. 18. ORDC report control no. CSR TN 55-206. Contract AF18(600)-1015.

Electron tubes. Specifications. U. S. Armed Services Electro-Standards Agency, Fort Monmouth, N. J. Jul 1955. 82p. Order from LC. Mi $4.80, ph $13.80. PB 115149s9

1. Tubes, Electron - Specifications 2. MIL-E-1B.

Experimental research upon the electronic properties of non metallic crystals. Technical status report no. 6 under Contract AF 18(600)-662, for the period Apr 1955 to Jun 1955, by Robert Maurer, Nicholas Inchauspe, James Thomson and Richard C. Miller. Illinois. University. Dept. of Physics, Urbana, Ill. Jun 1955. 3p. Order from LC. Mi $1.80, ph $1.80. PB 118416

Project no. R-355-40-8. Contents: Photoconductivity in potassium iodide, by Nicholas Inschauspe. - Self diffusion of sodium in sodium chloride containing calcium chloride, by James Thomson. - Dielectric loss of sodium chloride containing calcium and cadmium chlorides, by James Thomson. - Self diffusion and conductivity in silver bromide, by Richard C. Miller.

Hollow beams in electrostatic fields, by Lawrence A. Harris. Minnesota. University, Minneapolis, Minn. May 1955. 29p diagr, graph. Order from LC. Mi $2.70, ph $4.80. PB 118349

Trajectories are calculated for the inner and outer edges of tubular electron beams in radial electrostatic fields. Special cases considered include that of a beam inside a single drift tube and a beam between coaxial drift tubes. Both diverging and converging beams are treated in strong and weak radial fields. Calculated results for a particular beam are presented as an example for each of these cases. Project no. 47501. Technical note, no. HB2N. OSR TN 55-157. Contract AF 18(600)-1169.

Infinite system of linear equations arising in diffraction theory, by W. Magnus. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jun 1955. 25p diagr. Order from LC. Mi $2.70, ph $4.80. PB 118449

1. Waves, Electromagnetic - Diffraction - Theory 2. Mathematical equations and solutions 3. NYU RR EM 80 4. AAF CRC TN 55-562 5. Contract AF 19(122)-42.

Interaction between wide slot radiators, by H. Unz, G. Held, D. J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Oct 1954. 39p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 118247

In this work it is intended to show that the conventional equivalent circuit of two wide slot radiators gives a full account of the far-zone interaction between the slots; it is intended also to find the para-

meters for a simplified equivalent circuit for the near-zone interaction. Contract N7onr-29529, Report no. 33. UC IER Series 60, Issue no. 121.

Long-range propagation of low-frequency radio waves between the earth and the ionosphere, by J. Shmoys. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. May 1955. 30p graphs, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 118448

The problem of modes of propagation of electromagnetic waves between a perfectly conducting earth and a gradually varying ionosphere is considered. The case of exponentially varying ionospheric parameters is solved in terms of Bessel functions. The propagation constant, the angle of arrival, and the group velocity are calculated for the first few modes of propagation. It is shown that the results for the phase and group velocities and angle of arrival of low-order modes obtained when the ionosphere is assumed to be a perfectly conducting sheet at a height simply related to ionospheric parameters are very close to the true values. NYU RR EM 79. AAF CRC TN 55-561. Contract AF 19(122)-42.

Methods of determining long wave reflection coefficients for a specific ionospheric model, by J. J. Gibbons and J. D. Wolf. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Jun 1955. 54p graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 118302

The purpose of this report is twofold. The first objective is to test the applicability of an iterative process due to Dr. V. A. Bailey to the problem of computing the 75 kc/s ionospheric reflection coefficient for a specific model. The details of two applications using different first approximations are presented. The second part deals with the computation, by numerical integration, of the 75 kc/s reflection coefficient for the same ionospheric model. The detailed results of the numerical integration are tabulated in the appendix. AAF CRC TN 55-461. PSC IRL SR 75. Contract AF 19(604)-1304.

On the diffraction of electromagnetic waves by a circular aperture, by Howard H. C. Chang. Harvard University. Cruft Laboratory. Mar 1955. 113p diagrs, graphs. Order from LC. Mi $6, ph $18.30. PB 118457

1. Waves, Electromagnetic - Diffraction - Theory 2. Contract AF 19(604)-786 3. AAF CRC TN 55-172 4. HU CL SR 2.

Photographic silk screen process in the fabrication of printed electronic circuits, by William J. Bornemann. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Oct 1951. 28p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118397

The memorandum reviews the step-by-step methods of preparing a photographic silk screen stencil and the printing of a conductive or resist pattern with the stencil. The first part deals with the details of sensitizing, exposing, and developing the screen stencil, and explains the manner of affixing the stencil to the silk screen. The second part describes the use of register guides, masking of the screen, types of paints for printed circuit applications, and the squeeges operation. Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 2006-C. SCEL TM M-1413.

Printed circuit fabrication within SCEL. U. S. Squier Signal Laboratory. Components and Materials Branch, Fort Monmouth, N. J. May 1953. 15p photos, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 118400

Information bulletin no. 165A. Includes Autosembly system of circuit fabrication, by S. F. Danko and S. J. Lanzalotti. May 1951.
1. Circuits, Electronic - Printed - Fabrication
2. Electronic equipment, Miniaturized - Assembling methods.

Propagation in inhomogeneously filled waveguides, by K. V. Malinovsky and D. J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Oct 1954. 69p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118248

1. Waves, Electromagnetic - Propagation - Theory 2. Wave guides - Materials - Research 3. Dielectrics - Constants 4. Dielectrics - Electrical conduction 5. Contract N7onr-29529, Report no. 35 6. UC IER Series 60, Issue no. 125.

Propagation of millimeter radio waves in low-level overwater ducts, by A. W. Straiton, J. R. Gerhardt, C. W. Tolbert. Texas. University. Electrical Engineering Research Laboratory. Oct 1954. 36p photos, map, diagr, graphs, table. Order from LC. Mi $3, ph $6.30. PB 118406

Report no. 74. Mode theory calculations and power spectra analysis by H. W. Smith.
1. Radio waves - Propagation 2. Radio waves - Overwater transmission - Measuring equipment 3. Radio waves - Transmission - Measuring equipment 4. Radio waves - Meteorological effects.

Quarterly progress report, 1 Jul 1954-30 Sep 1954, by J. D. Axtell, Jr. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Oct 1954. 34p diagrs. Order from LC. Mi $3, ph $6.30. PB 118246

Report of research under ONR contract N7onr-29529, Boeing Airplane Co. research grant, and

some University-sponsored research.
1. Electronics - Research 2. Contract N7onr-29529 3. UC IER Series 60, Issue no. 6.

Quarterly progress report, No. 9 Feb 1, 1955 - May 1, 1955. Duke University. Dept. of Physics. Microwave Laboratory, Durham, N. C. May 1955. 69p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118093

Includes Technical reports: (1) Quadrupole couplings, dipole moments, and the chemical bond, Walter Gordey (Faraday Society discussion, Cambridge, England, Apr 4-6, 1955). (2) Millimetre wave spectrum of methyl mercury chloride, by J. T. Cox, T. Gaumann, and W. J. Orville Thomas.
1. Radio waves - Research 2. Spectroscopy, Microwave 3. Nuclear physics - Research 4. Spectroscopy, Nuclear 5. Mercuric chlorides 6. Mercury - Isotopes - Nuclear structure 7. Contract AF 18(600)-297, Project no. R-357-10-6.

Quarterly scientific report no. 8 covering period Apr 1, 1955 - July 1, 1955, under Contract no. AF 19(604)-786. Harvard University. Cruft Laboratory. Jul 1955. 13p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 118497

Contents: I. Investigation of optical current distributions, by D. B. Brick and A. R. Vobach. - II. Aperture scattering at high frequencies, by H. C. Chang. - III. Variational corrections to cylindrical scattering at high frequencies, by R. D. Kodis. - IV. Back-scattering measurement, by R. V. Row. - V. Scattering of plane waves by obstacles, by S. I. Rubinow. - VI. Scattering on cylindrical objects at high frequencies, by F. E. Borgnis. AAF CRC TN 55-559.

Spark breakdown in uniform fields, by Leonard B. Loeb. U. S. Office of Naval Research. Jul 1954. 147p photos, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 118404

Discusses sparking criterion and sparking mechanisms, growth and fluctuations of a Townsend discharge and its relation to Paschen's law, visual manifestations of sparks, and streamer mechanism of the spark (history, theories and properties).

Study of piezoelectric elements for the measurement of transient forces, by Yusuf A. Yoler and Henry T. Nagamatsu. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Feb 1955. 31p diagrs, tables. Order from OTS. $1. PB 111702

This report presents a brief study of the natural and artificially-polarized piezoelectric elements with a view to determining their suitability for measuring normal forces, shear forces, and volume expansion forces. The advantages of recently-developed ceramic elements over natural crystals for the measurement of normal forces and volume expansion are shown, while it is shown that material crystals must be used to measure shear forces. Tables showing the properties of various crystals for measuring normal forces and shear forces are presented. CIT GAL M23. Contract DA-04-495-Ord-19.

Study of some inherent errors in the three-dimensional Raydist system, by Irene Carswell. Stanford Research Institute, Stanford, Calif. Jun 1955. 46p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 118458

As a result of this study it is concluded that the anomalies observed during the flight tests cannot be explained on the basis of antenna and propagation limitations. Near-zone field effects cause significant errors in the position information for an aircraft near one of the Raydist receiving stations. An expression has been derived which relates the position error of an aircraft in the vicinity of a receiving station to appropriate parameters of the Raydist system. From this expression the locus of all points of equal phase error can be computed for any given set of conditions. SRI Proj 1197. SRI TR 50. AAF CRC TN 55-566. Contract AF 19(604)-1296.

Techniques of measuring scattered fields, by J. Honda, L. J. Black, F. D. Clapp. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Oct 1954. 31p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 118249

The principal objective of this research was the experimental instrumentation for measuring the back-scattered field from a prolate spheroid. The various measuring techniques are discussed and the instrumentation for a particular method is described. Contract N7-onr 29529, Report no. 37. UC IER Series 60, Issue no. 127.

Theory of operator fields, II, by Christopher Gregory. Hawaii. University, Honolulu, Hawaii. Oct 1954. 67p. Order from LC. Mi $3.90, ph $10.80. PB 118202

A program involving the study of non-local fields with interactions chosen in such manner as to vanish in the limit of the local field approximation, if the fields in nature are non-local to begin with. Contract no. 976(00), Project NR 010-106.

Topics in antenna radiation theory, by Alan F. Kay. Technical Research Group, New York, N. Y. Jun 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 118244

Summary of Sections I (PB 116989) and II (PB 116616) of Final report.
1. Antennas - Radiation - Theory 2. Waves, Electromagnetic - Radiation - Theory 3. Contract AF 19-

(604)-1126, Final report, section no. 3. 4. AAF CRC TR 55-157.

Transient behavior in a ferroresonant circuit, by J. G. Shalnik. Yale University. Dunham Laboratory, New Haven, Conn. Oct 1954. 69p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118405

Approximate solutions for steady-state behavior are well-known. The present work investigates the transient behavior in the region of the steady-state response. The theory developed is supported by solutions using an analog computer and by experiment with an actual electrical circuit whose behavior is approximated by a given equation. Contract Nonr 433(00), Report no. 8.

Generators, Motors, Transmission

DC to AC square-wave static converter and amplifier, by H. T. Mortimer. U. S. Naval Research Laboratory. Jul 1955. 6p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 118454

Two new devices using a combination of magnetic amplifier type saturable core elements and switching transistors have been developed. These devices, which operate from a dc power source, are a square-wave ac converter and a power amplifier. The power amplifier provides a pulse-time modulated output by a simple modification of the converter circuit in which two rectifiers are added. A typical power amplifier circuit providing power putputs up to 2.5 watts required maximum power dissipation of 100 milliwatts in the signal source. NRL R 4582.

Factors affecting life characteristics of metallic rectifiers. Final report, Jul 1, 1952-Aug 31, 1953 under Contract DA 36-039-sc-42490, by Ralph G. Gentile. Rice Institute. Dept. of Electrical Engineering, Houston, Texas. Aug 1953. 73p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118463

This report describes the work done and the results achieved in the course of an investigation aimed at developing an accelerated life test procedure for selenium rectifiers. Higher than rated current density, high ambient temperature and the operation inside of a Dewar flask are suggested as possible accelerating means. Data on standard life test and on tests performed under accelerating condition are enclosed for 207 tests on stacks of 11 different types. Dept. of the Army project no. 3-99-15-022. Signal Corps project no. 32-152B.

Investigation of metallized paper capacitors. Final report and addendum under Contract DA 36-039-sc-215. Sprague Electric Co., North Adams, Mass. Aug 1953. 63p graphs, tables. Order from OTS. $1.75. PB 111715

Purpose of this project is to investigate the metallized paper capacitor and evaluate the various problems concerned with its development. The report is concerned with the development of a capacitor for 85°C operation, and the tests conducted were for the purpose of determining the various electrical characteristics of the capacitor at that temperature. Addendum coordinates results in this report with those in final engineering report on Contract W-36-039-sc-36860 (PB 104114).

Investigation of the characteristics of electromechanical filters. Eleventh quarterly report on Contract no. DA 36-039-sc-5402, by C. R. Mingins, A. D. Frost, L. A. Howard, and R. W. Perry. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Aug 1953. 22p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 118462

Building upon the techniques of circuit analysis that were developed in previous work to apply to two-segment single-crystal arrangements, the methods have been extended to the more complicated system involved in a three-segment plate. Further experimental work has been done on dual-crystal filters, in an effort to determine the optimum combination of conditions of mounting, contouring, and electrode placing to meet given specifications. Dept. of the Army project no. 3-24-02-021. Signal Corps project 33-862A-5.

Rectifier for electrical indicating instruments. Final report under Contract no. DA-36-039-sc-5497 for the period 20 Feb 1951 to 21 Apr 1953, by Edward L. Pagano. Bradley Laboratories, Inc., New Haven, Conn. Apr 1953. 83p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 118398

Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 32-2006-3.
1. Rectifiers - Design 2. Circuits, Bridge - Design 3. Instruments, Electric - Calibration 4. SIG Contract DA36-039-sc-5497, Final report.

FOOD AND KINDRED PRODUCTS

Nutrition under climatic stress, a symposium sponsored by the Quartermaster Food and Container Institute for the Armed Forces, Quartermaster Corps, National Academy of Sciences, Washington, Dec 4-5, 1952, edited by Harry Spector and Martin S. Peterson. National Research Council. Advisory Board on Quartermaster Research and Development. Committee on Foods. May 1954. 212p photo, diagrs, graphs, tables. Order from Quartermaster Food and Container Institute, 1819 W. Pershing Drive, Chicago, 9, Ill. PB 117996

Contents: Conference objectives, by F. M. Nelson. - I. Practical problems of service operations under climatic stress: Army, by H. E. Ratcliffe. - Air Force, by W. F. Bills. - Canadian armed forces, by J. G. Armstrong. - Summary, by Austin Henschel. - Physiological responses of men to heat and cold, by Farrington Daniels, Jr. - II. Animal experimentation: Effect of heat on physiological economy, by Samuel Brody. - Vitamin requirements in hot climates, by C. A. Mills. - Water metabolism in hot climates, by E. F. Adolph. - Acclimatization to cold environment, by L. P. Dugal. - Effect of certain vitamins on the response of normal subjects to cold water stress, by Elaine P. Ralli. - Protein metabolism under stressful conditions, by Bacon F. Chow. - Food problems in exploring the Arctic, by Sir Hubert Wilkins. - III. Human experimentation: Laboratory studies, by H. H. Mitchell. - Role of the field test in nutrition and weather stress studies, by Fred Sargent. - Summary remarks, by R. M. Kark. - IV. Summary of present knowledge, need for more research: Lessons from Korea, by Herbert Pollack. - Heat tolerance and nutrition; suggestions for new directions in investigation and interpretation, by L. P. Herrington. - Low temperature considerations, by Edward Page. - Laboratory studies on man, by H. H. Mitchell. - Studies on troops in the field, by R. M. Kark. - Coordination of research approaches, by Ancel Keys.

FUELS AND LUBRICANTS

Continuous fuel sprays. Michigan. University, Ann Arbor, Mich. Contract W33-038-ac-21230. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, by R. A. Dodge, W. W. Hagerty, J. Louis York. Jul 1950. 77p photos, diagrs, graphs, tables. Mi $4.50, ph $12.30. PB 118494

Section I contains a statement of the general problem of fuel spray analysis and also discusses specific items of study which were to be undertaken within the scope of this contract. Section II is a review of the art of spray analysis as it stands today. Section III describes the photographic method of spray analysis developed at the University of Michigan, and presents the results obtained by the application of this method up to the present time. A description of the equipment used, the procedure and technique followed in this study, and a discussion of the data gathered are presented. Section IV describes the rapid spray analyzer developed under this contract. The requirements of such an analyzer are stated and the progress of ideas are given. The present forms of the analyzer and details of the test set-up are given. Section VI presents a bibliography of spray problems. AAF TR 6067, Part I. Contract W33-038-ac-21230.

Part III, edited by W. W. Hagerty. Dec 1952. 100p photos, drawings, diagrs, graphs, tables. Mi $5.40, ph $15.30. PB 118495

This is a report on the progress made in certain studies of fuel sprays and spray nozzles. The influence of many factors affecting the character of sprays is evaluated, on the basis of both past research and the work currently being carried on. Theoretical and experimental analyses of the actual mechanisms involved in the formation of sprays are presented. Combustion studies to determine the effect of specific spray characteristics on the burning efficiency are reviewed, and some performance data are indicated. The development of an instrument to measure spray patternation rapidly, including a description of and typical records obtained with the present model of this device, is described. For Part 2 see PB 109635. AAF TR 6067, Part 3. Contract W33-038-ac-21230.

Flame propagation limits of propane and n-pentane in oxides of nitrogen, by Riley O. Miller. U. S. National Advisory Committee for Aeronautics. Aug 1955. 29p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118238

Flame propagation limits with propane and n-pentane in oxides of nitrogen were obtained at subatmospheric pressures in a 2-inch-diameter, 48-inch-length tube. Three oxidants were investigated; namely, nitric oxide NO, nitrogen tetroxide N_2O_4, and a nearly equimolar mixture of these two oxides. In general, the data attest to the relative chemical stability of NO in the hydrocarbon flames. NACA TN 3520.

Stability and burning velocities of laminar carbon monoxide-air flames at pressures up to 93 atmospheres, by Rudolph Edse and William A. Strauss. Ohio State University Research Foundation, Columbus, Ohio. Jul 1953. 41p fold photos, fold drawing, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118441

The flash-back conditions and burning velocities of laminar carbon monoxide - air flames were determined at pressures up to 93 atmospheres. For measuring the burning velocities, the flames were photographed and flame cone measurements were made from these photographs. The results indicate that the velocity gradients at flash-back increase with increasing pressure whereas the burning velocities are reduced when the pressure is raised. From the values of the velocity gradients at flash-back and those of the burning velocities, the depth of penetration of quenching was found to be inversely proportional to the 0.89 power of the pressure. Task no. 70331: "Investigation of combustion phenomena at high temperature." AAF WADC TR 53-214. Contract AF 33(616)-44, Project no. 3058.

HIGHWAYS AND BRIDGES

Roadside development. Report of Committee on Roadside Development, presented at the thirty-fourth annual meeting, Jan 11-14, 1955. Highway Research Board. 1955. 65p photos, tables. Order from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. 90 cents. PB 118264

Contents: Report of Committee on Roadside Development, by Frank H. Brant. - Erosion control on extremely sandy soils, by Mark H. Astrup. - Erosion control on extremely sandy soils in New Jersey, by Clarence R. Pell. - Seeding and emulsified-asphalt mulching on road in North Carolina, by James A. Saunders. - Fertilizing and seeding with compressed air, by E. W. Muller. - Slope stabilization of West Virginia turnpike, by Maurice A. Mendel. - Progress report of Committee on Mowing and Herbicides, by Wilbur J. Garmhausen. - Chemical weed control along the New Jersey turnpike, by Homo Hagemeister. - Establishment of crown vetch and birdsfoot trefoil on highway slopes with various companion grasses and rates of seeding, by J. M. Duich, H. B. Musser, and W. L. Hottenstein. - Roadside design to reduce traffic noise, dust, and fumes (abstract of second report of special study group), by Wilbur H. Simonson. NRC 356.

