U. S. Government

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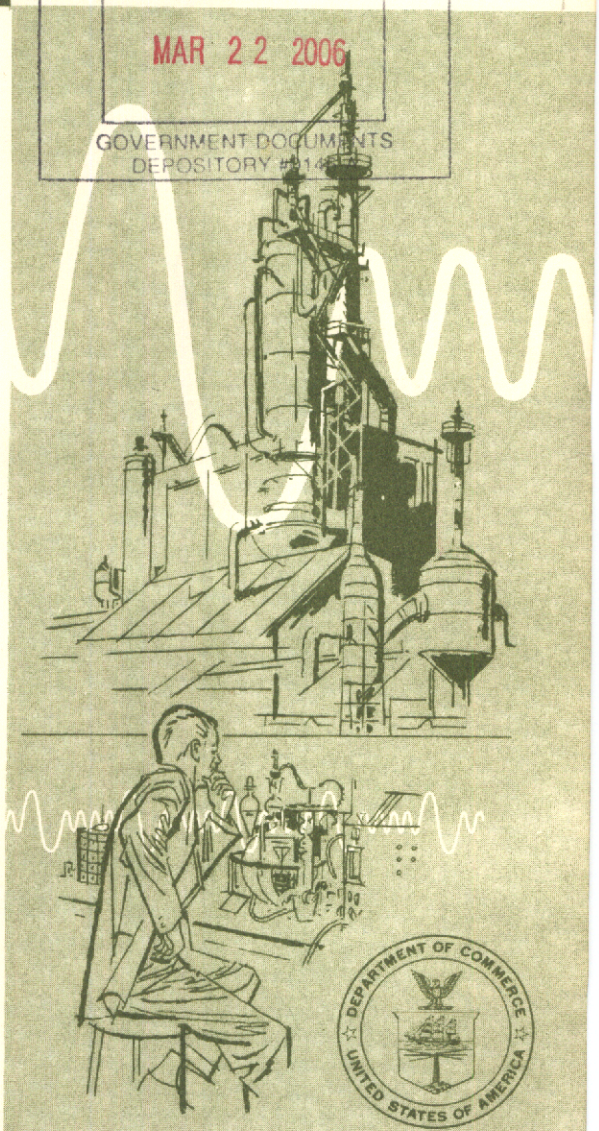
In this issue:



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U. S. Government RESEARCH REPORTS

Vol. 28, no. 5 November 15, 1957

Contents

Printed Reports Available from OTS Announced in This Issue

BIBLIOGRAPHY

Bibliography on snow, ice and permafrost, with abstracts, vol. X. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ind. Jul 1956. 191p. Order from LC. Mi $8.70, ph $30.30. PB 125902

This bibliography is published semi-annually as SIPRE Report 12. Each volume is an accumulation of the unclassified abstracts published weekly as standard catalog cards. Abstracts numbered 13001-14000 are included in this volume. Dept. of the Army project: 8-66-02-004. For volumes 1-9 see PB 113539-113540, 112250, 112252, 114461, 115969, 117329, 119002 and 125828.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Chlorine and fluorine-containing compounds for nonflammable materials, by O. R. Pierce and E. T. McBee. Purdue University, Lafayette, Ind. Apr 1954. 202p diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 127881

Flash point, fire point and autogenous temperature were determined for mixtures of 25 bromine compounds with hydraulic fluid Mil-0-5606. A series of alkylphosphonosilanes and alkylphosphonoethoxysilanes was prepared from alkylchlorosilanes and appropriate phosphorus compounds. Fluorine-containing polyethers were obtained from $F_3CCH\text{-}CH_2$ and sodium exthoxide. The ester $(CF_2CF_2CF_2CH_2\text{-}O)_4Si$ was prepared from silicon tetrachloride and heptafluorobutanol. Fluorine-containing esters and acids were prepared as intermediates from polyfluoroaldehydes by use of the Reformatsky reaction with α-bromo esters. Fluorinated phosphonate esters $RPO(OCH_2CF_3)_2$ were obtained from bistrifluoroethyl chlorophosphate by action of Grignard reagents or from tris-trifluoroethyl phosphite and alkyllithium compounds and air oxidation of the resultant alkyl phosphonites. Perfluoroalkyllithium compounds were prepared by lithium-halogen interchange at low temperature and were utilized in addition reactions with carbonyl compounds. The reaction between ethyl orthosilicate and heptafluoropentylmagnesium bromide was further investigated. Fluorine-containing alcohols were prepared as intermediates from fluoroalkylmagnesium halides by reaction with oxygen and paraformaldehyde. AD 32732. Contract AF 18(600)-128. AF WADC TR 53-462.