Solidifying or stabilizing soils for military operations. Second interim report, for the period Jan 1949 through Feb 1954, by V. H. Rhodes, and J. H. Reynolds, Jr. U. S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Dec 1954. 147p photos, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 118348

This report summarizes progress toward developing chemical means of rapidly solidifying soils for military purposes and also summarizes fundamental and applied research contracts, recommendations and review by consultants, industrial liaison, and field-laboratory studied conducted at ERDL. Project 8-70-03-002. Appendicies: A. Authority. - B. Technical notes on development of standard method for determination of acrylate content of treated soil by ignition-loss procedure. - C. Engineering properties of calcium acrylate-treated soil. ERDL R 1386.

INSTRUMENTS

Automatic viscometer for non-Newtonian materials, by Ruth N. Weltmann and Perry W. Kuhns. U. S. National Advisory Committee for Aeronautics. Aug 1955. 34p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118361

A concentric-cylinder rotational viscometer is described that can measure viscosities from 0.05 to 20,000 poises, program and record meaningful flow curves of rate of shear against shearing stress for most non-Newtonian materials, record time-torque curves, and produce dynamic flow measurements. A program feature provides for selecting (1) the maximum rate of shear up to 4000 sec^{-1}, (2) the time required to increase rotational speed from zero to the preset maximum, and (3) two sequences of rate of shear, which is varied automatically at a constant acceleration. Test data and curves are presented. NACA TN 3510.

Coaxial UHF noise source, by Hill Montague. U. S. Naval Research Laboratory. Aug 1955. 22p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118451

A gaseous discharge, which is equivalent to a resistor at an elevated temperature, can be used for a noise source if suitably coupled to a transmission line as in the microwave noise sources now available which use fluorescent lamps in waveguide sections. A similar noise source for lower frequencies has been developed with a 6-watt fluorescent lamp coupled to a low-impedance helical transmission line consisting of a copper-foil helix on a Teflon core. A coaxial output connector is provided. This noise source is satisfactory for use in built-in receiver monitors for uhf radar, and also as a laboratory instrument. NRL R 4560.

Design and construction of a Mach-Zehnder interferometer, by A. J. Greenwald and V. E. Bergdolt. U. S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Oct 1947. 30p photos, fold drawing, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 118456

A description is given of the design, construction, and use of a small Mach-Zehnder interferometer to be used with a firing chamber having controlled Reynolds' number. Some problems of constructing Mach-Zehnder interferometers are discussed. Project no. TB 3-0508. APG BRL M 469.

Engineering report on type II (Light-weight battery operable) refractometer, by DeForrest Metcalf. Texas. University. Electrical Engineering Research Laboratory, Austin, Texas. Sep 1954. 64p photos, diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118168

1. Refractometers, Microwave - Design 2. Oscillators, Klystron - Design 3. Amplifiers, Magnetic 4. TU EERL Report no. 5-03 5. AAF CRC TN 55-37 6. Contract AF 18(600)-13 7. Contract AF 19(604)-494.

Evaluation of the hypoxia warning device, by Richard W. Bancroft, Earl T. Carter, and Ulrich C. Luft. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. May 1955. 6p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 118516

The photoelectric hypoxia warning device was tested for reliability in the decompression chamber. The arterial oxygen saturation, as calculated from alveolar gas samples at the time of warning during acute hypoxic exposures, was used as the criterion for evaluating the device. The results indicated that under carefully controlled laboratory conditions the warning device tended to function consistently, but that further modifications in the photoelectric ear unit and in the amplifier and relay circuits are necessary before it can be considered suitable for testing under operational flying conditions. AAF SAM R 55-60.

High level Co^{60} irradiation facility, by John A. Auxier. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1955. 13p drawings, diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 118515

A facility for the exposure of small animals to intense radiation fields has been designed and built at the Radiobiological Laboratory of the University of Texas and the United States Air Force. A 1,200 curie Co^{60} source permits the exposure of rats to dose rates of 75 to 4,000 roentgens per minute. AAF SAM R 55-40.

Magnetic materials used in digital computer magnetic circuits, by LeRoy F. Silva. U. S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Apr 1955. 49p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118505

This is a survey and compilation of theories and data dealing with magnetic materials used in digital computer magnetic circuits. A set of performance criteria is presented to aid in the selection of materials for computer applications. A theory is presented which describes the mechanism of switching in a magnetic material subjected to an applied pulse field. Data in support of this theory is given. Correlations are made between the theory and performance criteria. The appendices contain a modern theory of the hysteresis loop along with experimental supporting evidence and a description of an experimental apparatus for magnetic core testing. Dept. of the Army project no. 5 B0306002. ORD project no. TB 3-0007. APG BRL M 890.

Measurements of turbulent skin friction on a flat plate at transonic speeds, by Raimo Jaakko Hakkinen. U. S. National Advisory Committee for Aeronautics. Sep 1955. 41p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118475

The design and construction of a floating-element skin-friction balance are described. This instrument was applied to measurements of local skin friction in the turbulent boundary layer of a smooth flat plate at high-subsonic Mach numbers and supersonic Mach numbers up to 1.75. The principal difficulties which exist in comparing skin-friction coefficients at various Mach numbers are discussed. NACA TN 3486.

Response of homogeneous and two-material laminated cylinders to sinusoidal environmental temperature change, with applications to hot-wire anemometry and thermocouple pyrometry, by Herman H. Lowell and Norman A. Patton. U. S. National Advisory Committee for Aeronautics. Sep 1955. 145p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118480

Generalized results are given for the cylinder consisting of a shell of high thermal conductivity and a core of low conductivity. The behavior of a number of specific platinum-fused-quartz "wires" of varying construction and diameter exposed to a representative airstream is indicated. Simplified analyses are included which are not exact but are adequate for design use. NACA TN 3514.

Simple meter for radioactive fall out, by C. C. Klick, H. Rabin, J. J. Lambe, H. J. Peake and P. T. Cole. U. S. Naval Research Laboratory. Jun 1955. 12p photos, diagr, graphs. Order from OTS. 50 cents. PB 111694

A dose rate meter has been constructed using a battery, cadmium sulphide crystal, and parallel combination condenser and neon flash lamp. It is sensitive over the range of 0.1 Roentgen to 1000 Roentgens per hour, is reasonabley energy independent, has a flash rate proportional to gamma dose rate, and uses only commercially available components. NRL R 4571.

Studies in the system CaO-MgO-CO_2: Stability relations of silicate-carbonates at elevated temperatures and pressures. Fourth progress report for the period Jul 1 to Sep 30, 1954 under Contract Nonr656, T. O. 6, Project NR 081-204, Code 416, by R. I. Harker and O. F. Tuttle. Pennsylvania State University. Mineral Industries Experiment Station, State College, Pa. Oct 1954. 50p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118329

1. Calcite - Thermal properties 2. Dolomite - Thermal properties 3. Magnesite - Thermal properties 4. Calcite - Solubility 5. Magnesite - Solubility 6. Dolomite - Solubility 7. Instruments, Measuring - Pressure.

Theoretical and experimental investigation of a deceleration probe for measurement of several properties of a droplet-laden air stream, by Jules L. Dussourd. Massachusetts Institute of Technology.

Dept. of Mechanical Engineering. Gas Turbine Laboratory. Oct 1954. 171p fold drawings, diagrs, graphs, tables. Order from LC. Mi $8.10, ph $27.30 PB 118305

The problem of complete determination, at any point, of the state of a gas-liquid stream, with liquid in droplet form is attacked from a general standpoint. Means are suggested by which all the significant properties of the stream can be obtained either experimentally or theoretically. The underlying principle of operation of these measuring instruments rests in all cases solely upon the dynamic behavior of the liquid droplets in their response to the local accelerations of the gas stream within or in the immediate vicinity of the testing probes. A theoretical study of this dynamic behavior is included for a broad range of the significant parameters and for the specific geometries of the test instruments. Aerothermopressor project. Appendices: - A. Definition of various pressures and definition of drop size. - B. Gas flow field existing near probe inlet. - C. Measurement of gas pressure variation upstream of and along the axis of symmetry of an axisymmetrical body. - D. Dynamics of a particle in an incompressible three-dimensional field. - E. Momentum relations. - F. Mechanics of droplet motion within the probe and rate of overpressure rise. - G. Relative order of magnitude of buoyancy effects acting upon droplet immediately before impingement. - H. Necessary condition for constant Mach number in the tunnel test plan. - J. Correction of experimental and stagnation pressure data for energy effects. - K. Energy effects. - L. Tunnel characteristics. MIT DIC 5-6985. Contract N5ori-07878.

MACHINERY

Blow-down energy recovery by pre-exhaust separation, by A. W. Hussman and W. A. Pullman. Pennsylvania State University. Dept. of Engineering Research, State College, Pa. Sep 1954. 148p diagrs, graphs (part fold). Order from LC. Mi $7.20, ph $22.80. PB 118393

This report deals with a method of utilizing the blowdown energy in piston engines by means of pre-exhaust separation. The relations for the theoretical available energy are first established as functions of engine conditions along with conditions of similitude. The procedures for calculating the actual available energy at a blowdown turbine have been developed and are presented in nomogram form for the two cases of applying the pulse energy system or of using an accumulator system with a steady flow turbine. Numerical examples have been calculated for a two-stroke cycle uniflow engine, showing that a theoretical blowdown turbine mean effective pressure of about 18 psi can be obtained with an engine mep of 90 psi. Contract Nonr 656(02), Project NR 097-195.

Experimental investigation of eccentricity-ratio, friction, and oil flow of long and short journal bearings with load-number charts, by George B. DuBois, Fred W. Ocvirk, and R. L. Wehe. U. S. National Advisory Committee for Aeronautics. Sep 1955. 63p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118477

Experimental data for length-diameter ratios of 1, $1\frac{1}{2}$, and 2 are shown for comparison with earlier data for length-diameter ratios of 1/4, 1/2, and 1. The combined data provide charts of plain-bearing performance which cover the practical range of length-diameter ratio. NACA TN 3491.

Operation of German centrifugal casting equipment, by P. J. Ahearn and J. F. Wallace. U. S. Arsenal, Watertown, Mass. Rodman Laboratory. Mar 1955. 25p photos, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 118279

A water-cooled, horizontal axis, true centrifugal casting machine acquired from Germany was installed, placed in operation, and gun tubes produced on an experimental basis. The construction and operational features of the equipment were evaluated and compared with conventional Watertown Arsenal centrifugal casting machines. A large number of tubes of two different sizes were produced experimentally utilizing varying techniques including varying thicknesses of dry sand lining, different designs of muzzle accelerator, application of longitudinal pressure, and tilting the machine during pouring. The influence of these variables on the quality of the tube is assessed, and the benefits derivable from the equipment are discussed. Production preparedness measure, work directive no. C-530-53. WAL RPL 8.

Static strength and fatigue properties of threaded bolts, by Waloddi Weibull. Flygtekniska Försöksanstalten (FFA), Stockholm. May 1955. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118224

The tensile strength of 497 double screw joints has been determined and its distribution has been found to be neither normal nor log-normal. An exponential distribution function previously used by the author fits the data reasonably well. The fatigue lifetimes of 417 of the same joints have been measured at five stress levels. The statistical fatigue properties have been condensed into one single equation, the P-S-N equation.

MEDICAL RESEARCH AND PRACTICE

Determination of masticatory efficiency and its controlling factors. Final progress report under Contract N7-onr-463, Task order no. 2, by A. A. Yurkstas. Tufts College. Dental School, Boston, Mass. Jun 1954. 5p. Order from LC. Mi $1.80, ph $1.80. PB 118418

Research accomplished has been of a theoretical, laboratory, and clinical nature. Deals in the main with persons possessing a natural dentition, although some work was on prosthetic appliances. For report no. 3 see PB 105088.

Differentiation of effects of ionization radiation and other mutagenic agents on the functional versus the genetic capacities of cells. Final report under Contract Nonr 222(13), NR 164,128, by Spencer W. Brown. California. University. College of Agriculture Dept. of Genetics, Berkeley, Calif. Jun 1954. 3p. Order from LC. Mi $1.80, ph $1.80. PB 118113

1. X-rays - Biological effects 2. Contract Nonr 222(13), NR 164-128, Final report no. 2.

Effect of air-generated sound waves on suspensions of microorganisms, by Helen L. Kinsloe, Eugene Ackerman, and James J. Reid. Pennsylvania State College, State College, Pa. May 1952. 78p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118227

Two high intensity air borne sound generators, a siren and a jer T type whistle, were used to study the effects of sound on liquid suspensions of bacteria. The experiments failed to elucidate the mode of action of the acoustic field in producing lethal effects. The data do show that bacteria can be killed in standing wave fields, with maximum pressure amplitudes of a few tenths of an atmosphere and maximum particle velocities of a few centimeters. The threshold for these effects appears to be very sharp. It is concluded that although these sound sources are impractical for enzyme or antigen extractions, they do indicate a relative scale of bacterial sensitivity to these sound fields. Contract AF 33(038)-786. AAF WADC TR 52-176.

Effect of malonate on growth rate of Salmonella typbimurium in mice, by L. Joe Berry. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1955. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 118518

This report analyzes the causes for the more rapid reproduction of pathogens in mice given injections of malonate. A technique is presented which allows the experimenter to correlate the total number of bacteria in mice with time during an experimental infection. Evidence is presented that the more rapid reproduction of pathogens to a lethal population in mice given injections of malonate is due to an enhanced nutritive environment and not to an impaired cellular defense. AAF SAM R 55-36.

Effects of pupil size and flash duration on acuity during dark adaptation, by Helmut E. Adler, John L. Brown, and Robert M. Herrick. Columbia University, New York, N. Y. Nov 1954. 15p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 118439

Task no. 720W-7186-71544 "Presentation of data on radar scopes."
1. Tests, Optical 2. Visual perception - Research 3. Vision - Dark adaptation - Effect of pupil size 4. Vision - Dark adaptation - Effect of length of illumination 5. AAF WADC TR 54-551 6. Contract AF 33(038)-22616.

Factorial analysis of foot measurements, by Thomas E. Jeffrey and L. L. Thurstone. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 30p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118194

This report gives the results of a methodological study carried out for the purpose of investigating the nature of some of the critical factors determining the size of feet in Army personnel. Twenty-nine measures taken from the anthropometric data collected in the Fort Knox Foot Survey were factor analyzed. Contract no. DA 44-109-QM-1125 with University of North Carolina, Psychometric Laboratory. Project reference 7-79-10-001 G. QMC EP TR 10.

Study of specific antihyaluronidases in serum. Annual progress report under Contract NORN 494 (07), NR 190 030 for the period Feb 1, 1953 to Jun 30, 1954, by Zareh Hadidian. Tufts College, Medford, Mass. Jul 1954. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 118421

A brief summary of results is given for the following: Salivary hyaluronidase, parotid saliva, specific hyaluronidase inhibitors in serum, classification of Streptococci isolated from the oral cavity, production of specific anti-aluronidases against bacterial enzymes. Plans for immediate and long range work are discussed. Contract Nonr 494(07).

Symposium on atherosclerosis, 22-23 March 1954. National Research Council. Division of Medical Sciences. 1954. 254p photos, diagrs, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. $2. PB 117739

Irvine H. Page, Chairman.
1. Atherosclerosis 2. Diseases, Arterial 3. NRC 338.

Test of the effects of pregnenolone methyl ether on subjective feelings of B-29 crews after a twelve-hour mission, by S. B. Sells, J. R. Barry, D. K. Trites, and H. I. Chinn. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. May 1955. 8p diagrs, tables. Order from LC. Mi $1.80, ph $1.80. PB 118444

Pregnenolone methyl ether has been reported in the literature as having favorable effects, with psychiatric patients, on subjective reactions of

fatigue, irritability, anxiety, and fear. Student B-29 crews were administered this drug or a placebo, in a balanced design, immediately after completing an all-night, overwater mission, to determine whether similar effects might be produced in normal bomber crew personnel. AAF SAM R 55-11.

METALS AND METAL PRODUCTS

Aging study of metal plating on quartz crystals. Quarterly report no. 5, May 1, 1953 to Aug 1, 1953, under Contract DA 36-039-sc-42453, by R. J. Raudebaugh and R. B. Belser. Georgia Institute of Technology. State Engineering Experiment Station, Atlanta, Ga. Aug 1953. 76p photos, drawings, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118262

The metal rhodium has been deposited on glass and quartz substrates by sputtering in the high-sputtering-rate apparatus developed here. Resistivity values for films in the range 250 to 1,500 angstroms have been measured before and after artificial aging. Electron micrographs and diffraction patterns of rhodium films before and after aging to high temperatures, near 600° C, show rhodium to be extremely resistant to aggregational effects. An evaluation of metals and techniques for coating quartz crystal resonators is included in the appendix. Evaporation techniques have given crystals of lowest R_e and highest Q. Sputtering, however, gives films of good adherence and coated crystals of excellent stability. Project 163-176. Dept. of the Army project 3-24-02-021. Signal Corps project: 33-863A. For 1st-4th reports see PB 117335, PB 117726, PB 117727, PB 117728. SIG Contract DA36-039-sc-42453, Quarterly report no. 5. Appendix: An evaluation of metals and techniques used for coating quartz crystal resonators, by R. D. Raudebaugh and R. B. Belser, presented at Frequency Control Symposium, Asbury Park, N. J., May 18-20, 1953.

Axial-load fatigue properties of 24S-T and 75S-T aluminum alloy as determined in several laboratories, by H. J. Grover and W. S. Hyler, Paul Kuhn, Charles B. Landers, and F. M. Howell. U. S. National Advisory Committee for Aeronautics. 1954. 27p photos, drawings, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 118472

The test techniques used at Battelle Memorial Institute, Langley Aeronautical Laboratory of the NACA, the Aluminum Company of America are described in detail; the test results are compared with each other and with results obtained on unpolished sheet by the National Bureau of Standards. Revision of NACA TN 2928 (PB 109372). NACA TN 2928 Revised. NACA 1190.

Chemisorption, photoconductivity, and photodesorption in zinc oxide, by David B. Medved. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Feb 1955. 114p diagrs, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 118311

Photoconductivity processes in zinc oxide are studied in detail at room temperature as a function of time, incident light intensity, and pressure. The results are in essential agreement with the theory of chemisorption and conductivity developed by Morrison and Melnick. Technical report no. 4. Contract AF 33-(616)-78.

Crack arresting by overlays of notch-tough weld metal, by P. P. Puzak and W. S. Pellini. U. S. Naval Research Laboratory. Sep 1955. 10p photos, diagr, graph. Order from OTS. 50 cents. PB 111781

Crack-starter explosion tests were utilized to demonstrate the feasibility of using overlays of notch-tough welds to prevent the initiation and propagation of brittle fracture in otherwise brittle, structural mild steels. Simple bead-on-plate welds of notch-tough weld metal were deposited on the surfaces of a mild steel plate. Tests demonstrated that brittle fractures do not propagate in overlay regions. The method is considered practical for application to existing or new structures. NRL R 4622.

Creep of copper at intermediate temperatures, by T. F. Tietz and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Sep 1954. 25p photos, graphs. Order from LC. Mi $2.70, ph $4.80. PB 118278

Activation energies for creep of copper at intermediate temperatures, where crystal recovery was negligible, were determined by the simple technique of rapidly alternating the test temperature between $\mathcal{T}_1$ and $\mathcal{T}_2$ ($\mathcal{T}_2 = \mathcal{T}_1$ + about 10° K) throughout a constant stress creep test. The same creep laws as have been previously established for high temperature creep were found to be valid for creep at intermediate temperatures. But the ΔH was found to be lower than that for self-diffusion in the intermediate temperature range whereas it is known to be equal to that for self-diffusion at high temperatures. UC IER Series 22, Issue no. 38. Contract N7onr-295, T. O. I, NR-031-048, Technical report no. 38.

Crystal perfection in aluminum single crystals. Technical report no. 1 under Contract N6ori 071 (54), by T. S. Noggle and J. S. Koehler. Illinois. University. Dept. of Physics, Urbana, Ill. Sep 1954. 28p. Order from LC. Mi $2.70, ph $4.80. PB 118415

A high resolution x-ray diffraction technique has been employed on annealed single crystals of aluminum in order to arrive at an estimate of dislocation densities and distributions. Comparison of crystals obtained by growth from the melt and by recrystallization indicates that there are no basic differences in the degree of crystal perfection obtained using the two methods of growth.

Cumulative fatigue damage of axially loaded alclad 75S-T-6 and alclad 24S-T3 aluminum-alloy sheet, by Ira Smith, Darnley M. Howard, and Frank C. Smith. U. S. National Advisory Committee for Aeronautics. Sep 1955. 49p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118479

Results are presented of cumulative-fatigue-damage tests made on 607 specimens machined from alclad 75S-T6 aluminum-alloy sheet 0.064 inch thick and 198 specimens of alclad 24S-T3 and alclad 75S-T6 aluminum-alloy sheet 0.032 inch thick. The tests of the 0.064-inch-thick specimens consisted of 35 different loading conditions and the tests of the 0.032-inch material consisted of 13 different loading conditions. NACA TN 3293.

Determination of Young's modulus of porous metals by a vibrational method, by Leo Zwell. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Jun 1949. 18p photo, drawing, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 118380

The experiments described in this report have demonstrated that the modulus of elasticity of porous metals can be easily measured by a vibrational method. As a general conclusion, it may be stated that the modulus of elasticity of a porous metal depends primarily on the density, and that factors such as particle size, compacting pressure, and the nature of the porosity-producing agent have only a secondary influence. ORDCIT Project. Progress report no. 4-104. Contract W04-200-ORD-455.

Development of equipment and of experimental techniques for column creep tests, by Sharad A. Patel, Martin Bloom, Burton Frickson, Alexander Chwick and Nicholas John Hoff. U. S. National Advisory Committee for Aeronautics. Sep 1955. 20p photos, diagr, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118473

Equipment and procedures developed for testing aluminum-alloy columns subjected to constant loads at elevated temperatures are described. Particular emphasis was put on determination of the influence of initial deviations from straightness on the time necessary for the column to buckle when subjected to a constant load. Results are presented of tests of a number of 2024-T4 aluminum-alloy columns having large slenderness ratios. NACA TN 3493.

Development of magnesium-lithium structural alloys. Final report under Contract NOa(s) 9526 for the period Sep 26, 1950 through July 31, 1951, by P. D. Frost, V. S. Emler, and J. H. Jackson. Battelle Memorial Institute, Columbus, Ohio. Jul 1951. 92f photos, graphs, tables. Order from LC. Mi $5.40, enl pr $16.80. PB 118490

1. Aluminum-magnesium alloys - Corrosion fatigue 2. Aluminum-magnesium alloys - Tensile properties 3. Lithium-magnesium alloys - Corrosion tests 4. Lithium-magnesium alloys - Cracking 5. Lithium-magnesium alloys - Heat treatment 6. Lithium-magnesium alloys - Mechanical properties.

Development of processes for making titanium castings other than ingots. Battelle Memorial Institute, Columbus, Ohio. Contract DA33-019-ORD-223. Order separate parts described below from LC, giving PB number of each part ordered.

Summary report for the period Oct 22, 1951 to Nov 29, 1952, by R. M. Lang, J. G. Kura and J. H. Jackson. Nov 1952. 36p photos, drawings, tables. Mi $3, ph $6.30. PB 118325

Mold materials were evaluated by melting and casting titanium under a helium atmosphere in a graphite-lined induction furnace. Permanent molds of copper, aluminum, and graphite were tested. All of these mold materials had a short life except when used for casting simple shapes. The most promising shell mold developed was made with electrically fuzed zirconia. Castings made in zirconia shell molds had good surface finish and good detail, but some of the heavier sections of these castings contained pinholes.

Summary report for the period Jan 19, 1953 to Mar 1, 1954, by R. M. Lang, J. L. Gissy, G. H. Schippereit, J. G. Kura, E. M. Stein, H. C. McIntire and G. K. Manning. Mar 1954. 100p photos, diagrs, graphs, tables. Mi $5.40, ph $15.30. PB 118326

Refractory oxide molds of alumina, magnesia, olivine [2(MgFe)O. SiO_2], silica, zircon, and zirconia were evaluated as mold materials for titanium. Various mold binders, mold washes, and mold additives were used in conjunction with the different mold materials. The most satisfactory molding technique used was the shell process, in which phenol formaldehyde resin was used as the binder. Appendix A contains a comprehensive table of all mold materials investigated since the inception of the project. Appendix F is a list of the publications originating from this project. Appendices: - A. Mold materials evaluated since the inception of the project. - B. Preparation of molds. - C. Mold washes. - D. Surface contamination of titanium castings. - E. Design and construction of induction coils. - F. Technical papers originating from this project.

Dynamic behavior of domain walls in barium titanate, by Elizabeth A. Little. Massachusetts Institute of Technology. Laboratory for Insulation Research. Oct 1954. 46p photo, diagrs, graphs Order from LC. Mi $3.30, ph $7.80. PB 118255

Based on a thesis.
1. Barium titanate - Crystal structure 2. Crystals, Barium titanate - Growth 3. MIT LIR TR 87 4. Contract N5ori-07801.

Effect of stress on creep at high temperatures, by H. Laks, C. D. Wiseman, O. D. Sherby, J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Sep 1954. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118277

According to a preliminary dislocation climb model for high temperature creep, the activation energy for creep should be that for self-diffusion and the effect of stress on the creep rate should depend on the number of active Frank-Read sources, and the rate of climb depends on the structure as determined by the pattern of climbing dislocations. Many of the experimental observations on high temperature creep can be accounted for by this model. UC IER Series 22, Issue no. 37. Contract N7onr-295, T. O. II, NR-031-048, Technical report no. 37.

Effect of temperature on the ductility of high-strength structural steels loaded in the presence of sharp cracks, by P. P. Puzak and W. S. Pellini. U. S. Naval Research Laboratory. Jun 1955. 31p photos, graphs, tables. Order from OTS. $1. PB 111720

Effect of temperature on the fracture characteristics of various high-strength structural steels when loaded in the presence of a sharp, cracklike notch, was determined by the NRL drop-weight and explosion crack-starter tests. The concept of critical fracture transition temperatures is discussed. NRL R 4545.

Effects of range of stress and prestrain on notched specimens of titanium and its alloys, by J. P. Romualdi and E. D'Appolonia. Carnegie Institute of Technology. Dept. of Civil Engineering, Pittsburgh, Pa. Oct 1953. 44p photos, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118379

The effect of the theoretical stress concentration factor K_T on the notch sensitivity for different testing conditions was determined by conducting tests on notched and unnotched specimens at different speeds and under isothermal and non-isothermal conditions. A study of the effect of internal heating on the fatigue life of titanium was made from continuous records of temperature and deflection of rotating beam fatigue specimens tested at different speeds and under isothermal and non-isothermal conditions. Contract DA 36-061-ORD-259, Final report.

Investigation of a new method for the determination of the coefficients of surface diffusion of metals. Eighth quarterly progress report, by Peter F. Mataich. Horizons, Inc., Cleveland, Ohio. Jun 1955. 18p graphs. Order from LC. Mi $2.40, ph $3.30. PB 118399

The work during this quarter was centered exclusively on the use of radioactive tracers to measure diffusion. It was found that autoradiographs taken immediately after a readioactive silver strip was evaporated on a polished gold base usually show only the pattern of the deposited silver which can also be checked interferometrically. Project no. R-355-30-2. Contract AF 18(600)-644, 8th quarterly report.

K teorii dinamich eskoi polyuchesti (Theory of dynamic creep), by A. A. Predvoditelev and B. A. Smirnov. Translated by S. Reiss. Sep 1955. 12p graph. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118482

An analysis is given of the causes of the increase in creep under varying loads. It is suggested that the increase in creep is due to local rise in temperature over the slip planes, thus facilitating slip. A theory of dynamic creep is proposed, based on the Becker theory of the after-effect, which treats the metal as a granular structure and includes a rate factor. Translated from Vestnik Moskovskogo Univ. Phys. vol. 8, no. 8, 1953, p. 79-86. NACA TM 1330.

Research on grain boundaries, by K. T. Aust, E. Harrison, R. Maddin, Shiu-kang Tung. Johns Hopkins University. Institute for Cooperative Research, Baltimore, Md. Jul 1955. 35p photos, graphs, table. Order from LC. Mi $3, ph $6.30. PB 118396

The activation energies for grain boundary migration were calculated from the results of migration of grain boundaries in bicrystals of aluminum having orientation differences of 55° and 85° about [110]. The relative energy (γ R) of symmetrical tilt boundaries in high purity silver was determined for a series of different orientations. It is shown that the boundary energy depends upon the orientation of the boundary. The results are in agreement with the dislocation model of the grain boundary. Preliminary research on shear along tilt grain boundaries in aluminum is reported. It is shown that above 400°C, the boundary during initial loading will undergo a pure shear which is followed by boundary migration. Contents: Part I. Grain boundary migration in aluminum bicrystals (Type 1). - Part II. Interfacial energies of symmetrical tilt crystal boundaries in silver (Type 1). - Part III. Shear along grain boundaries in aluminum bicrystals at elevated temperatures (Type 2). Contract AF 18(600)-1012, Technical report no. 6, Final report.

Studies in the system nickel-titanium-carbon, by Edward R. Stover and John Wulff. Massachusetts Institute of Technology. Jan 1954. 21p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 118268

The equilibrium phase relationships in the Ni-Ti-C system have been studied by metallographic, X-ray, and magnetic examination of arc-melted and annealed alloys in order to assist in understanding the processes in sintering and infiltrating TiC-Ni cermets. This report describes experiments mentioned in the previous final report together with more recent studies. Contract AF 33(616)-61. AAF WADC TR 54-212.

Variability in fatigue testing: Sources and effect on notch sensitivity, by Frank A. McClintock. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. May 1955. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 118401

Presented to International Union of Theoretical and Applied Mechanics. Colloquium on fatigue, Stockholm, May 25, 1955. Appendix: Titles and brief comments on papers presented at the Colloquium on Fatigue, Stockholm, 1955.
1. Metals - Fatigue tests 2. Metals - Notch sensitivity 3. Fatigue, Structural - Tests.

Velocity diameter and wave studies in low density 50/50 TNT-sodium nitrate mixtures, by M. A. Cook. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Jul 1954. 18p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 118252

1. Sodium nitrate - Reactions with TNT 2. TNT - Reactions with sodium nitrate 3. Explosives - Research 4. Contract N7onr-45107, Project NR 357-239 5. UU ISRP TR 36.

Wetting properties of organic liquids on high-energy surfaces, by H. W. Fox, E. F. Hare, and W. A. Zisman. U. S. Naval Research Laboratory. Jul 1955. 25p tables. Order from LC. Mi $2.70, ph $4.80. PB 118452

Wettability was measured by the contact angle at 20°C of each liquid on various metals, fused silica, and sapphire (α-alumina). The qualitative effects on the wettability of varying the temperature, humidity, and roughness of solid are discussed. It was found that many carboxylic esters hydrolyze at ordinary temperatures upon being adsorbed on silica or sapphire. It is concluded that the wettability of smooth high-energy surfaces by organic liquids can be predicted approximately from knowledge of the orientation and packing of the molecules adsorbed from the liquid phase. NRL R 4569.

METEOROLOGY AND CLIMATOLOGY

Aerology of the polar regions, by Hermann Flohn. McGill University. Arctic Meteorology Research Group, Montreal, Canada. Mar 1955. 50p maps, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118175

From the wealth of aerological material for the years 1948-52 the main trends of arctic aerology are derived and compared with the data of the antarctic. The following problems are treated in some detail: formation conditions of the winter surface inversion, role of the air masses, geographic distribution and properties of the aerological cold centres, distribution of temperature and wind, asymmetry of the circumpolar vortex. The statistical fundamentals of the atmospheric circulation in the polar regions are summarized briefly. Translation of "Zur aerologie der polargebiete" from "Meteorologische Rundschau" v. 5, pp. 81-87 and pp. 121-128, 1952, by Miss A. M. Kröger, edited by A. D. Belmont. Appendix to Status Report #4; prepared under Contract AF 19(604)-11-41. AAF CRC TN 55-482. Contract AF 19(604)-11-41.

Alphabetical list of translations made by the American Meteorological Society. Supplement no. 1, 1 Jan-31 Mar 1955. American Meteorological Society, Washington, D. C. Mar 1955. 9p. Order from LC. Mi $1.80, ph $1.80. PB 117933

Translations made under Contract AF(604)-1364.
1. Translations - Bibliography 2. Contract AF-(604)-1364.

Atmospheric ozone at College, Alaska (Lat. 64° 52'N, Long. 147°49'W.) Final report under Contract AF 19(604)-127 for Apr 1952 to Nov 1954, by Joseph C. Cain and Annie B. Cain. Alaska. University. Geophysical Institute, College, Alaska. Mar 1955. 195p photos, drawing, diagr, graphs, tables. Order from LC. Mi $8.70, ph $30.30. PB 118124

1. Spectrophotometers - Uses 2. Spectrophotometers - Design 3. Atmosphere, Upper - Ozone - Determination 4. AAF CRC TR 55-270 5. Contract AF 19(604)-127, Final report.

Circulation in the upper atmosphere, by P. S. Pant. New York University. College of Engineering. Dept. of Meteorology and Oceanography. May 1955. 48p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118299

The winds in the region from 20 to 100 km over the Northern Hemisphere are critically examined. The temperatures are computed from the wind field with the aid of rocket mean pressure data and under the assumption that the wind field is geostrophic. The computed temperatures are found to agree with direct observations. Possible causes of some of the observed seasonal temperature changes in different parts of the upper atmosphere are discussed. Tentative temperature cross-sections for the region from 20 to 90 km over the Northern Hemisphere for summer and winter are presented.

Scientific report no. 1, Project 299. AAF CRC TN 55-651. Contract AF 19(604)-1006.

Comparison of several systems for photometry of the twilight sodium emission, by D. M. Hunten. Saskatchewan. University. Physics Dept. Jun 1955. 16p table. Order from LC. Mi $2.40, ph $3.30. PB 118338

Scientific report no. AR-21.
1. Spectrometers, Photoelectric - Use 2. Atmosphere, Upper - Sodium distribution 3. SASK AR 21 4. Contract AF 19(122)-152.

Diffusion thermo effect in the atmosphere above 120 km, by Norman Davids. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Jul 1955. 28p graphs. Order from LC. Mi $2.70, ph $4.80. PB 118300

The diffusion thermo effect, in which a temperature gradient is formed by the action of a heat transport due to a diffusion process, is investigated theoretically in the atmosphere above 120 km. It is shown that the problem can be reduced to a pair of linear partial differential equations of second order in two variables. Suggestions for the solution of these equations are presented. AAF CRC TN 55-484. PSC IRL SR 76. Contract AF 19(604)-1304.

First synoptic test of the solar hypothesis, by C. E. Palmer. California. University. Institute of Geophysics. Oahu Research Center, Oahu, Hawaiian Islands. Jul 1955. 28p fold diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 118334

The report offers evidence that confirms the hypothesis that the occurrence of solar flares and fluctuations in the vertical component of vorticity at 30,000 feet over the Marshall Islands are correlated. The hypothesis, shortly referred to as the solar hypothesis, was originally developed during the study of data from the 1951 weapon tests in the Marshalls. New data from the 1952 tests in the same area are used to check the hypothesis. Corrections to the theoretical part of the work are briefly introduced. Scientific report no. 11. Contract AF 19(604)-546.

Interpretative techniques in radar meteorology. Final report under Contract no. AF 19(604)-550, by Shepard Bartnoff. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Jul 1955. 11p. Order from LC. Mi $2.40, ph $3.30. PB 118414

The work done under this contract can be summarized briefly under the following headings: 1. Drop size distributions and visibility in clouds and (2) Analysis of optical raindrop spectrometers (3) Scattering of electromagnetic radiation from a dielectric prolate spheroid. (4) Computations of moments of theoretical and observed drop size distributions and their analysis. (5) Miscellaneous studies.

Investigation of cyclone development, storm no. 5, by C. W. Newton. Chicago. University. Dept. of Meteorology. Weather Forecasting Research Center, Chicago, Ill. Apr 1955. 47p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 118301

The development, behaviour and dissipation of a major cyclone over the United States during 16 to 21 November 1948 is investigated in detail. The vorticity advection at 300 mb, as an indicator of upper divergence, is found to be closely related to the initial formation, maintenance and final collapse of the low-level circulation. The relationship of orography to the development is investigated, and it is found that (1) vertical motions at the surface contribute a significant amount to the convergence-divergence pattern over the steeper slopes, and (2) differential adiabatic warming due to orographic vertical motions contribute a major amount to the initial development in low levels. AAF CRC TN 55-483.

Investigation of the ice fog phenomena in the Alaskan area. Final report covering the contract periods 28 Dec 1951 - 30 Sep 1954, by T. J. Parks and Donald L. Benedict. Stanford Research Institute, Stanford, Calif. Jun 1955. 174p photos, fold map, drawings, diagrs, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 118424

The meteorological conditions leading to the formation of ice fog were found to be the low temperatures, clear skies, and low wind speeds associated with polar continental air masses. The water vapor required for ice fog was considered to result almost entirely from human activity. Measures are suggested for reducing the incidence of ice fog by control of water vapor sources and by taking advantage of meteorological patterns, and for removal of ice fog after formation. Recommendations are made as to immediate remedial measures which could be taken at Eielson and Ladd Air Force Bases, and as to factors which should be considered in the design of new bases. Brief descriptions are given of the special techniques, instrumentation, and laboratory facilities used during the investigations. Abstracts of all other reports issued in the course of the project are included in an appendix. SRI Proj CU-473, Report no. 21. SRI TR 21. Contract AF 19(122)-634.

Kinematics of double vortices, by Gordon A. Dean. California. University. Institute of Geophysics. Jun 1955. 34p fold diagrs. Order from LC. Mi $3, ph $6.30. PB 118335

A synoptic model of the early stages of double vortices (one occurring on each side of the geographic

equator) is proposed. Illustrations of specific situations that occurred during the period April 27 to May 3, 1951 (Operation Greenhouse) are presented. Scientific report no. 12. Contract AF 19(604)-546.

Luftelektrische potentialgefälle und der vertikalstrom in Uppsala (Atmospheric-electric potential gradient and vertical current in Uppsala), by H. Norinder, H. Israel and R. Siksna. Translated by James Gough, Jr. Revised. May 1955. 43p map, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118222

Translated for Geophysics Research Center, AF Cambridge Research Center, by the American Meteorological Society under Contract no. AF 19-(604)-1364, from Arkiv för geofysik vol. 2, no. 6, p. 109-138, 1954.
1. Currents, Air - Measurement - Sweden 2. Atmosphere - Electricity - Sweden 3. Atmosphere - Potential gradient - Sweden.

Mean winds over the Marshall Islands, May 1951, by Julius Korshover. California. University. Institute of Geophysics. Oahu Research Center, Oahu, Hawaiian Islands. Mar 1955. 64p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118333

The report summarizes, chiefly in diagrammatic form, the mean atmospheric motion over the Marshall Islands during the month of May and the Spring of 1951. Charts, depicting the mean field of motion at numerous horizontal levels from 2,000 feet to 90,000 feet, are included. Cross-sections, approximately along the 167°E meridian, show the variation with height (up to 90,000 feet) and latitude (0 - 20°N) of the mean zonal and meridional components of the wind, the mean wind speed, the resultant wind speed, and the steadiness of the wind. Scientific report no. 10. Continuation of work already reported in Scientific report no. 1. For earlier reports see PB 114064, 117361, 116414, 116355. Contract AF 19-(604)-546.

On the quantitative characterization of low pressure centers. Scientific report no. 3, by Morris H. McCutchan and Reid A. Bryson. Wisconsin. University. Dept. of Meteorology, Madison, Wis. Jun 1955. 37p map, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118201

1. Meteorology - Research 2. Weather forecasting - Mathematical analysis 3. Winds - Velocities - Theory 4. Pressure, Low - Measurement 5. AAF CRC TN 55-494 6. Contract AF 19(604)-992.

Rayleigh's problem at low Mach number according to the kinetic theory of gases, by Hsun-Tiao Yang and Lester Lees. California Institute of Technology. Guggenheim Aeronautical Laboratory, Pasadena, Calif. Jul 1955. 98p diagrs, graphs tables. Order from LC. Mi $5.40, ph $15.30. PB 118118

Rayleigh's problem of an infinite flat plate set into uniform motion impulsively in its own plane is studied by using Grad's equations and boundary conditions developed from the kinetic theory of gases. Near the start of the motion the flow behaves like a "free-molecule flow", and all physical quantities are analytic functions of the flow parameters and time. The results obtained for "large time", however, add to the growing lack of confidence in the Burnett-type series expansions in powers of mean free path. To replace these unsatisfactory solutions, approximate closed-form solutions valid for all values of the time are developed, which agree with the free-molecule values for small time and the classical Rayleigh solution for large time. This technique may be useful in studying more general flow problems within the framework of the kinetic theory of gases. CIT GAL TR 2. Contract DA-04-495-Ord-19.