Dielectric loss in sodium chloride, by J. O. Thomson. Illinois. University, Urbana, Ill. Dec 1956. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125133

AD 96509. 1. Sodium chloride - Crystal structure 2. Sodium chloride - Diffusion - Measurement 3. Crystals - Dielectric losses 4. Contract AF 18(600)-662 5. AF OSR TN 56-427

Military specification: Chloracetophenone. U.S. Army, U.S. Navy Dept., and U.S. Air Force. Dec 1950. 18p fold drawings, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 129072

Drawings by Chemical Corps. Supersedes MIL-C-10338, dated 1 Jun 1950. 1. M25A1 (Grenade) 2. Chloracetophenone - Specifications 3. MIL-C-10338A.

Pinoresinel and its dimethyl ether from Araucaria angustifolia, by Elisabeth Dryselius and Bengt Lindberg. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 2p. Order from LC. Mi $1.80, ph $1.80. PB 124751

Reprinted from Acta Chemica Scandinavica, 10 (1956) 445-446. 1. Pinoresinol - Sweden 2. Svenska Träforskningsinstitutet. Träkemi och Papperssteknik. Meddelande 213.

Plastics and Plasticizers

Development of thermally stable polymeric materials, by Charles P. Haber. U.S. Naval Ordnance Laboratory, Corona, Calif. Jun 1957. 57p diagrs, graphs, tables. Order from OTS. $1.75. PB 131253

The work described in this report has as its objective the synthesis of polymeric materials having extreme chemical and thermal stability which are suitable for use in various aircraft applications such as elastomers, plastics, fluids, dielectrics, and adhesives. In most applications the needed materials must be able to resist the action of the atmosphere at the elevated temperatures; in some, resistance to corrosive fuels and fuel combustion products is required. The task of this program is to investigate promising inorganic bonding systems for thermal and chemical resistance and to incorporate these bonding systems into high polymer molecules with the required physical and mechanical properties. Diphenylvinylsilane has been prepared in good yields. The polymerization of this material by peroxide-initiated reactions in bulk, solution, and emulsion has led only to low molecular weight low melting solids of no apparent practical significance. The mechanism of polymerization has been established as the addition of the elements of a Si-H bond of one molecule across the vinyl unsaturation of another molecule. In an attempt to prepare

$(CF_3)_2PN$ polymers, a multistep synthesis giving an excellent overall yield of the desired starting material, $(CF_3)_2PCl_3$, was developed. AD 130798. Project 7340, Task 73404. Covers work from Jan 1954 - May 1956 under Contract AF 33(616)-55-41. AF WADC TR 56-376.

Dilute solution techniques for styrene-methyl methacrylate graft copolymer and its precursors, by Rudolph A. Guzzi. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Apr 1957. 20p graphs, tables. Order from OTS. 50 cents. PB 131261

A dilute solution study of styrene-methyl methacrylate graft copolymers and their precursors was carried out. It was found that dilute solution techniques are applicable to the study of graft copolymers. However, because of a multiplicity of problems, such as solution color, fluorescene, opacity, microgel, uncertainty as to the composition, and molecular weight distribution, a quantitative study and interpretation of the data obtained was not feasible. Light-scattering and viscosity measurements of samples of the graft copolymers and their precusors were made and analyzed. Ordnance project TB 2-0001. Dept. of the Army project 559-01-004. PATR 2406.