Research directed toward the "Observation of dew deposition on various types of cover." Final report under Contract no. AF 19(604)-589, by Robert H. Shaw. Iowa State College. Dept. of Agronomy, Ames, Iowa. 1955. 71p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118173

Observations on amount and duration of dew were collected during the 1953 and 1954 crop seasons. In 1953 the crops used were grass, oats, soybeans and corn. In 1954 the crops used were grass, oats, soybeans and potatoes. In addition, observations were taken on Duvdevani dew gauges both years, and on the Taylor and Wallin-Polhemus dew recorders in 1954. Observations were taken on both time of first dew deposition and duration of dew deposition. Hourly observations of air temperature and relative humidity, wind, radiation, cloud cover and air mass were also taken. See also PB 116515. AAF CRC TR 55-267. Contract AF 19(604)-589.

Research on atmospheric pressure changes, by Richard J. Reed. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Oct 1954. 42p maps, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118427

Recent advances in numerical weather prediction have set the problem of atmospheric pressure change on a quantitative basis. In this report tests are made of various numerical equations, and suggestions are made as to how they may be improved. The great mass of computations was carried out by hand methods. Technical report no. 15. Contract N5ori-07804.

Study of 442 solar flares observed at Sacramento Peak, N. M. from 28 Feb 1951 to 31 Oct 1953, by Ching Sung Yü. Harvard University. Harvard College Observatory. Solar Dept. Jul 1955. 63p photo, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118123

1. Solar flares - Measurements 2. Chromosphere - Research 3. Baird filter 4. Solar flares - Distribution 5. HU HCO SR 26 6. AAF CRC TN 55-488 7. Contract AF 19(604)-146, Scientific report no. 26.

Study of the variability of solar energy output from 1949 to 1954 by different oil methods, by A. G. Wilson, R. H. Hardie and H. L. Johnson. Lowell Observatory, Flagstaff, Ariz. May 1955. 28p graphs. Order from LC. Mi $2.70, ph $4.80. PB 118423

A brief statement of the problem of measurement of possible solar variations is given. The differential method of measuring the sun's light as reflected by objects in the solar system when compared to the light from stars is outlined. Differential observations covering five years of study are presented together with the development of techniques that will yield the highest precision of observation at this time. Scientific report no. 1 under Contract no. AF 19(604)-291.

ORDNANCE AND ACCESSORIES

Development of castings for pressure-tight, high-strength ordnance components, by R. B. Gilliam and P. J. Ahearn. U. S. Arsenal, Watertown, Mass. Rodman Laboratory. Apr 1955. 38p photos, drawings, diagrs, tables. Order from LC. Mi $3, ph $6.30. PB 118460

A satisfactory manufacturing technique was developed for the stuffing box for the 240mm howitzer recoil mechanism and the expansion tank for the 280mm gun carriage T72 (equilibrator). This development included the selection of the proper chemical composition, correct casting practice, and the utilization of the proper heat treatment. Pressure testing was also utilized in some cases for evaluation of these parts. The results of these tests and the relative merits of castings for these components are discussed. WAL RPL 4.

Mass spectrometric analysis of gaseous combustion products from delay powders (Research and development of delay powders for ammunition fuze application, general), by Phillip Rochlin. U. S. Picatinny Arsenal, Dover, N. J. Mar 1954. 11p drawing, tables. Order from LC. Mi $2.40, ph $3.30. PB 118521

Samples of non-gaseous delay powders were evacuated in a vacuum apparatus and heated, either until gas was evolved, or the powder flashed. The gaseous products were analyzed in the General Electric Analytical Mass Spectrometer which, because of the small volumes obtained and the complexity of the mixtures involved, was considered the best instrument available here for this type of analysis. The products consisted mainly of hydrogen, water, nitrogen, carbon monoxide, and carbon dioxide, in varying percentages depending on the composition. Traces of one or more unidentified organic compounds also appeared to be present. Ordnance project no. TA 2-9203. Dept. of the Army project no. 504-01-029. PA TR 2006.

Microscopic examination of high explosives and boosters, by Alfred T. Blomquist. Cornell University. Dept. of Chemistry, Ithaca, N. Y. Aug 1944. 496f photos, diagrs, tables. Order from LC. Mi $11.10, enl pr $75.35. PB 118489

The report gives precise information on all the data available for the analysis and examination of high explosives and boosters by means of the microscope. Part I is a complete presentation of the technique and application of fusion analysis. Part II describes all the optical properties of high explosives and boosters (some 32 compounds) which are useful in making a microscopic examination. Part III contains specific details of the fusion analysis of each pure compound used as a high explosive or booster (30 compounds). Part IV gives complete procedures for analysis by optical crystallography and fusion analysis. Part V contains tables for use of the analyst in making rapid identification of an unknown explosive. OSRD 3014. NDRC Div 8. Contract OEMsr-193.

Periodic test of cartridge cloth and cotton sewing thread manufactured during World War II and stored at Picatinny Arsenal, by Harry A. Aaronson. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Apr 1955. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 118265

1. Cartridge cloth, Cotton - Storage - Tests
2. Thread, Cotton - Storage - Tests 3. PA TR 2162.

Solid propellant development facility, by James H. Wiegand. U. S. Naval Ordnance Test Station, Inyokern, Calif. Jan 1951. 32p photos, diagr, graphs, table. Order from LC. Mi $3, ph $6.30. PB 118263

This report was prepared to give, in a nontechnical manner, a generalized description of the solid propellant problem, including the coordinated use of several different types of equipment, to supplement the information that can be obtained from the usual technical reports on specific developments. NOTS 342. NAVORD 1272.

Utilization of special steel addition agents to gun tubes and breech rings, by P. A. G. Carbonaro and P. J. Ahearn. U. S. Arsenal, Watertown, Mass. Rodman Laboratory. Jul 1954. 35p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118461

A total of 39 centrifugally cast 90MM gun tubes and

10 statically sand cast 90MM breech rings were cast utilizing a variety of compositions at a number of hardenability levels with boron and/or rare-earth additions. The gun tubes and breech rings were processed with normal production equipment. While the usual production methods were generally employed, a wide variety of heat treatments were utilized in an attempt to meet the requirements of specifications. WAL RPL 2.

Watertown Arsenal manufacturing techniques for gun tubes, breech rings and ferrous sand castings for the period 1950-1954 inclusive, by P. J. Ahearn and J. L. Belser. U. S. Arsenal, Watertown, Mass. Rodman Laboratory. Apr 1954. 102p photos, drawings, diagrs, tables. Order from LC. Mi $5.70, ph $16.80. PB 118459

This technique includes the melting practice, refractories employed, centrifugal casting machine procedure, inspection, and heat treatment methods. The practices developed at Watertown Arsenal for the manufacture of ferrous sand castings including breech rings are described in considerable detail. The procedures for melting, ladle practice, molding sand, cores, pouring, gating and risering, heat treatment, and subsequent processing are covered. The manufacturing methods for breech rings are described in detail. The practices utilized for the manufacture of miscellaneous ferrous sand castings to meet the various classes of Specification #QQ-S-681b are also outlined. Appendix A. Specifications and drawings for centrifugally cast gun tubes. - Appendix B. Specifications and drawings for ferrous sand castings. WAL RPL 1.

PACKING AND PACKAGING

Improved methods of export packaging quart oil cans, by B. S. Gaines, S. Hechtlinger, and S. Stambler. U. S. Naval Supply Research and Development Facility, Bayonne, N. J. Mar 1955. 56p photos, diagr, tables. Order from CTS. $1.50. PB 111709

Purpose of this project was to investigate the improvement of the present export packaging methods for units of 24 round quart cans of automotive type motor oil utilized by the Armed Services. Results indicated present specifications (MIL-C-124B) utilizing a V2S fiberboard container with sleeve, did not provide sufficient protection to the contents; but that two alternative types of packaging, a wirebound wrap-around crate (also called a Q-crate) over a V3C fiberboard container, and secondly, a wirebound box used alone without a fiberboard container, did provide approximately twice the present protection at approximately the same packaging cost. The wrap-around crate pack also permits the use of automatic packaging equipment for the V3C fiberboard container. Project NT003-016(f), Sub-project SE 52-53. Engineering report no. 2,5070 (Third report).

PERSONNEL APTITUDE TESTING

Analysis of officer billets in combat information centers: Methods. Technical report no. 14 under Contract Nonr-228(02), NR 153-093, Project designation NR 15-093, by Glenn L. Bryan, Joseph W. Rigney, Donald W. Svenson and William Axelrod. University of Southern California. Dept. of Psychology, Los Angeles, Calif. Oct 1954. 71p. Order from LC. Mi $4.50, ph $12.30. PB 118425

Electronics Personnel Research.
1. Personnel, Electronics - Ability tests 2. Tests, Officer qualification 3. Personnel, Electronics - Combat information centers - Ability tests 4. Job analysis.

Grades in CNI language course and the prediction of these grades from Miller analogy scores. Technical report under Contract NR 151-152. Tulane University, New Orleans, La. Jun 1954. 5p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 118111

1. Ability tests - Evaluation 2. ONI (Language course) 3. Miller analogy scores 4. Contract NR 151-152, Technical report.

Prediction of academic grades with a projective test of achievement motivation. I: Initial validation studies, by Henry M. Riccinti. Educational Testing Service, Inc., Princeton, N. J. Jun 1954. 35p tables. Order from LC. Mi $3, ph $6.30. PB 118251

Results based upon groups of high school juniors, college freshmen, and Naval officer candidates, revealed promising relationships only at high school level between the test and academic grades, corrected for ability differences. The validities of all scoring categories were analyzed separately for each picture included in the study. The results also suggested that absence of reasonably suggestive achievement-related content in the stimulus pictures tended to be associated with poor validity. Technical report no. 1. Contract Nonr-694(00), Project NR 151-113.

Study of speed factors in tests and academic grades, by Frederic M. Lord. Educational Testing Service, Inc., Princeton, N. J. Sep 1954. 38p tables. Order from LC. Mi $3, ph $6.30. PB 118250

Speeded and unspeeded tests of vocabulary, spatial relations, and arithmetic reasoning were factorially analyzed, together with certain reference tests and academic grades. Contract Nonr-564(00), Project NR 150-089.

PHYSICS

General

Acoustic radiation from two-dimensional rectangular cutouts in aerodynamic surfaces, by K. Krishnamurty. U. S. National Advisory Committee for Aeronautics. Aug 1955. 33p photos, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118234

The acoustic radiation from two-dimensional rectangular cavities cut into a flat surface was investigated by schlieren, hot-wire, and optical interferometric techniques. The relation of the frequency, as measured in the gap by a hot-wire, to the gap breadth at a particular Mach number and free-stream temperature is shown. The intensity of the radiation was measured by means of an optical interferometer. NACA TN 3487.

Approach to the theory of shock waves in air-sand mixtures, by L. H. Thomas. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1955. 10p graphs. Order from LC. Mi $1.80, ph $1.80. PB 118502

An approximate theoretical derivation of the thermodynamic and Rankine-Hugoniot equations for a shock wave passing through a mixture of air and sand is derived. The equations are extended to study the approximate structure of a steady shock in a mixture of air and sand. Dept. of the Army project no. 503-04-002. ORD project no. TB 3-0112. APG BRL M 871.

Contributions on the mechanics of boundary-layer transition, by G. B. Schubauer and P. S. Klebanoff. U. S. National Advisory Committee for Aeronautics. Sep 1955. 31p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118372

The manner in which flow in a boundary layer becomes turbulent was investigated on a flat plate at wind speeds generally below 100 feet per second. Hot-wire techniques were used, and many of the results are derived from oscillograms of velocity fluctuations in the transition region. The more familiar aspects of transition are discussed, and the facts discovered while studying the characteristics of artificially produced turbulent spots are presented. NACA TN 3489.

Effects of noise on human behavior, by John F. Corso. Pennsylvania State College, State College, Pa. Dec 1952. 65p photos, graphs, tables. Order from OTS. $2. PB 111402

Formerly PB 113701 (See Bibliography of Technical Reports, v. 21, p. 185).
1. Noise, Psychological effects 2. Sound, High intensity - Psychological effects 3. Contract AF 33(038)-786 4. AAF WADC TR 53-81.

Existence of conservation laws, by Howard Osborn. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Oct 1954. 73p. Order from LC. Mi $4.50, ph $12.30. PB 118209

1. Conservation law (Mathematics) 2. Equations, Differential 3. Mathematics - Statistical theory 4. Contract Nonr-225(11), NR 041-086 5. SU AMSL TR 27.

Experimental investigation of flow over simple blunt bodies at a nominal Mach number of 5.8, by Robert F. Oliver. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Jun 1955. 37p photos, drawings, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 118119

The scope of this investigation was to determine surface static pressure distributions and to obtain Schlieren photographs showing the shock configurations. The seven bodies investigated were as follows: (1) 40° half angle cone; (2) 40° half angle cone with spherical nose; (3) hemisphere-cylinder; (4) cylinder transverse to the free stream flow; (5) flat nosed cylinder with its major axis parallel to the free stream flow direction; (6) 10°-40° half angle double cone; and (7) 13°-30° half angle double cone. All tests were conducted in one-phase flow with a tunnel stagnation temperature of 225°F and with models at zero angles of attack and yaw. CIT GAL M 26.

Experimental investigation of pressure gradients due to temperature gradients in small diameter tubes, by Weston M. Howard. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Jun 1955. 21p photos, diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 118120

Results of an experimental investigation of pressure gradients due to axial temperature gradients in small diameter tubes are presented. The tests, which covered the region of Knudsen numbers (based on tube inside radius) of 0.01 to 6, indicate good correlation with theory. In order to apply pressure corrections easily and rapidly, a system of correction curves is given. CIT GAL M 27. Contract no. DA 04-495-Ord-19.

Graphical solution of the single degree of freedom vibration problem with arbitrary damping and restoring forces, by W. H. Pell. Brown University. Division of Applied Mathematics, Providence, R. I. Jul 1955. 16p graphs. Order from LC. Mi $2.40, ph $3.30. PB 118506

This paper is concerned with the graphical construction in the phase plane of integral curves of the nonlinear ordinary differential equations which arise most frequently in mechanical and electrical systems. A method is given for constructing such integral curves for a one-degree of freedom system with damping which (for a mechanical system) is an arbitrary function of velocity and with a restoring force which is an arbitrary function of displacement. Dept. of the Army project 503-06-005. Ordnance project TB 3-0122. GDAM DA-798/23. GDAM TR 23. Contract DA020-ORD-798.

Harmonic, superharmonic, and subharmonic response for single degree of freedom systems of the Duffing type, by John C. Burgess. Stanford University. Division of Engineering Mechanics, Stanford, Calif. Sep 1954. 97p graphs, table. Order from LC. Mi $5.40, ph $15.30. PB 118346

The algebraic equations resulting from application of the Ritz averaging method are solved exactly. The range of applicability of the bi-frequency type of approximation, as well as the range of validity of some possible abridgements, is discussed. The principle contribution of this investigation consists in the derivation and analysis of equations with damping considered for the superharmonic of order 3 and for the subharmonic of order 1/3. A new phenomenon, super-harmonic jump, is described. A second contribution consists in a comparison for free undamped motion of the exact solution with approximate solutions obtained by the Ritz and the perturbation methods. A third contribution consists in a comparison for forced undamped motion between approximate solutions obtained by the Ritz and the perturbation methods. SU ME TR 27. Contract N6onr-251, Task Order 2 (NR 041-943).

Heat loss from yawed hot wires at subsonic Mach numbers, by Virgil A. Sandborn and James C. Laurence. U. S. National Advisory Committee for Aeronautics. Sep 1955. 44p photo, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118239

Heat-loss data at angles of yaw and fixed subsonic Mach numbers for several wires of different diameters commonly used in hot-wire anemometry are presented. Possible methods of correlating the data are examined. The relation of the Reynolds number normal to the flow, which has been used by most researchers, was inadequate except near a Mach number of zero. An empirical relation based on weighted addition of the heat losses of wires normal and parallel to the flow correlated all data reasonably well. NACA TN 3563.

Hypersonic viscous flow on a noninsulated flat plate, by Ting-Yi Li and H. T. Nagamatsu. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Apr 1955. 37p photo, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118122

An analytical treatment of the "strong" interaction problem in hypersonic viscous flow on a noninsulated flat plate is presented, using the method of "similar" solutions of the compressible boundary layer equations. Recent experimental data which confirm some of the theoretical results are also discussed. CIT GAL M 25. Contract DA-04-495-Ord-19.

Influence of edges on shearing stresses in viscous laminar flow, by Joseph Kestin and Leif N. Persen. Brown University. Division of Engineering, Providence, R. I. Jun 1955. 60p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 118256

This report examines the influence exerted by the existence of thin edges on slow laminar flow patterns in connection with the work undertaken on the theory of the oscillating disk viscometer. Formulae are deduced for the integrated force on a strip or for the moment on a disk and their ratios to the corresponding values for sections of infinite extent are calculated. This ratio is found to vary from close to unity to about 1.6 depending on the geometrical arrangement. Brown University report no. AF 891/3. OSR TN 55-195. Technical report 3. Contract AF 18(600)-891.

Intensity, scale, and spectra of turbulence in mixing region of free subsonic jet, by James C. Laurence. U. S. National Advisory Committee for Aeronautics. Sep 1955. 58p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118527

Hot-wire anemometer measurements of the turbulence parameters were made in a 3.5-inch-diameter free jet at exit Mach numbers between 0.2 and 0.7 and Reynolds numbers (based on jet rad.) between 37,500 and 350,000. NACA TN 3561.

Investigations of thermal and electrical properties of solids at very low temperature. Final report under Contract N6ori-47, Task order 3, Project no. NR 016-403 for the period Apr 15, 1946 to Sep 30, 1954, by S. A. Friedburg. Carnegie Institute of Technology. Dept. of Physics, Pittsburgh, Pa. Sep 1954. 73p drawings, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118327

Heat capacities of several metals and non-metals have been determined as functions of temperature in the liquid helium range as well as between liquid hydrogen temperatures and about 200°K. Temperature dependence of the resistivity of germanium from 0.2°K to room temperature and of the Hall constant from 1.3°K to room temperature is studied. A method of measuring the diffusivity of a metal is described, thermal conductivity of

some alloys is studied, and the electrical resistance of α -brass between 1.6° and 300°K is determined. Contract N6ori-47, T. O. 3, Project NR 016-403.

Line broadening and dielectric relaxation in compressed gases, by C. S. E. Phillips. Massachusetts Institute of Technology. Laboratory for Insulation Research. Oct 1954. 25p drawing, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 118254

A first attempt is made to investigate the transition from resonance to relaxation spectrum by high-pressure research in the microwave region. Equipment has been developed for studying the dielectric constant and loss of gases and liquids in the K-band region up to 1000 atmospheres at temperatures up to 300°C. Measurements on a nearly spherical molecule of strong dipole moment ($CHClF_2$), on a linear molecule of weak dipole moment (N_2O), and on mixtures of $CHClF_2$ with nitrogen are reported and a preliminary discussion of the results is given. MIT LIR TR 88. Contract N5ori-07801.

Modifications of the shock tube for the generation of hypersonic flow, by A. Hertzberg, W. E. Smith, H. S. Glick and W. Squire. Cornell Aeronautical Lab., Inc., Buffalo, N. Y. Mar 1955. 109p photos, fold drawing, diagrs, graphs. Order from LC. Mi $5.70, ph $16.80. PB 118115

This report describes shock tube configurations which utilize either the region of steady flow between the shock wave and the interface, or the region of steady flow behind the interface. Three basic modifications are discussed, the "nonreflected" method, the "reflected" method, and the "nonsteady-expansion" method. The feasibility of the "nonreflected" modification has been established experimentally, and the results of tunnel tests up to Mach 13 are discussed. AAF AEDC TN 55-15. Contract AF 40(600)-6.

Practical considerations in specific applications of gas-flow interferometry, by Walton L. Howes and Donald R. Buchele. U. S. National Advisory Committee for Aeronautics. Jul 1955. 97p photos, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118360

By extending the analysis in NACA TN 3340 (PB 116718), equations which simultaneously account for refraction and corner effects are derived for evaluating one-dimensional density fields from optical interferograms. The random error in measuring fringe shifts is determined. Spurious surface phenomena are discussed and a simple method for model alinement is described. A method for determining the density at a surface is described. Systematic and random errors are computed for three representative experimental situations, namely, boundary layers associated with supersonic and subsonic flows along flat plates and free convection of heat from a horizontal cylinder. Reasons for discrepancies between theory and experiment are offered. NACA TN 3507.

Prandtl number determination by means of recovery factor measurement, by R. A. Seban, S. Scesa, and A. Levy. California. University. Institute of Engineering Research, Los Angeles, Calif. Sep 1954. 38p drawings, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118341

An apparatus is described and results obtained in research from Oct 1, 1951 to Oct 1, 1954 are given for the recovery factors for the laminar boundary layer flow of air, nitrogen, helium, and helium-nitrogen mixtures in the temperature range of 100 to 600°F. Use of recovery factor measurements for determination of the Prandtl number is discussed. Results indicate that the available Prandtl numbers for helium may be high, and that the true value may be closer to that predicted by kinetic theory. Project Squid. Contract N6ori, Task Order III, NR 098-038. UC IER TR UCB1-R.

Quarterly progress report, by R. H. Blot and R. D. Fay. Massachusetts Institute of Technology. Acoustics Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

Jul-Sep 1954. Sep 1954. 39p diagrs, graphs. Mi $3, ph $6.30. PB 118260

1. Acoustic research 2. Sound - Absorption - Gases 3. Computers, Electronic - Storage systems 4. Barium titanate - Polarization 5. Sound - Pitch - Perception.

Jan-Mar 1955. Mar 1955. 30p drawing, diagr. Mi $2.70, ph $4.80. PB 118198

1. Acoustic research 2. Spectrometers, Pulse - Ultrasonic - Design 3. Vibration - Measurements 4. Sound - Propagation 5. Computers, Electronic - Components 6. AAF CRC TN 55-359.

Apr-Jun 1955. Jun 1955. 42p photos, diagrs, graphs. Mi $3.30, ph $7.80. PB 118413

1. Acoustic research 2. Sound - Absorption - Gases 3. Sound - Scattering - Measurement. 4. AAF CRC TN 55-575.

Rate theory and irreversible thermodynamics, the non-linear approximation, by Rudolph J. Marcus, Ransom B. Parlin and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jul 1954. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 118067

It is shown that a model for biological membranes which considers the coupling between concentration and potential gradients across a diffusion barrier reduces to a linear expression obeying the Onsager conditions. Further problems in irreversible thermodynamics are pointed out. UU ISRP TR 14. Contract N7onr-45103, Project no. NR 051-192.

Real gas effects in a hypersonic shock tunnel, by W. Squire, A. Hertzberg, and W. E. Smith. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1955. 79p photos, graphs. Order from LC. Mi $4.50, ph $12.30. PB 118116

This report presents the results of computations of the speed of sound and the change of state across normal shock waves using previously compiled tables of thermodynamic properties of air which were based on a dissociation energy of nitrogen of 7.37 ev. These results were used to determine the effect of the real gas properties on the oblique shock characteristics, the design of nozzles for hypersonic flow, and the calculation of tunnel performance characteristics such as Reynolds number and testing time. Appendix I - Velocity of sound at various temperatures and pressures. - Appendix II. Normal shock and stagnation temperature calculations. AAF AEDC TN 55-14. Contract AF 40(600)-6.

Simultaneous nonlinear equations of growth, by W. J. Cunningham. Yale University. Dunham Laboratory, New Haven, Conn. Sep 1954. 41p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118343

Report no. 7 under Contract Nonr-433(00). 1. Equations, Differential - Non-linear 2. Mathematical equations and solutions 3. Contract Nonr-433(00), Report no. 7.

Some measurements of flow in a rectangular cutout, by Anatol Roshko. U. S. National Advisory Committee for Aeronautics. Aug 1955. 21p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118235

The flow in a rectangular cavity, or slot, in the floor of a wind tunnel is described by the results of pressure and velocity measurements. Pressure distributions on the cavity walls as well as measurements of friction are presented. The effects of varying depth-breadth ratio are shown. NACA TN 3488.

Some theoretical aspects of the lot plot sampling plan, by Lincoln E. Moses. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Oct 1954. 39p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118208

Discusses industrial sampling plans, particularly the "Lot Plot Sampling Plan", a modified variables plan proposed as a method for assuring smaller fraction defective in accepted lots. This paper considers the theoretical aspects of this procedure. SU AMSL TR 18. Contract N6onr-25126, NR 042-002.

Stirling numbers identities obtained from circulant permanent expansions, by Charles L. Carroll, Jr. and Jack Levine. North Carolina State College. Dept. of Engineering Research, Raleigh, N. C. Oct 1954. 18p. Order from LC. Mi $2.40, ph $3.30. PB 118339

Report covers period Sep 15, 1954 to Oct 15, 1954. 1. Mathematical equations and solutions 2. Mathematics - Statistical theory 3. Contract no. Nonr 870(00).

Study of hypersonic small-disturbance theory, by Milton D. Van Dyke. U. S. National Advisory Committee for Aeronautics. 1954. 23p graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 118350

The small-disturbance equations are derived for inviscid flow past thin bodies at high supersonic speeds. Reinterpreted, they apply throughout the supersonic range. The theory is used to find pressures on cones and wedges, initial gradients on ogives, and initial pressure curvatures on ogives of revolution. Additional approximations from existing theories are discussed. Revision of PB 114230. NACA 1194. NACA TN 3173 Revised.

Supersonic flow past oscillating airfoils including nonlinear thickness effects, by Milton D. Van Dyke. U. S. National Advisory Committee for Aeronautics. 1954. 19p photos, drawings, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118351

A solution to second order in thickness is derived for harmonically oscillating two-dimensional airfoils in supersonic flow. For slow oscillations of an arbitrary profile, the result is found as a series including the third power of frequency. For arbitrary frequencies, the method of solution for any specific profile is indicated, and the explicit solution derived for a single wedge. Nonlinear thickness effects are found generally to reduce the torsional damping, and so enlarge the range of Mach numbers within which torsional instability is possible. NACA 1183. NACA TN 2982 Revised.

Surface activity methods for the determination of diffusion coefficients in solids, by R. H. Condit and C. E. Brichenall. Princeton University. James Forrestal Research Center, Princeton, N. J. Apr 1955. 23p graphs. Order from LC. Mi $2.70, ph $4.80. PB 118345

The surface activity method of determining diffusion coefficients in solids is examined with emphasis on the proper treatment of the radiation absorption problem under a variety of geometrical conditions which may be employed in diffusion measurements. The theoretical equations have been tested for several geometries with the Mn K_{oc} radiation from Fe^{55} sources. Metallurgy report no. 2. Report control no. OSR TN 55-159. Contract AF 18(600)-967.

Theory and design of an end-fire directive sound source, by Miguel C. Junger. Harvard University. Acoustics Research Laboratory. Sep 1954. 105p photos, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 118347

A radially pulsating cylindrical sound source gives rise to broadside radiation if all its elements move in phase. However, when a progressive phase shift between elements along the cylinder is introduced (by means of wave propagating along the cylinder, or of standing waves), the radiation can be "steered." Experimental results verifying the mathematical analysis are presented. HU ARL TM 34. Contract N5ori-76, Project X (NR 014-903).

Transmission of blast through a dust filled gas: Linearized treatment II, by G. F. Carrier. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 118503

The transmission of a sharp fronted wave through a gas containing dust particles is analysed for the case where the dust particles are distributed in size. It is found that the asymptotic (large time) behavior of the wave is identical in form with that of the single particle size problem. Dept. of the Army project no. 503-04-002. ORD project no. TB 3-0112. Part I is Memorandum report 873. APG BRL M 872.

Viscous effects on static pressure distribution for a slender cone at a nominal Mach number of 5.8, by Lawrence C. Baldwin. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Jun 1955. 31p photos, drawings, diagr, graphs. Order from LC. Mi $3, ph $6.30. PB 118121

This investigation was concerned with the effect of hypersonic boundary layer-shock wave interaction on the pressure at the cone surface. Pressure distributions were measured for three values of Reynolds numbers per inch and a comparison was made with theoretically calculated pressure distributions. This influence of viscosity in hypersonic flow was demonstrated by an induced pressure rise of approximately 45% above theoretical inviscid pressure for the lowest Reynolds number tested. CIT GAL M 28. Contract DA-04-495-Ord-19.

Nuclear

Elastic scattering of 20.6-Mev protons by deuterons, by David O. Caldwell and J. Reginald Richardson. California. University. Dept. of Physics, Los Angeles, Calif. Jul 1954. 71p drawing, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118253

This study of the scattering of nucleons by deuterons was intended to yield information on (1) the character of the force between neutrons, as compared with that between protons; (2) the exchange properties of nuclear forces; and (3) the existence and nature of three-body forces. Technical report no. 22. Contract N6onr-275, Task order IV, Project NR 022-053.

High energy phenomena in nuclear emulsions, by John E. Naugle. Minnesota. University. Dept. of Physics. 1953. 97p photos, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 118336

Four high energy interactions initiated by particles with charge greater than 2 have been investigated. The neutral to charged meson ratio has been measured in one of the interactions. The energies of three secondary particles from one of the interactions have been measured by analysis of the angular distributions of the showers which they initiate. The energies of the electrons in the soft component of this same interaction have been measured. The mean free path for trident production in the emulsion has been measured for electrons with energy between 2 and 25 bev. Thesis - University of Minnesota. Cosmic ray project. Contract N6onr-246.

Neutron convertor: Thermal neutron flux calibration, by H. M. Childers, J. D. Graves, and A. E. Nash. U. S. Naval Research Laboratory. Aug 1955. 12p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 118453

A device for the production of fast and thermal neutron fields has been constructed and the thermal neutron fields calibrated. The over-all estimated accuracy of calibration based on the National Bureau of Standards thermal neutron standard flux is about 4 percent. NRL R 4575.

Nuclear absorption of μ mesons in medium and heavy elements, by Albert J. Meyer. Princeton University. Palmer Physical Laboratory and U. S. Naval Ordnance Laboratory. Oct 1954. 127p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 118207

An apparatus for the measurement of the absorption probabilities of cosmic-ray μ mesons in materials available in 10 or 20 kg amounts has been developed.

The mean life of delayed non-ionizing radiation from a target in which mesons disappear is measured. Preliminary runs with the new apparatus revealed the presence of hitherto unrecognized backgrounds of delayed counts associated with the soft component and clearly showed that systematic tests of the purity of the sample of counts attributed to meson absorption events were necessary. Thesis - Princeton University. Appendix A. Positron annihilation in air. PU PPL TR 16.

Nuclear spin exchange in solids: Tl 203 and Tl 205 magnetic resonance in thallium and thallic oxide, by N. Bloembergen and T. J. Rowland. Harvard University. Cruft Laboratory. Oct 1954. 53p photos, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 118204

The line width of the Tl^{203} and Tl^{205} nuclear magnetic resonance in thallium and thallium oxide greatly exceeds the dipolar width, and is a function of the abundance of the other isotope. Ramsey's theory of nuclear spin exchange via excited electron states in molecules is extended to solids. Most heavy isotopes in metals and insulators should exhibit exchange effects. From the anisotropy of the exchange information about the relative amount of p- or d-character of the electron wave function in the solid can be obtained. Contract N5-ori-76, T. O. I, Project NR 372-012. HU CL TR 205.

Resonansnaia perezariadka ionov pri medlennykh stolkoveniiakh (Charge exchange resonance of ions during slow collisions), by O. B. Firsov. Translated by David Kraus. May 1955. 17p. Order from LC. Mi $2.40, ph $3.30. PB 118221

A formula is derived for the cross section of the resonance charge exchange of ions (in adiabatic approximation). This makes it possible to determine the energy of the electron bond in negatively charged ions of alkali metals by an experimental curve of the dependence between the cross sections for resonance charge exchange and the ion velocity. A comparison is made of the experimental and theoretical cross sections of the charge exchange between positively charged He^+ and Hg^+ ions. This theory is applicable only in cases where the atom and its ion are in an S-state. Translated for Geophysics Research Center, AF Cambridge Research Center, by American Meteorological Society, from Zhurnal eksperimental'noi i teoreticheskoi fiziki, vol. 21, no. 9, p. 1001-1008, 1951. Contract AF 19(604)-1364.

Second maxima in the transition curve of cosmic ray showers, by J. B. Harding and P. R. Robinson. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1954. 25p diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 68 cents. PB 118043

1. Cosmic radiation - Showers - Testing equipment - Gt. Brit. 2. Atomic power - Research - Gt. Brit. 3. AERE N/R 1550.

PHYSIOLOGY

Relationship between skinfold thickness and body cooling at 59°F, by Paul T. Baker, Farrington Daniels, Jr., Robert F. Byrom, and Ella H. Munro. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 25p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118296

This report describes some basic differences in the responses of soldiers to cold exposure which are related to the physical characteristics of the men. The fact that significant correlations have been found between skin temperature and the thickness at the fat layer under the skin encourages the search for physical characteristics which may be used as a guide to the differential protective requirements of men and as a method to pick those soldiers who will make the best men for cold-weather operations. Project reference 7-64-12-001. QMC EP TR 14.

Total body water in man: Adaptation of measurement of total body water to field studies, by Smith Freeman, Jules H. Last, David T. Petty, Inga L. Faller. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 30p tables. Order from LC. Mi $2.70, ph $4.80. PB 118195

A critical comparison was made between the heavy water (D_2O) and antipyrine (ANP) methods for measuring body water. In addition, comparisons were made between values obtained from intravenous and oral routes of administration for each method for the purpose of developing a field method of determining total body water (TBW). From these findings a simple field method for determining TBW is outlined in which subjects drink a known amount of D_2O, and urine collected after 3 hours is analyzed. The data suggest that the lean body mass may not contain a constant fraction of water as has been suggested by other workers. Contract no. DA-44-109-QM-729 with Northwestern University, Medical School. Project reference 7-64-12-002. QMC EP TR 11.

Weights of organs in sixty-six male Macaca mulatta monkeys, by B. D. Fremming, R. E. Benson, and R. J. Young. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 118517

The organ weights of 66 male Macaca mulatta monkeys are presented in five body weight groups. The data presented give an approximation of normal variation in organ weights of M. mulatta monkeys in

the five body weight groups and a correlation of body weight and organ weight as to the stage of spermatogenic development. AAF SAM R 55-42.

PSYCHOLOGY

Descriptive review of research on the staff process of decision-making, by Philip Lichtenberg and Morton Deutsch. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 54p. Order from LC. Mi $3.60, ph $9.30. PB 118509

This Research Bulletin summarizes literature (principally in the area of experimental social psychology) which describes research having direct or indirect implications for the study of staff functioning in the Air Force. The studies are discussed under five headings: group versus individual effort, size of group, leadership, coordination, and motivation. In addition, gaps in the present literature are noted. Project no. 505-036-0004. AAF PTRC TR 54-129. Contract AF 18(600)-404.

Effect on intelligibility scores of specific instructions regarding talking, by Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. Nov 1954. 7p tables. Order from LC. Mi $1.80, ph $1.80. PB 118713

Groups of experimental subjects read and heard two forms of the multiple-choice intelligibility tests. During the second test one-third of the subjects followed a special instruction to talk loudly; another third, to articulate precisely; and the remainder, to talk fast. All instructions were effective in improving speaker intelligibility. Joint project report no. 35, under Contract N6ONR 22525, Project NR 145-993. NMRI Proj NM 001 064.01.35.

Effect of low-pass filtering of side-tone upon speaker intelligibility, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. 1955. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 118455

The purpose of the experiment was to evaluate speaker intelligibility as a function of frequency attenuation above 600 cps in the side-tone signal, and to evaluate whether the improvement in speaker intelligibility which was found to accompany low-pass filtering of side-tone in previous experimentation was a function of the decreased level of side-tone produced by filtering or was primarily a function of the frequency effects of filtering. The results indicate that speaker intelligibility improves as frequencies above 600 cps in the side-tone signal are attenuated, and that this change appears to be primarily a function of the attenuation of the higher frequencies of the side-tone signal. NMRI Proj NM 001 104 500.49.

Intelligibility as related to the path of airborne side-tone, by John W. Black and Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. Nov 1954. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 118712

Panels of 12 speakers read under pairs of experimental conditions that provided criterion intelligibility scores associated with different paths of the speaker's airborne side-tone. Differences between pairs of scores suggest that the speaker's guide in setting his level of normal speech in quiet is carried by the airborne channel. Joint project report no. 34 under Contract N6ONR 22525, Project no. NR 145-993. NMRI Proj NM 001 064.01.34.

Message reception as a function of the time of occurrence of extraneous messages, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Pensacola, Fla. and Chio State University Research Foundation, Columbus, Ohio. Nov 1954. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118711

The effect of extraneous messages upon the reception of voice messages was studied relative to the time of occurrence of the two messages and the content of the extraneous message. The results indicated that the presence of a message either immediately preceding or following a primary message significantly interfered with reception. Extraneous messages following primary messages were more damaging to reception than were preceding extraneous messages. The amount of interference varied depending upon the type of extraneous message. Joint project report no. 33 under Contract N6ONR 22525, Project no. NR 145-993. NMRI Proj NM 001 064.01.33.

Perception of attitude relationships, a multidimensional scaling approach to the structuring of social attitudes, by Samuel J. Messick. Princeton University. Dept. of Psychology and Educational Testing Service, Princeton, N. J. Sep 1954. 243p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $37.80. PB 118402

The primary purpose of this study was to see whether a set of perceived attitude relationships could be adequately represented by a dimensional model. The particular attitude area selected for this purpose was composed of attitudes toward war, capital punishment, and the treatment of criminals. A multidimensional method of successive intervals based upon the Euclidean model of multidimensional psychophysics was developed. A secondary purpose of the experiment was to investigate judgments

made by two diverse groups in order to discover whether they perceive attitudes as being structured in different ways. Thesis - Princeton University. Contract N6onr 270-20, Project NR 150-088.

Prediction of speech intelligibility in noise, by J. M. Pickett and Karl D. Kryter. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory. Bolling Air Force Base, Washington, D. C. Jun 1955. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118447

The purpose of the present study was to measure the intelligibility of speech in a variety of noise conditions, to compare these data with expected scores computed by each of the prediction methods described above, and to develop, if required, a new method for predicting the results of the intelligibility tests from acoustical measurement. Several methods have been proposed for calculating what the effects of noise will be on speech intelligibility: (1) The Bell Telephone Laboratories (BTL) method. (2) Octave-band methods. (a) In addition to contributing techniques for use with the BTL method Beranek developed a procedure for predicting speech communication that requires only knowledge of the levels of noise in three octave bands. The arithmetic average of the noise levels of these three octave bands, called SIL (Speech Interference Level), determines the greatest distance between speaker and listener and lowest volume of voice necessary for "good" communication. (b) The Strasberg method. AAF CRC TN 55-4.

Rate of force application in a simple reaction time test, by Edmund T. Klemmer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. Jun 1955. 10p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 118431

An electrical strain gage was fitted to a pressure key and continuous force records were taken during a simple reaction time experiment. Various levels of holding force previous to stimulus onset were required of the subject with two widely different amounts of additional force for the response. It was found that pre-stimulus holding force had little effect upon reaction time defined by a given additional force. However, the slope of the force vs time curves is such that reaction time differences of 0.04 sec may be obtained by changing the added force required of the response from 1 to 20 ounces. AAF CRC TR 55-1.

Reception of repeated speech signals, by John W. Black and Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. Apr 1955. 16p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 118445

Recorded monosyllables, comprised of consonant-vowel-consonant (CVC), in a variety of permutations, listened to simultaneously through a direct playback and a delay channel, were found to be successively relatively intelligibile and unintelligible depending on different values of delay times. These word groups when repeated were no more intelligible then single renditions of the separate words. Contract N6onr 22545, Project NR 145-993. NMRI Proj NM 001 104 500.48.

Relative intelligibility of speech recorded simultaneously at the ear and the mouth, by Henry M. Moser, John J. Dreher, and Herbert J. Oyer. Ohio State University Research Foundation, Columbus, Ohio. Contract AF 18(600)-316. Order separate parts described below from LC, giving PB number of each part ordered.

Preliminary report. Feb 1955. 8p tables. Mi $1.80, ph $1.80. PB 118420

1. Speech - Intelligibility 2. Speech - Analysis 3. Speech - Discrimination 4. Speech - Tests 5. AAF CRC TN 55-50 6. OSURF Project 519, Report no. 20 7. OSURF TR no. 20 .

Supplementary report no. 1. Mar 1955. 8p graphs, tables. Mi $1.80, ph $1.80. PB 118419

1. Speech - Intelligibility 2. Speech - Analysis - Equipment 3. Speech - Discrimination 4. Speech - Tests 5. AAF CRC TN 55-53 6. OSURF Project 519, Technical report no. 22 7. OSURF TR no. 22.

Speech communication in noise, by Karl D. Kryter. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D. C. May 1955. 46p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118446

Discusses acoustical characteristics of speech, measurements of speech intelligibility as related to test materials and language factor, effects of some acoustical factors upon speech intelligibility, and practical limitations on speech communication in noise. Bibliography included. AAF CRC TR 54-52.

RUBBER AND RUBBER PRODUCTS

Branching reaction and chain transfer in styrene polymerization, by Maurice Morton. Akron. University. Rubber Research Laboratory, Akron, Ohio. Feb 1954. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118440

The chain transfer activity of the following four compounds in the polymerization of styrene was measured: t-butyl mercaptan, t-butyl alcohol,

isopropyl cyanide and isopropyl alcohol. This work was intended to measure the relative ease of formation of certain sulfur-, oxygen-, or carbon-headed free radicals and thus to establish the relative activity of these radicals in abstracting hydrogen from a given compound, as it may apply to the formation of branches on a polymer chain. Project no. 7340: Rubber, Plastic and Composite Materials, Task no. 70325: Branching in high polymers. AAF WADC TR 54-11. Contract AF 33(616)-337.

Friction study of aircraft tire material on concrete, by W. G. Hample. U. S. National Advisory Committee for Aeronautics. Sep 1955. 34p photos, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118368

A systematic study was made of the variation of frictional resistance between typical tire-tread material and three concrete surfaces of different roughness at various temperatures and normal pressures. The tire-tread specimens were taken from the thickest portion of worn ten-ply tires, and the three concrete test blocks were poured from the same mix but subjected to different surface finishes. Curves are presented of the apparent coefficient of friction as a function of normal pressure. NACA TN 3294.

STRUCTURAL ENGINEERING

Limit-analysis and design of tension-field beams, by H. G. Hopkins. Brown University. Division of Applied Mathematics, Providence, R. I. Oct 1954. 61p diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 118422

The purpose of this paper is to develop theoretical analysis that may be applied to the general problem of the behavior of tension-field beams. The analysis is based upon the application of the theory of limit analysis to a plastic-rigid model that approximates the actual behavior of such a beam. It is shown that Wagner's tension-field beam analysis is a special case of the present analysis. GDAM A11-114. GDAM TR 114. Contract Nonr 35801.

Rapid radiant-heating tests of multiweb beams, by Joseph N. Kotanchik, Aldie E. Johnson, Jr., and Robert D. Ross. U. S. National Advisory Committee for Aeronautics. Sep 1955. 30p photos, drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118373

Results are described of rapid-heating tests on four unloaded multiweb box beams. Temperature distributions and strains measured during a heating cycle are given. An analysis of the thermal stress required to cause buckling is in agreement with the experimentally observed results. A transient heating apparatus used in the tests and capable of producing heating rates up to 100 Btu/ft^2-sec is described. NACA TN 3474.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Analysis of acceleration, airspeed, and gust-velocity data from a four-engine transport airplane in operations on an eastern United States route, by Thomas L. Coleman and Mary W. Fetner. U. S. National Advisory Committee for Aeronautics. Sep 1955. 20p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118370

1. Loads, Aerodynamic - Measurement 2. Gust loads - Mathematical analysis 3. Airplanes, Transport - Loads 4. Airplanes, Transport - Acceleration 5. Airplanes, Transport - Speed 6. NACA TN 3483.

Analysis of cabin conditioning systems for jet-propelled military aircraft, by Robert J. Schroeder and Frieda Meuser. U. S. Air Material Command, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1946. 346p diagr, graphs, tables. Order from LC. Mi $11.10, ph $52.85. PB 118395

This report makes a four-fold study of the cabin conditioning problem. It presents (1) a method of analysis that may be used at the preliminary design stage of the airplane; (2) a discussion of the fundamental attributes of air cycle refrigeration and its application to aircraft installations; (3) a detailed analysis of three proposed systems; and (4) a study of the possibilities of air cycle refrigeration in aircraft capable of low altitude flight at speeds above 600 miles per hour. Detailed discussion and presentation of applicable equations are found in seven appendices, each dealing with a specific phase of the problem. Appendices: I. Prediction of airplane and engine performance data. - II. Establishing the ambient atmospheric conditions. - III. Evaluating cabin heating and cooling loads. - IV. Summary of physiological requirements and their application to the problem of system evaluation. - V. Fundamental relationships and possible component arrangements of air cycle cabin refrigeration systems. - VI. Method of air cycle cabin conditioning system performance calculation. - VII. Performance comparison of 7 lb/min and 10 lb/min sea level capacity S.I.T. systems to the 10lb/min bootstrap system in P-80 aircraft. AAF TR 5506.

Effect of interaction on landing-gear behavior and dynamic loads in a flexible airplane structure, by Francis E. Cook and Benjamin Milwitzky. U. S. National Advisory Committee for Aeronautics. Aug 1955. 75p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118233

1. Aerodynamics - Research 2. Landing gear - Impact loads 3. Loads, Aerodynamic - Theory 4. Loads, Landing - Impact - Theory 5. Loads, Structural - Dynamic - Theory 6. NACA TN 3467.

Minimum weight design of cylindrical shells subjected to axial loading and arbitrary internal or external pressure, by W. Freiberger. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. May 1955. 15p drawings. Order from LC. Mi $2.40, ph $3.30. PB 118282

The theory of collapse and minimum weight design of cylindrical shells by Onat and Prager is used in this paper to develop a method for designing the variable wall thickness of a cylindrical shell under axial loading and arbitrary pressures to give maximum economy of material. The design is such that the shell does not fail plastically in the sense used in limit analysis. Ordnance project TB 3-0122. Dept. of the Army project 503-06-005. GDAM DA-798/20. GDAM TR 20.

Traiettore ottime di volo digli aeroplani azionati da turboreattori (Optimum flight paths of turbojet aircraft), by Angelo Miele. Translated by J. Vanier. Sep 1955. 47p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118528

Translated from L'Aerotecnica, vol. 32, no. 4, 1952, p. 206-219.
1. Airplanes, Jet propelled - Flight characteristics - Italy 2. Flight path - Calculation - Italy 3. Flying, Stratospheric - Italy 4. Flying, Tropospheric - Italy 5. Mach number - Effect - Italy 6. NACA TM 1389.

Instruments

Calibration of strain-gage installations in aircraft structures for the measurement of flight loads, by T. H. Skopinski, William S. Aiken, Jr. and Wilber B. Huston. U. S. National Advisory Committee for Aeronautics. 1954. 31p graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents. PB 118352

Revision of PB 110767.
1. Loads, Aerodynamic 2. Gages, Strain - Calibration 3. Loads, Structural - Calculations 4. NACA TN 2993 Revised 5. NACA 1178.

Development of aircraft fire-fighting vehicles incorporating foam pumps, by R. L. Tuve, R. R. Neill, H. B. Peterson, and E. J. Jablonski. U. S. Naval Research Laboratory. Jul 1955. 43p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118450

An experimental vehicle with a carrying capacity of 1200 gallons of water was constructed using two 3000-gpm British foam pumps to generate an expansion 10 to 12 foam with a 25% drainage time of 40 minutes minimum. Details of the pumps, turrets, nozzles, piping, and other components are discussed together with the operational procedures in fighting aircraft fires. Results of tests showed the vehicle to have excellent fire-fighting ability and to be capable of extinguishing 20,000 square feet of burning gasoline area with its load of 1000 gallons of water. NRL R 4558.

Effectiveness of wing vortex generators in improving the maneuvering characteristics of a swept-wing airplane at transonic speeds, by Norman M. McFadden, George A. Rathert, Jr., and Richard S. Bray. U. S. National Advisory Committee for Aeronautics. Sep 1955. 43p photos, drawings, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118474

1. Mach number - Effect 2. Vortex generators - Tests 3. Airplanes - Drag - Measuring equipment 4. Wings, Swept - Aerodynamics 5. Wings, Swept - Boundary layer 6. Flow, Transonic - Effects 7. NACA TN 3523.

Performance characteristics of the Navarho long distance ground based navigation facility, by Irving Gordy and Peter Antonucci. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Jul 1955. 164p photos, diagrs (part fold), tables. Order from LC. Mi $7.80, ph $25.80. PB 118298

Navarho is intended to supply navigational aid information to an unlimited number of military and/or civil aircraft suitably equipped, engaged in long distance flights over areas devoid of identifying marks. This facility has 360 degree coverage at distances up to 2000 nautical miles with no regions of uncertainty and a single 180 degree ambiguity. Navarho uses a single transmitter site for supplying the required information. Flight tests have been performed, demonstrating the feasibility of the techniques being employed for both distance and azimuth. The systems which preceded the development of Navarho are also described in this report. Appendixes: - I. Experimental bearing transmitter (Navaglobe) at Adamston, N. J. - II. Ground monitor receiving equipment. - III. Experimental airborne Navaglobe (Bearing) receiving equipment. - IV. Simulated Navaglobe deriving unit. - VI. Description of experimental transmitting station and airborne distance measuring equipment . - VII.

Proposed Navarho transmitting station. - VIII. Analysis of sources of error. - IX. Procedures used in results of flight and ground monitoring receiver equipment (Bearing only). - X. Procedures used in airborne tests of the distance measuring equipment. - XI. Formulas and considerations involved in computing Rho-Theta positional fixes. - XII. Recommendations for airborne distance measuring equipment. AAF RADC TR 55-10.

Engines and Propellers

Criterions for prediction and control of ram-jet flow pulsations, by William H. Sterbentz and John C. Evvard. U. S. National Advisory Committee for Aeronautics. Aug 1955. 60p photos, diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118362

1. Diffusers, Supersonic - Theory 2. Diffusers, Supersonic - Flow patterns 3. Jet engines, Ram jet - Accessories 4. NACA TN 3506.

Evaluation of seams and gaskets used in shielding enclosures, and development of correctives for improvement. Final report, by W. E. Stinger. U. S. Aeronautical Electronic and Electrical Laboratory. Naval Air Development Center, Johnsville, Pa. Feb 1953. 46p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 118205

Research was directed toward the investigation and development of a method of suppressing the radio-interference leakage emanating from the seams of shielding enclosures which are used in engine ignition systems. A new RF gasket and a saw-tooth seam were developed. The gasket satisfactorily attenuates the leakage from seams, including anodized or other coated surfaces. A description is given of a test method developed for type-testing gaskets and seams which gives a satisfactory evaluation of the leakages present with regard to radio-interference specification requirements. Project TED no. ADC EL-536. NADC EL 52139.

Free-spinning-tunnel investigation of gyroscopic effects of jet-engine rotating parts (or of rotating propellers) on spin and spin recovery, by James S. Bowman, Jr. U. S. National Advisory Committee for Aeronautics. Aug 1955. 21p photo, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118363

1. Rotating bodies - Gyroscopic effects 2. Rotating bodies - Aerodynamics 3. NACA TN 3480.

Gust-tunnel investigation of the effect of a sharp-edge gust on the flapwise blade bending moments of a model helicopter rotor, by Domenic J. Maglieri and Thomas D. Reisert. U. S. National Advisory Committee for Aeronautics. Aug 1955. 24p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118236

1. Helicopters - Rotors - Models - Tests 2. Helicopters - Rotors - Wind tunnel tests 3. Helicopter blades - Bending moments 4. NACA TN 3470.

Index of drawings on microfilm: Wright aeronautical series engine. Revised. U. S. Air Force. Aug 1953. 505p. Order from LC. Mi $11.10, ph $77.15. PB 118585

1. Engines, Airplane - Design 2. AAF TO MF02A 3. AAF TO MF02B-Wright-1.

Normal component of the induced velocity in the vicinity of a lifting rotor and some examples of its application, by Walter Castles, Jr. and Jacob Henri De Leeuw. U. S. National Advisory Committee for Aeronautics. 1954. 17p diagrs, graph, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118179

Supersedes NACA TN 2912 (PB 109103).
1. Flow, Incompressible 2. Helicopters - Rotors - Air flow 3. Helicopters - Rotors - Velocity, Induced 4. NACA TN 2912 Revised 5. NACA 1184.

Polar-coordinate survey method for determining jet-engine combustion-chamber performance, by Robert Friedman and Edward R. Carlson. U. S. National Advisory Committee for Aeronautics. Sep 1955. 29p photos, drawings, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118481

1. Jet engines - Combustion chambers - Pressure - Measuring equipment 2. Jet engines - Combustion chambers - Temperature - Measuring equipment 3. NACA TN 3566.

Research investigation of magnetostrictive techniques for obtaining high frequency vibrations, by Ralph W. Gretter and Leonard S. Wilk. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Applied Mechanics Laboratory. Jun 1954. 236p photos, diagrs, graphs, tables. Order from OTS. $6. PB 111777

The need for a vibration exciter for turbine and compressor blading vibration research in the 10 - 30-kc frequency range is pointed out. It is shown that a magnetostrictive or crystal transducer in conjunction with an exponential probe should give sufficient amplitude to cause failure stresses in turbine blades if the apparatus is tuned, by construction, to the blade frequency. Design and construction of a magnetostrictive stack, exponential

probe, displacement pickups and an amplifier is discussed. Proposed tests of the apparatus are outlined. Project no. 3066. AAF WADC TR 54-382. Contract AF 33(616)-378.

Rotating-stall characteristics of a rotor with high hub-tip radius ratio, by Eleanor T. Costilow and Merle C. Huppert. U. S. National Advisory Committee for Aeronautics. Aug 1955. 59p photos, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118355

1. Rotor aircraft - Aerodynamics 2. Helicopters - Stalling - Research 3. Rotors - Temperature - Measurements 4. Rotors - Pressure distribution - Measurements 5. Rotors - Flow - Measurements 6. Compressors - Flow - Theory 7. NACA TN 3518.

Visualization study of secondary flows in turbine rotor tip regions, by Hubert W. Allen and Milton G. Kofskey. U. S. National Advisory Committee for Aeronautics. Sep 1955. 33p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118524

1. Boundary layer - Transition point 2. Turbines - Rotors - Tests 3. Turbines - Rotors - Flow 4. Flow, Subsonic - Theory 5. NACA TN 3519.

Training and Training Devices

Effect of variations in control-display ratio and exponential time delay on tracking performance, by Marty R. Rockway. U. S. Air Force. Research and Development Command. Wright Air Development Center. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1954. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 118512

A rational analysis of the joint effects of control-display exponential time delay suggests that the effects of increasing exponential delay depend upon the particular C/D ratio employed. The present study was designed to demonstrate this interaction between the effects of C/D ratio and exponential time delay on the performance of a two-dimensional tracking task. Project no. 7197. AAF WADC TR 54-618.

Airports and Airways

Design of flexible airfield pavements for multiple-wheel landing gear assemblies. Report no. 2: Analysis of existing data, by W. J. Turnbull, C. R. Foster, and R. G. Ahlvin. U. S. Waterways Experiment Station, Vicksburg, Miss. Jun 1955. 53p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 118186

This study was conducted for the purpose of re-evaluating the current, tentatively adopted methods for resolving the existing single-wheel design criteria for flexible airfield pavements into criteria for multiple-wheel assemblies. All available data that might provide means of comparing the effects of single and multiple loadings were reviewed and a new analysis was made. Both stress and deflection effects were examined wherever possible. A proposed alternate theoretical means of resolving well-established single-wheel design criteria to give valid multiple-wheel criteria was developed. WES TM 3-349.

Aerodynamics

Aerodynamic derivatives for both study and non-steady and motion of slender bodies, by R. M. Wood and C. H. Murphy. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Apr 1955. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 118504

Slender body values of all non-Magnus first order aerodynamic coefficients are derived by a simple application of the concept of cross-sectional apparent mass. These results are converted to ballistic nomenclature for two types of motion. Dept. of the Army project no. 503-03-001. ORD project no. TB 3-0108. APG BRL M 880.

Aerodynamic theory of the oscillating wing of finite span, by M. A. Biot and C. T. Boehnlein. California Institute of Technology. Guggenheim Aeronautics Laboratory, Pasadena, Calif. Sep 1942. 151f diagrs, graphs, tables. Order from LC. Mi $7.50, enl pr $25.80. PB 118491

The oscillating airfoil of finite span is considered with the purpose of introducing the effect of the trailing vortices and the three dimensional character of the velocity field on the aerodynamic forces. General formulae are established for the lift and moment on an elliptic airfoil oscillating in both translation and rotation and the numerical results are presented in tabular and graphical form. Project MX 152. Contract W 535-ac-27883, Report no. 5.

Analytical study of the effect of airplane wake on the lateral dispersion of aerial sprays, by Wilmer H. Reed, III. U. S. National Advisory Committee for Aeronautics. 1954. 18p diagrs, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118177

Supersedes NACA TN 3032 (PB 112297).
1. Wings - Wake 2. Sprays - Dispersion 3. Trajectories, Water droplet 4. Nozzles, Liquid spray 5. NACA TN 3032 Revised 6. NACA 1196.

Comparison of the measured and predicted lateral oscillatory characteristics of a 35° swept-wing fighter airplane, by Walter E. McNeill and George E. Cooper. U. S. National Advisory Committee for Aeronautics. Aug 1955. 22p photo, drawing, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118356

1. Mach number - Effect 2. Airplanes, Fighter - Performance tests 3. Airplanes, Fighter - Stabilization 4. Airplanes, Fighter - Flight characteristics 5. NACA TN 3521.

Description of the E-1 tunnel, GDF, by C. J. Schueler. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jan 1953. 34p photos, drawings, diagr, graphs. Order from LC. Mi $3, ph $6.30. PB 118280

1. Wind tunnels, Supersonic - Design 2. Wind tunnels, Supersonic - Equipment 3. E-1 (Wind tunnel) 4. AAF AEDC TN 53-19 5. AAF AEDC GDF TN-9 6. Contract AF 18(600)-854.

Determination of mean camber surfaces for wings having uniform chordwise loading and arbitrary spanwise loading in subsonic flow, by S. Katzoff, M. Frances Faison and Hugh C. DuBose. U. S. National Advisory Committee for Aeronautics. 1954. 18p diagrs, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 118178

Supersedes NACA TN 2908 (PB 109579).
1. Flow, Subsonic - Theory 2. Wings - Aerodynamics 3. Wings, Sweptback - Camber 4. Wing theory 5. NACA TN 2908 Revised 6. NACA 1176.

Effects of sweep and angle of attack on boundary-layer transition on wings at Mach number 4.04, by Robert W. Dunning and Edward F. Ulmann. U. S. National Advisory Committee for Aeronautics. Aug 1955. 31p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118354

1. Mach number - Effect 2. Reynolds number - Effect 3. Wings - Boundary layer - Measurements 4. Boundary layer - Transition point - Effect of wing sweep 5. Boundary layer - Transition point - Effect of angle of attack 6. Wings - Sweep - Effect on boundary layer 7. Angle of attack - Effect on boundary layer 8. NACA TN 3473.

Experimental investigation of regions of separated laminar flow, by Donald F. Gault. U. S. National Advisory Committee for Aeronautics. Sep 1955. 65p photos, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118369

1. Reynolds number - Effect 2. Flow, Laminar - Measurements 3. Flow, Turbulent - Measurements 4. Boundary layer - Flow - Pressure gradients 5. NACA TN 3505.

Flight investigation of the surface-pressure distribution and the flow field around a conical and two spherical nonrotating full-scale propeller spinners, by Jerome B. Hammack, Milton L. Windler, and Elwood F. Scheithauer. U. S. National Advisory Committee for Aeronautics. Sep 1955. 36p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118525

1. Mach number - Effect 2. Spinners - Tests 3. Propeller blades - Aerodynamics 4. Propeller blades - Pressure distribution 5. Flow - Measurements 6. NACA TN 3535.

Flow phenomena in starting a hypersonic shock tunnel, by H. S. Glick, A. Hertzberg, and W. E. Smith. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1955. 8p photos, drawings, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 118114

Theoretical and experimental studies have been carried out to determine the flow phenomena associated with starting hypersonic shock tunnels. Approximate methods of calculation have been developed to analyze the flow phenomena in various nozzle configurations. Several techniques have been devised to improve tunnel starting. Design charts of pressure ratios for perfect starting, imperfect starting, nozzle-testing time losses, etc. are presented for nonreflected-type and reflected-type hypersonic shock tunnels. AAF AEDC TN 55-16. Contract AF 40(600)-6.

Influence of plenum-chamber suction and wall convergence on the Mach number distribution in partially open test sections of wind tunnels at subsonic and supersonic speeds, by Bernhard H. Goethert. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Apr 1955. 52p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 118117

A theoretical investigation was conducted to analyze the flow conditions in perforated test sections with plenum-chamber suction and various wall settings. The results of the theory are compared with experimental data obtained in the Transonic Model Tunnel at the Arnold Engineering Development Center. AAF AEDC TR 54-42. Contract AF 18-(600)-1233.

Limited flight investigation of the effect of three vortex-generator configurations on the effectiveness of a plain flap on an unswept wing, by Garland J. Morris and Lindsay John Lina. U. S.

National Advisory Committee for Aeronautics. Sep 1955. 20p photos, drawings, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118526

1. Vortex motion - Effects 2. Wing flaps - High lift devices 3. Vortex generators - Tests 4. NACA TN 3536.

Measurements of the effects of finite span on the pressure distribution over double-wedge wings at Mach numbers near shock attachment, by Walter G. Vincenti. U. S. National Advisory Committee for Aeronautics. Sep 1955. 50p drawings, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118366

1. Mach number - Effect 2. Wings, Rectangular - Pressure distribution - Measurement 3. Wings, Rectangular - Aspect ratio 4. NACA TN 3522.

On boattail bodies of revolution having minimum wave drag, by Keith C. Harder and Conrad Rennemann, Jr. U. S. National Advisory Committee for Aeronautics. Aug 1955. 28p graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118364

1. Ward's drag equation 2. Parker's drag equation 3. Bodies of revolution - Aerodynamics - Theory 4. Bodies of revolution - Drag - Theory 5. Flow, Supersonic - Measurements 6. NACA TN 3478.

On the use of the indical function concept in the analysis of unsteady motions of wings and wing-tail combinations, by Murray Tobak. U. S. National Advisory Committee for Aeronautics. 1954. 46p diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 40 cents. PB 118353

1. Flow, Unsteady 2. Wings - Loading - Calculations 3. Wings - Vibration - Calculations 4. Tail surfaces - Aspect ratio 5. Tail surfaces - Aerodynamics 6. Stability, Longitudinal - Dynamic 7. NACA 1188.

Reduction of profile drag at supersonic velocities by the use of airfoil sections having a blunt trailing edge, by Dean R. Chapman. U. S. National Advisory Committee for Aeronautics. Sep 1955. 29p photo, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118476

1. Airfoils, Trailing-edge - Aerodynamics 2. Mach number - Effect 3. Reynolds number - Effect 4. Drag, Aerodynamic - Theory 5. Drag, Profile - Theory 6. Flow, Supersonic - Theory 7. NACA TN 3503.

Reevaluation of gust-load statistics for applications in spectral calculations, by Harry Press and May T. Meadows. U. S. National Advisory Committee for Aeronautics. Aug 1955. 19p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118357

1. Gust loads - Mathematical analysis 2. Atmosphere - Turbulence - Spectrographic analysis 3. NACA TN 3540.

Supplementary charts for estimating performance of high-performance helicopters, by Robert J. Tapscott and Alfred Gessow. U. S. National Advisory Committee for Aeronautics. Jul 1955. 31p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118359

Supplements NACA 3323 (PB 116277).
1. Wings, Rotating - Theory 2. Helicopters - Performance 3. Helicopters - Rotors - Drag 4. Helicopters - Rotors - Thrust 5. NACA TN 3482.

Theoretical analyses to determine unbalanced trailing-edge controls having minimum hinge moments due to deflection at supersonic speeds, by Kennith L. Goin. U. S. National Advisory Committee for Aeronautics. Aug 1955. 52p diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118237

1. Mach number - Effect 2. Flaps, Aircraft - Trailing edges 3. Flaps, Aircraft - Hinge moments 4. Flow, Supersonic - Theory 5. Control surfaces - Aerodynamics 6. NACA TN 3471.

Variation of boundary-layer transition with heat transfer on two bodies of revolution at a Mach number of 3.12, by John R. Jack and N. S. Diaconis. U. S. National Advisory Committee for Aeronautics. Sep 1955. 16p photos, diagrs, graphs Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118365

1. Reynolds number - Effect 2. Mach number - Effect 3. Bodies of revolution - Heat transfer - Calculation 4. Boundary layer - Transition point 5. NACA TN 3562.

Wind-tunnel investigation at low speed of effect of size and position of closed air ducts on static longitudinal and static lateral stability characteristics of unswept midwing models having wings of aspect ratio 2, 4, and 6, by Byron M. Jaquet and James L. Williams. U. S. National Advisory Committee for Aeronautics. Sep 1955. 45p photos,

diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118523

1. Mach number - Effect 2. Ducts, Air - Stability effects 3. Wings, Unswept - Aspect ratio 4. Wings, Unswept - Wind tunnel tests 5. Stability, Lateral - Tests 6. Stability, Longitudinal - Tests 7. Stability, Ratio - Tests 8. NACA TN 3481.

Rockets and Jet Propulsion

Analysis of the horizontal-tail loads measured in flight on a multiengine jet bomber, by William S. Aiken, Jr. and Bernard Wiener. U. S. National Advisory Committee for Aeronautics. Sep 1955. 70p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118367

1. Tail surfaces - Loads - Mathematical analysis 2. Loads, Tail - Tests 3. Airplanes, Jet propelled - Flight characteristics 4. NACA TN 3479.

Project Squid, semi-annual progress report for the period 1 Apr 1954 to 30 Sep 1954 under Contract N6ori-105, Task order III, NR 098-038. Princeton University. James Forrestal Research Center. Oct 1954. 141p graph, tables. Order from LC. Mi $7.20, ph $22.80. PB 118188

For earlier reports see PB 107680, PB 114392 and PB 116870. A cooperative program of fundamental research as related to jet propulsion for the Navy, Air Force and Army. Contents: Mixing of supersonic and subsonic gas streams (Princeton). - Fundamental investigation of nonstationery flow phenomena (Cornell). - Investigation of turbulence (Johns Hopkins). - Interaction of discontinuities (Michigan). - Transport properties of liquids (Princeton). - Heat conductivity of gases (M.I.T.). - Prandtl number determination (Calif.). - Physical properties of the oxides of nitrogen (Cal. Tech.). - Convective and radiant heat transfer from hot gases to a cold wall in the turbulent flow regime (Purdue). - Stability of coolant films (Purdue). - Porous wall cooling studies (Brooklyn). - Vaporization and combustion of multi-component fuel droplets (Northwestern). - Combustion studies of homogeneous droplet-air mixtures (Dartmouth). - Gaseous combustion studies (Delaware). - Flame and flow interaction (Cornell). - Flame and ignition phenomena (Bureau of Mines). - Minimum spark ignition energy and the source of ionization in flames (Experiment, Inc.). - Combustion in high-velocity ducted burner (Experiment, Inc.). - High output combustion (M.I.T.) - Turbulent flames, flame stability and rough burning (Atlantic research). - Study of chemical kinetics and basic combustion processes (Princeton). - Ignition study of falling fuel droplets (Purdue). - Appendix A. Reports published Apr 1, 1954 - Sep 30, 1954.

Summary evaluation of toothed-nozzle attachments as a jet-noise-suppression device, by Warren J. North. U. S. National Advisory Committee for Aeronautics. Jul 1955. 19p photo, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118358

1. Nozzles, Jet - Noise reduction equipment
2. Airplanes, Jet propelled - Noise - Reduction
3. Jet engines, Turbojet - Noise - Reduction
4. NACA TN 3516.

Marine Transportation

Choptank River autumn cruise, 23 Sept-27 Sept 1952, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Nov 1954. 43p map, tables. Order from LC. Mi $3.30, ph $7.80. PB 118430

Data report 22. Reference 54-9.
1. Sea water - Temperature - Choptank River
2. Sea water - Salinity - Choptank River 3. Currents, Ocean - Measurement - Choptank River
4. Contract Nonr 248(20) Project NR 083-016
5. Contract Nonr 248(30) Project NR 083-070.

Cruise XIII, 17 Feb-18 Mar 1953, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Jan 1955. 103p fold map, tables. Order from LC. Mi $5.70, ph $16.80. PB 118428

Data report 26. Reference 55-5.
1. Sea water - Salinity - Chesapeake Bay 2. Sea water - Temperature - Chesapeake Bay 3. Currents, Ocean - Measurement 4. Contract Nonr 248(20) NR 083-016 5. Contract Nonr 248(30), NR 083-070.

Hydrodynamic pressure distributions obtained during a planing investigation of five related prismatic surfaces, by Walter J. Kapryan and George M. Boyd, Jr. U. S. National Advisory Committee for Aeronautics. Sep 1955. 82p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118478

The distributions gave integrated lifts that in almost every case were well within 10 percent of the applied load. Comparison of experiment with theory shows that existing theories will adequately predict flat-plate pressures. For the V-shaped surfaces, experiment and theory are in poor agreement. The lift and center-of-pressure data for both the flat and V-shaped surfaces are in good agreement with recent experimental and theoretical NACA research on planing surfaces. NACA TN 3477.

Marine gravity research. Annual summary report, Sep 1953-Sep 1954, under Contract Nonr 233(19), by J. C. Harrison and G. L. Brown. California. University. Institute of Geophysics, Los Angeles, Calif. Sep 1954. 5p. Order from LC. Mi $1.80, ph $1.80. PB 118342

1. Gravimeters - Design 2. Gravity - Measurement 3. Contract Nonr-233(19), NR 081-206.

Patuxent River autumn cruise, 15 Sep-22 Sep 1952, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Oct 1954. 54p map, tables. Order from LC. Mi $3.60, ph $9.30. PB 118344

Purpose of this cruise was to study the physical and chemical structure of the area in the autumn season. Temperature and salinity were determined by means of the conductivity temperature indicator (CTI). Oxygen was determined by the Winkler titration method. pH was determined with a Beckman pH meter. Inorganic phosphate analyses were made by the cerumeomolybdate method using stannous chloride as the reducing agent. Turbidity and alkalinity were determined and chlorophyll analyses made. Data report 21. Reference 54-8. See also PB 114631 and PB 117416. Contract Nonr248(20), NR 083-016. Contract Nonr 248(30), NR 083-070.

Performance of galvanic anodes for cathodic protection, by F. E. Nelson and L. J. Waldron. U. S. Naval Research Laboratory. 1955. 38p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 118243

Data are given showing the relative current output of magnesium, aluminum, and zinc anodes electrically connected to a large steel sea wall at the Norfolk Reserve Fleet site. Magnesium, aluminum, and one zinc type were shown to be free of resistant film formation. A discussion of the relative merit of high versus low voltage anodes and of some of the factors involved is presented. NRL R 4586.

Study of galvanic corrosion in marine pseudosediments, by William G. Bradley. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Sep 1954. 73p photos, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 118308

Corrosion tests are described in which monometallic couples are exposed as concentration cells in pseudo-marine environments. Data on S. A. E. 1020 steel and aluminum alloy Al 61 S - T6 are presented. Effects of marine sulfate-reducing bacteria are superimposed over the physico-chemical system. The polarities of the cells studied, as well as data relating cell resistance to galvanic current, are presented. Possible effects of redox potential (E_h) and pH are discussed. A & M Project 24-A. Oceanic survey of the Gulf of Mexico. Reference 54-52T. Based on a thesis. Contract N7onr-48702, Project NR 083-036.

MISCELLANEOUS

Bibliographic survey of automobile and aircraft wheel shimmy, by Max Dengler, Martin Goland, Georg Herrman. Midwest Research Institute, Kansas City, Mo. Dec 1951. 147p diagrs. Order from LC. Mi $7.20, ph $22.80. PB 118496

1. Wheel shimmy - Bibliography 2. AAF WADC TR 52-141 3. Contract AF 33(038)-21994.

Environmental handbook of Fort Sherman and Fort Gulick, Panama Canal Zone, by Selva C. Wiley, Arthur V. Dodd and Jack V. Chambers. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1955. 54p photos, maps, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 118437

Project reference 7-83-03-008D.
1. Climate - Panama Canal Zone 2. Temperature - Panama Canal Zone 3. Vegetation - Panama Canal Zone 4. QMC EP TR 17.

Rate measurement of marine chronometers, gimbal-mounted chrometer watches, and non-gimbal navigating watches under controlled climatic conditions, by H. M. Suski. U. S. Naval Research Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

Part 1: Instrumentation. Jul 1955. 54p photos, diagrs, graphs, tables. Mi $3.60, ph $9.30. PB 118514

Instrumentation was developed to permit rate observations of three types of timepieces under simultaneously controlled temperature and pressure conditions. The types of timepieces considered were marine chronometer, gimbal-mounted chronometer watch, and non-gimbal navigating watch with break-circuit contacts. The instrumentation in its final form, as described herein, was considered reliable and suitable for making rate observations. A comparison is given of this final instrumentation with that of the previous phases of the work. NRL R 4524.

Part 2: Definition of the term "rate". Aug 1955. 26p drawings, diagrs, graphs. Mi $2.70, ph $4.80. PB 118513

Starting with a definition of the error per period of a timekeeping instrument and considering that methods of rate measurement involve at least initial and final observations an expression for the term "rate" is derived. NRL R 4568.

ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

The following Atomic Energy reports are listed here because of their interest and usefulness to general industry.

Reports may be purchased in accordance with instructions on the inside front cover of the U. S. GOVERNMENT RESEARCH REPORTS. As PB numbers are not indicated, order by series and number. These reports may also be consulted at any AEC Depository Library. A list of these libraries may be obtained from the U. S. Department of Commerce, Office of Technical Services, Washington 25, D. C.

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Biology and Medicine

Studies of the metabolism and toxic action of injected radium, by William P. Norris and H. B. Evans. Metallurgical Laboratory. University of Chicago. Jun 1946. Contract W-7401-eng-37. 124p. Order from LC. Mi $6.30, ph $19.80 AECD-1965

Apparatus for injection of animals with dangerous amounts of hard beta and gamma emitters, by David S. Anthony and William P. Norris. Metallurgical Laboratory. University of Chicago. Jun 1946. Contract No. W-7401-eng-37. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-2007

Quarterly report August 1947 to November 1947, by Austin M. Brues. Argonne National Laboratory. Nov 1947. Contract W-31-109-eng-38. 152p. Order from LC. Mi $7.50, ph $24.30. AECD-2009

Studies of liver function in experimental animals with special reference to radiation and metal exposure, by Samuel Schwartz, Lorraine Schneider, Lillie Mae Porter, Mary Tinsley, and Jean Wallace. Metallurgical Laboratory. University of Chicago. Jul 1947. Contract No. W-7401-eng-37. 38p. Order from LC. Mi $3, ph $6.30. AECD-2020

Quarterly report May 1947 to August 1947, by Austin M. Brues. Argonne National Laboratory. Aug 1947. Contract W-31-109-eng-38. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-2024

The excretion, retention, distribution, and clinical effects of strontium^{89} in the dog. Part II: Statistical analysis of excretion and retention of strontium ^{89} for individual dogs, by George Sacher. Metallurgical Laboratory. University of Chicago. Jun 1946. Contract No. W-7401-eng-37. 20p. Order from LC. Mi $2.40, ph $3.30. AECD-2108

Effect of X-irradiation on the maturation of the circulating reticulocyte, by Evelyn O. Gaston, Edna K. Marks, and Leon O. Jacobson. Metallurgical Laboratory. University of Chicago. Jul 1946. Contract No. W-7401-eng-37. 36p. Order from LC. Mi $3, ph $6.30. AECD-2132

Teletherapy design problems. IV. Isodose charts for the Co^{60} hectocurie teletherapy machine, by Marshall Brucer. Oak Ridge Institute of Nuclear Studies Inc. Mar 1955. 157p. Order from OTS. 75 cents. ORINS-10

Utilization of fission products. A bibliography of selected unclassified literature, by Gifford A. Young and Robert E. Allen. Technical Information Service, Oak Ridge, Tenn. Jun 1955. 54p. Order from OTS. 40 cents. TID-3046 (Suppl. 1)

Special report of the Medical Division on teletherapy design problems: I, Cs^{137}, by Marshall Brucer. Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn. May 1955. Contract No. AT-40-1-Gen-33. 61p. Order from OTS. 40 cents. TID-5086 (2nd Rev.)

Chemistry and Chemical Engineering

Manual for the conversion of small samples of uranium salts to uranium hexafluoride for isotopic analysis on the mass spectrometer, by B. Weinstock. Mar 1943. 22p. Order from LC. Mi $2.70, ph $4.80. A-569

The reaction of hydrogen and oxygen with uranium oxides in water suspension, by D. M. Gillies. Apr 1944. 28p. Order from LC. Mi $2.70, ph $4.80. A-1262

Chemistry of vanadium, by Dr. Andrew J. Frank. A summary of the non-project literature through November 1952. American Cyanamid Co., Raw Materials Development Lab., Winchester, Mass. Jun 1954. Contract AT(49-1)-533. 39p. Order from LC. Mi $3, ph $6.30. ACCO-49

Activation cross sections by boron absorption, by S. M. Dancoff, H. Kubitschek, H. V. Lichtenberger, G. D. Monk, and R. G. Nobles. Argonne National Laboratory, Chicago, Ill. Sep 1945. 35p. Order from LC. Mi $3, ph $6.30. AECD-1781

A note on the use of ion exchange resins for the purification of urinary purines, kynurenic acid, and coproporphyrin. (Preliminary report), by Samuel Schwartz, Lee Wattenberg, Ralph Zagaria and with the technical assistance of Julia Madigan and Virginia Meschke. Jul 1946. Contract No. W-7401-Eng-37. 18p. Order from LC. Mi $2.40, ph $3.30. AECD-1861

The thermodynamics of intermediate uranium fluorides from measurements of the disproportionation pressures, by Paul A. Agron. Columbia University. Jan 1948. 14p. Order from LC. Mi $2.40, ph $3.30. AECD-1878

Cloud chamber measurements of cadmium-capture gamma rays, by C. D. Moak and J. W. T. Dabbs. n.d. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-1882

Preliminary report on the hydrolytic behavior of cerium (IV)$_2$, by K. A. Kraus, R. W. Holmberg and F. Nelson. n.d. 15p. Order from LC. Mi $2.40, ph $3.30. AECD-2070

The crystal structure of trichlorides, tribromides and trihydroxides of uranium and of rare earth elements, by W. H. Zachariasen. Jun 1948. 14p Order from LC. Mi $2.40, ph $3.30. AECD-2091

The use of uranium and uranium compounds in purifying gases, by Amos S. Newton. n.d. 10p. Order from LC. Mi $1.80, ph $1.80. AECD-2135

The volumetric assay of uranium tetrafluoride, by N. H. Furman and G. P. Haight, Jr. Princeton Univ., Frick Chemical Lab., Princeton, N. J. May 1947. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-2155

The preparation and properties of refractory sulfides, by Leo Brewer, Leroy Bromley, Paul Gilles, and Norman Lofgren. Aug 1948. 51p. Order from LC. Mi $3.60, ph $9.30. AECD-2242

The system uranium-nitrogen, by R. E. Rundle, N. C. Baenziger, A. S. Newton, A. H. Deane, T. A. Butler, I. B. Johns, W. Tucker, and P. Figard. n.d. 22p. Order from LC. Mi $2.70, ph $4.80. AECD-2247

Silver-111 beta-ray sources, by W. Wayne Meinke and D. N. Sunderman. Dept. of Chemistry, University of Michigan, Ann Arbor, Mich. 1955. 12p. Order from LC. Mi $2.40, ph $3.30. AECU-3070

LMFR-12: Estimates of the solubility and diffusion constant of xenon in liquid bismuth, by W. G. McMillan. Brookhaven National Laboratory. Jun 1955. 10p. Order from OTS. 20 cents. BNL-353 (T-63)

Spectrophotometric titration of milligram quantities of barium, by Keith Rowley, R. W. Stoenner and Louis Gordon. Brookhaven National Laboratory, Upton, Long Island, N. Y. 1955. 7p. Order from LC. Mi $1.80, ph $1.80. BNL-2130

The determination of dibutylphosphate, by D. W. Brite. Engineering Dept. Hanford Atomic Products Operation, Richland, Washington. Oct 1954. Contract #W-31-109-Eng-52. 18p. Order from OTS. 20 cents. HW-30643 (Rev.)

A new technique for the separation of radiophosphorus from sulfur, by L. D. McIsaac and A. Voigt. Ames Laboratory. Iowa State College, Ames, Iowa. Jun 1952. Contract No. W-7405-eng-82. 33p. Order from OTS. 25 cents. ISC-271

Adsorption of aliphatic alcohols and acids from binary aqueous solution by non-porous carbons, by Roy P. Craig and Robert S. Hansen. Ames Laboratory. Iowa State College, Ames, Iowa. Mar 1953. Contract No. W-7405-eng-82. 106p. Order from OTS. 55 cents. ISC-309

Summary of available data on radiation damage to various non-metallic materials, by E. L. Mincher. Knolls Atomic Power Laboratory. General Electric Co., Schenectady, N. Y. Apr 1952. 50p. Order from OTS. 35 cents. KAPL-731

The crystal structure of actinium metal and actinium hydride, by John D. Farr, Angelo L. Giorgi, Richard K. Money, and Melvin G. Bowman. Los Alamos Scientific Laboratory. University of California. Apr 1953. 12p. Order from LC. Mi $2.40, ph $3.30. LA-1545

Improved synthesis of sodium D-glucuronate-6-C^{14} and of D-glucose-6-C^{14}, by R. Schaffer and H. S. Isbell. National Bureau of Standards, Washington, D. C. May 1955. 20p. Order from OTS. 20 cents. NBS-4084

Silver fission induced by 388 Mev. protons, by Daniel H. Greenberg. Columbia University. Apr 1954. Contract AT (30-1)-1019. 86p. Order from LC. Mi $4.80, ph $13.80. NYO-6140

Diffusion coefficients of electrolytes in dilute aqueous solution, by Herbert S. Harned. Yale University. Jan 1955. Contract AT(30-1)-1375. 19p. Order from LC. Mi $2.40, ph $3.30. NYO-6613

The salicylate method for determining microgram amounts of uranium, by Paul F. Thomason, Leighton A. Nutting, Urpo Koskela, and Ward M. Byerly. Analytical Chemistry Division. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1955. Contract No. W-7405-eng-26. 15p. Order from OTS. 20 cents. ORNL-1641

Chemistry in the electromagnetic separation of platinum isotopes, by W. C. Davis and C. W. Sheridan. Oak Ridge National Laboratory, Oak Ridge, Tenn. May 1955. Contract No. W-7405-eng-26. 8p. Order from OTS. 15 cents. ORNL-1900

Mass transfer in a horizontal liquid-liquid extraction tube, by Nelson F. Murphy, John E. Lastovica, and Adam E. Skrzec. Virginia Polytechnic Institute. Chemical Engineering Dept., Blacksburg, Virginia. n.d. Contract AT(40-1)-1442. 62p. Order from LC. Mi $3.90, ph $10.80. ORO-135

Definitive report. Project 890 - organic phosphorus compounds, by J. R. Mangham, C. L. Harowitz and T. M. Melton. Virginia-Carolina Chemical Corp. Research Dept. Dec 1954. 22p. Order from LC. Mi $2.70, ph $4.80. RMO-2944

The determination of triose phosphate isomerase, by William S. Beck. The University of California. Los Angeles Campus. School of Medicine. Atomic Energy Project. Jan 1955. Contract No. AT-04-1-GEN-12. 12p. Order from LC. Mi $2.40, ph $3.30. UCLA-321

Factors influencing ammonia decomposition in the Kjeldahl method with sealed tube digestion, by LeRoy G. Green and Charles W. Koch, Benjamin W. Grunbaum and Paul L. Kirk. University of California. Radiation Laboratory. Jun 1954. Contract No. W-7405-eng-48. 22p. Order from LC. Mi $2.70, ph $4.80. UCRL-2619

The dissociation energies of some common molecules, by Leo Brewer. University of California. Radiation Laboratory, Berkeley, Calif. Jan 1955. Contract No. W-7405-eng-48. 4p. Order from LC. Mi $1.80, ph $1.80 UCRL-2832

Engineering

Experience of handling low level active liquid wastes at the Idaho Chemical Processing Plant, by S. F. Fairbourne, D. G. Reid and B. R. Kramer. Phillips Petroleum Co. Atomic Energy Division. Jun 1955. Contract No. AT(10-1)-205. 64p. Order from OTS. 40 cents. IDO-14334

Sanitary engineering conference held at South District Filtration Plant, City of Chicago. Division of Reactor Development, AEC., Washington, D. C. Mar 1955. 189p. Order from OTS. $1. WASH-129

Geology and Mineralogy

Results of an airborne radiometric survey in the Canon City Embayment Area, Colorado, by A. L. Nash and L. J. Brown. Denver Exploration Branch. Division of Raw Materials, Denver, Colorado. Jun 1954. 13p. Order from OTS. 15 cents. RME-1050 (Rev.)

Airborne reconnaissance in Southwestern Arkansas, by R. C. Malan and A. L. Nash. Denver Exploration Branch. Division of Raw Materials, Denver, Colorado. Dec 1954. 38p. Order from OTS. 20 cents. RME-1052

Summary report of reconnaissance and exploration for uranium deposits in Northern Nevada, by H. Clyde Davis. Division of Raw Materials. Jul 1954. 23p. Order from OTS. 20 cents. RME-2013 (Pt. 1, Rev.)

Copper-uranium deposit at the Ridenour Mine, Hualapai Indian Reservation, Coconino County, Arizona, Part I, by Richard D. Miller. Supplement: Results of an aerial radiometric examination of the Ridenour Mine District, Hualapai Indian Reservation Coconino County, Arizona, by Earl M. P. Lovejoy. Division of Raw Materials, Salt Lake City, Utah. Aug 1954. 23p. Order from OTS. 20 cents. RME-2014

Radioactivity of some coals and shales in Southern Illinois, by E. D. Patterson. United States Geological Survey, Washington, D. C. Aug 1954. 23p. Order from OTS. 25 cents. TEI-466

Health and Safety

The therapeutic use of Bal in polonium toxicity. I. The effect of dithiol compounds on the excretion of polonium. II. Blood and tissue distribution of polonium as affected by Bal. III. Survival

experiments on polonium injected rats as affected by Bal treatment, by John B. Hursh. The University of Rochester. Jul 1949. 65p. Order from LC. Mi $3.90, ph $10.80. AECD-2852

Neutron monitoring with indium foils, by F. B. Oleson. Brookhaven National Laboratory. Jul 1955. 13p. Order from OTS. 20 cents. BNL-351 (T-62)

Radioactive debris in North America from operation Teapot, by Daniel E. Lynch. New York Operations Office. Aug 1955. 5p. Order from OTS. 10 cents. NYO-4659

Lethality in rabbits as a function of depth dose distribution and average dose, by M. A. Greenfield, M. S. Billings, A. Norman and A. E. Lewis. The University of California. Los Angeles Campus. School of Medicine. Jan 1954. Contract No. AT-04-1-GEN-12. 16p. Order from LC. Mi $2.40, ph $3.30. UCLA-278

Failure of heterologous spleen extracts to increase survival time in irradiated mice, by Thomas J. Haley, John Heglin and Eve F. McCulloh. The University of California. Los Angeles Campus. School of Medicine. Oct 1954. Contract No. AT-04-1-GEN-12. 7p. Order from LC. Mi $1.80, ph $1.80. UCLA-312

The effect of critical dosages of gamma irradiation upon the capacity of the pituitary gland of Bufo to secrete thyrotrophic hormone, by Bennet M. Allen and Betty L. Bachman. The University of California. Los Angeles Campus. School of Medicine. Feb 1955. Contract No. AT-04-1-GEN-12. 30p. Order from LC. Mi $2.70, ph $4.80. UCLA-324

Effect of chlorpromazine on cardiac arrhythmias induced by intra-cerebral injection of tryptamine-strophanthidin, by S. J. Weinberg and Thomas J. Haley. The University of California. Los Angeles Campus. School of Medicine. Mar 1955. Contract No. AT-04-1-GEN-12. 17p. Order from LC. Mi $2.40, ph $3.30. UCLA-327

The effect of certain environmental factors on mineral uptake by bean plants: I. Phosphorus uptake, by William L. Ehrler, Arthur H. Lange, Karl C. Hamner. The University of California. Los Angeles Campus. School of Medicine. Mar 1955. Contract No. AT-04-1-GEN-12. 35p. Order from LC. Mi $3, ph $6.30. UCLA-328

Physical studies of cell division: Statistical fluctuations; effects due to X-radiation, temperature, and hydrostatic pressure, by Victor W. Burns. University of California. Radiation Laboratory, Berkeley, Calif. Dec 1954. Contract No. W-7405-eng-48. 95p. Order from LC. Mi $5.40, ph $15.30. UCRL-2812

Studies on factors effecting the radiation syndrome. I. The effect of aureomycin and antibiotics on whole body irradiation, by Joe W. Howland, Frank Furth, L. R. Bennett, Molly Coulter, and G. M. McDonnel. The University of Rochester. Atomic Energy Project, Rochester 20, N. Y. Oct 1949. Contract W-7401-eng-49. 35p. Order from LC. Mi $3, ph $6.30. UR-94

Instrumentation

Ryerson metal diffusion pump-mercury type. Ryerson Machine Shop. Metallurgical Laboratory, University of Chicago. n.d. 8p. Order from LC. Mi $1.80, ph $1.80. A-3351

Remote control apparatus, by R. C. Goertz. Argonne National Laboratory. May 1948. 34p. Order from LC. Mi $3, ph $6.30. AECD-1958

Positive ion gun for the Notre Dame Van de Graff-herb generator, by M. L. Wiedenbeck. Notre Dame University, Notre Dame, Ind. 1945. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-2045

Electromagnetic flowmeter, by A. Barnes, G. K. Whitham, F. A. Smith. Argonne National Laboratory. Jun 1952. Contract No. W-31-109-eng-38. 4p. Order from LC. Mi $1.80, ph $1.80. AECD-3407

Iodine stack monitor, by B. M. Carmichael and D. G. Karraker. E. I. du Pont de Nemours & Co. Aug 1955. Contract AT(07-2)-1. 7p. Order from CTS. 10 cents. DP-129

The MTR automatic wire scanner, by R. J. Preston. Phillips Petroleum Co. Sep 1955. Contract No. AT(10-1)-205. 42p. Order from OTS. 30 cents. IDO-16243

Applied health physics radiation survey instrumentation, by D. M. Davis, E. D. Gupton and J. C. Hart. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1954. Contract No. W-7405-eng-26. 230p. Order from OTS. $1.25. ORNL-332 (1st Rev.)

Fourth annual symposium on hot laboratories and equipment, held in Washington, D. C., September 29 and 30, 1955. Technical Information Service, Oak Ridge, Tenn. Sep 1955. 383p. Order from OTS. $1.75. TID-5280

A criterion for vacuum sparking designed to include both R. F. and D. C., by W. D. Kilpatrick. University of California. Radiation Laboratory. Sep 1953. Contract No. W-7405-eng-48. 15p. Order from LC. Mi $2.40, ph $3.30. UCRL-2321

Metallurgy and Ceramics

Bonding of metals by adhesives, by J. S. Church, S. Feuer, and B. Zweig. May 1946. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-2103

Computed values of X-ray lines and limits for the trans-uranic elements, by Ardis T. Monk and Samuel K. Allison. Metallurgical Laboratory. Sep 1944. 11p. Order from LC. Mi $1.80, ph $1.80. AECD-2263

The consolidation of boron, by F. G. Stroke. Los Alamos Scientific Laboratory. Aug 1944. 14p. Order from LC. Mi $2.40, ph $3.30. AECD-2291

The development of a melting method for conversion of zirconium sponge to corrosion resistant ingot. National Research Corporation, Cambridge, Mass. Dec 1953. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-3676

Deformation mechanisms of alpha-uranium single crystals, by L. T. Lloyd and H. H. Chiswik. Argonne National Laboratory, Lemont, Ill. Dec 1954. Contract W-31-109-eng-38. 100p. Order from OTS. $1. ANL-5367

The high temperature, high vacuum vaporization and thermodynamic properties of uranium dioxide, by Raymond J. Ackermann. Argonne National Laboratory, Lemont, Ill. Sep 1955. Contract W-31-109-eng-38. 117p. Order from OTS. 60 cents. ANL-5482

Polarographic determination of zirconium, by Arno H. A. Heyn. Brookhaven National Laboratory and Boston University. Dept. of Chemistry, Boston, Mass. n.d. 3p. Order from LC. Mi $1.80, ph $1.80. BNL-2041

Metallurgy of 94. Report for month ending Oct 11, 1953, by T. Magel. Chicago University. Metallurgical Laboratory, Chicago, Ill. Feb 1955. 6p. Order from LC. Mi $1.80, ph $1.80. CT-963

Reflectivity of calcite for thermal neutrons, by M. W. Holm. Phillips Petroleum Co. Atomic Energy Division. Sep 1955. Contract No. AT(10-1)-205. 12p. Order from OTS. 15 cents. IDO-16237

The micrometallurgy of actinium, by J. G. Stites, Jr., M. L. Salutsky, and B. D. Stone. Mound Laboratory. Aug 1953. Contract No. AT-33-1-GEN-53. 14p. Order from LC. Mi $2.40, ph $3.30. MLM-881

An investigation of the mineralogy, petrography and paleobotany of uranium-bearing shales and lignites. Quarterly progress report period of April 1, 1954 to June 30, 1954. Pennsylvania State University. Jun 1954. Contract No. U. S. AEC AT(30-1)-1202. 22p. Order from LC. Mi $2.70, ph $4.80. NYO-6063

Utilization of Florida leached zone material. Progress report. Tennessee Valley Authority. Division of Chemical Development. Jan 1955. 5p. Order from LC. Mi $1.80, ph $1.80. RMO-2732

Mechanism of dimensional instability, by L. L. Seigle and A. J. Opinsky. Atomic Energy Division. Sylvania Electric Products, Inc., Bayside, N. Y. Aug 1954. Contract AT-30-1-Gen-366. 22p. Order from OTS. 20 cents. SEP-160

Fundamental research in physical metallurgy. Twenty-fourth quarterly report, by J. H. Hollomon and D. Turnbull. General Electric Research Laboratory. Jan 1955. Contract No. W-31-109-Eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. SO-2037

Self-diffusion in dilute binary solid solutions, by R. E. Hoffman, D. Turnbull, and E. W. Hart. General Electric Research Laboratory. Mar 1955. Contract No. W-31-109-Eng-52. 21p. Order from LC. Mi $2.70, ph $4.80. SO-2038

Fundamental research in physical metallurgy. Twenty-fifth quarterly report, by J. H. Hollomon and D. Turnbull. General Electric Research Laboratory. Apr 1955. Contract No. W-31-109-Eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. SO-2039

Development of zirconium-base alloys. Twenty-second quarterly report, by J. H. Keeler. General Electric Research Laboratory. Apr 1955. Contract No. W-31-109-Eng-52. 18p. Order from LC. Mi $2.40, ph $3.30. SO-2520

Zirconium alloys for nuclear properties. Spectrographic determination of aluminum in zirconium, by L. B. Bronk and R. S. McDonald. General Electric Research Laboratory. Jul 1955. Contract No. W-31-109-Eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. SO-2522

Titanium metallurgy. A bibliography of unclassified report literature, compiled by Hugh E. Voress. Technical Information Service, Oak Ridge, Tenn. Feb 1955. 63p. Order from LC. Mi $3.90, ph $10.80. TID-3039 (Suppl. 1)

Liquid-metals handbook. Sodium-NaK supplement, by R. R. Miller, R. A. Tidball, R. C. Werner, H. E. Grantz, and R. E. Lee. The Atomic Energy Commission and The Bureau of Ships, Department of the Navy. Jul 1955. 450p. Order from GPO. $2. TID-5277

The casting of inconel-tubing heaters in high copper alloy, by F. J. Lambert. Oak Ridge National Laboratory. Mar 1950. 23p. Order from OTS. 15 cents. Y-583

Physics

Simple globar heating arrangement, by A. Creutz. Jul 1953. 4p. Order from LC. Mi $1.80, ph $1.80. A-1113

Radioactive tracers, by Allen F. Reid, Adele S. Weil. Columbia University. Pupin Physics Laboratories. Apr 1947. 29p. Order from LC. Mi $2.70, ph $4.80. AECD-2324

Heat generation in irradiated uranium, by S. Untermyer and J. T. Weills. Argonne National Laboratory. Feb 1952. Contract W-31-109-eng-38. 21p. Order from OTS. 20 cents. AECD-3454

Perturbation theory and applications, by H. L. McMurry. Technical Branch. Atomic Energy Division. Phillips Petroleum Company, Idaho Falls, Idaho. Jun 1952. Contract No. AT(10-1)-205. 19p. Order from OTS. 20 cents. AECD-3656

New version of free neutrino experiment, by C. L. Cowan, Jr., F. Reines, A. T. Brousseau, F. B. Harrison, and A. R. Ronzio. Los Alamos Scientific Laboratory, Los Alamos, N. M. Jul 1955. Contract No. W-7405-eng-36. 5p. Order from CTS. 10 cents. AECU-2924

The Lindemann and Grüneisen laws, by J. J. Gilvarry. The Rand Corporation, Santa Monica, Calif. Mar 1955. 35p. Order from LC. Mi $3, ph $6.30. AECU-3067

The equation of the fusion curve, by J. J. Gilvarry. The Rand Corporation, Santa Monica, Calif. May 1955. 25p. Order from LC. Mi $2.70, ph $4.80. AECU-3068

Aerosol collection by wetted fiberglas media, by Joseph A. Leary, Robert A. Clark, R. Philip Hammond, and Charles S. Leopold. Los Alamos Scientific Laboratory, Los Alamos, N. M. Apr 1954. 68p. Order from LC. Mi $3.90, ph $10.80. AECU-3072

Photocathode and reflector effects on relative pulse height measurements, by F. N. Hayes and Betty S. Rogers. Los Alamos Scientific Laboratory. Univ. of Calif., Los Alamos, N. M. Aug 1954. 6p. Order from LC. Mi $1.80, ph $1.80. AECU-3073

Chlorine-36 in nature, by Raymond Davis, Jr. and Oliver A. Schaeffer. Brookhaven National Laboratory. Jun 1955. 16p. Order from OTS. 20 cents. BNL-340

Preparation of fused clay radiation sources. I. Yttrium macrospheres, by William S. Ginell and Robert Doering. Brookhaven National Laboratory. Jun 1955. 5p. Order from OTS. 10 cents. BNL-341

The nuclear reactor with a transverse air cap, by J. Chernick and I. Kaplan. Brookhaven National Laboratory. Aug 1954. 20p. Order from LC. Mi $2.40, ph $3.30. BNL-1996

The permeability method of determining surface areas of finely divided materials, by L. L. Lyon, G. R. Crocker, J. S. Fisher, and R. L. Barns. University of Wichita. May 1955. Contract No. AT(11-1)-203. 34p. Order from LC. Mi $3, ph $6.30. COO-143

Effect of the temperature of the moderator on the velocity distribution of neutrons for a heavy moderator, by J. Ernest Wilkins, Jr. University of Chicago. Metallurgical Laboratory. Nov 1944. Contract No. W-7401-eng-37. 13p. Order from LC. Mi $2.40, ph $3.30. CP-2481

IBM 650 sub-routines I: Circular and hyperbolic functions; regular Bessel functions, by W. V. Baxter. E. I. du Pont de Nemours & Co. Jul 1955. Contract AT(07-2)-1. 16p. Order from OTS. 15 cents. DP-124

Two techniques for fast neutron detection using the $S^{32}(n,p)P^{32}$ reaction, by R. L. Tomlinson. Hanford Atomic Products Operation, Richland, Washington. Jan 1955. Contract #W-31-109-Eng-52. 20p. Order from OTS. 20 cents. HW-33122

The materials testing reactor hot cell, by M. H. Bartz and J. B. Burnham, Jr. Atomic Energy Division. Phillips Petroleum Company. Jul 1954. Contract No. AT(10-1)-205. 19p. Order from OTS. 20 cents. IDC-16210

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