Electrical properties of irradiated polymers, by Ralph E. Woodard. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1957. 32p photo, diagr, graphs. Order from OTS. $1.00. PB 131254

A brief discussion is given of the electronic nature of solids as it applies to insulators and then polymers. The fundamental theory of nuclear radiation effects is discussed and shown to be associated with the laws of energy dissipation of these radiation particles within a material. A survey is given on the role that nuclear radiation plays in polymer kinetics. Work of various investigators on the electrical properties of irradiated polymers is reported. An analogy is drawn between photoconductivity in semi-conductors and nuclear radiation induced conductivity in certain polymers. The instantaneous nature of this induced conductivity is emphasized. The change produced in the dielectric constant of an irradiated polymer is considered in terms of cross-linking and dipole moments. A survey is included of the available engineering data for irradiated polymers. Factors affecting radiation to the electrical properties of two tetraarylmonosilanes is given. AD 130801. Project 7360, Task 73608. Covers work from Mar 1955 - May 1956. AF WADC TR 56-465.

Fluorine-containing polyethers, by Ogden R. Pierce, Donald D. Smith and Robert M. Murch. Dow Corning Corp., Midland, Mich. Feb 1956. 42p tables. Order from CTS. $1.25. PB 131227

The purpose of this research is to synthesize fluorine-containing polymers of the polyether type for evaluation as sealants, rubbers, coatings and adhesives. In particular, the desired properties are thermal stability (up to 500°F.), fuel and oil resistance (up to 400°F), retention of properties at -65°F, and resistance to fuming nitric acid and ozone. AD 92587. Project 7340, Task 73404. Covers work from Apr-Nov 1955 under Contract AF 33-616-2417, Suppl. agreement S 2 (55-1563). For Part 1 see PB 111986. AF WADC TR 55-193, Part 2.

Materials developments and fabrication processes in radomes for USAF ground electronic equipment, by S.C. Nilo. U.S. Air Force. Air Research and Development Command. Rome Air Development Center. Griffiss Air Force Base, Rome, N.Y. Feb 1956. 35p photos, drawing, diagr, graph. Order from OTS. $1.00. PB 121272

The fabrication of air supported and rigid radomes and the development of lightweight fabric material is disucssed. Properties of the new Dacralon fabric are given and compared to the fabrics used in the earlier stages of radome development. Use of coating compounds and their formulations is also discussed, together with results from life service tests. Development and fabrication characteristics of the rigid reinforced plastics radome is given along with the factors that made such radomes desirable. AF RADC TN 56-18.

Organosiloxane polymers containing polar groups in the side chains, by Victor D. Aftandilian and Eugene Rochow. Harvard University, Cambridge, Mass. Feb 1956. 18p. Order from LC. Mi $2.40, ph $3.30. PB 127902

Report of the preparation of trimethylboron, aluminum bromide, boron tribromide, dimethylboron bromide, methyl (chloromethyl) dichlorosilane, methyl (chloromethyl) bis (o-cresoxy) silane, methyl (chloromethyl) silane, and attempted preparation of methyl (dimethylboromethyl) silane. AD 93800. Project 7340, Task 73404. Covers work from Jan-Sep 1955 under Contract AF 33(616)-479. AF WADC TR 54-102, Part 2.

Paints, Varnishes and Lacquers

Heat resistant dibutyl titanate paints for rocket launchers, by T. Rice. U.S. Arsenal, Rock Island, Ill. May 1956. 20p photos, tables. Order from OTS. 50 cents. PB 131268

This report describes tests of three dibutyl titanate base heat resisting paints. These paints contain aluminum flake, zinc dust and olive drab (chiefly iron oxide) pigments. The tests indicate that dibutyl titanate base paints have excellent resistance to temperatures up to 1000 F. Like the silicone type paints, however, the pigmentation must be a

metallic type such as flake aluminum or zinc dust to obtain maximum heat resistance. Ordnance project TB 4-771F, Report 6. D.A. project 593-14-007. RIAL R 56-1385.

Preparation and application of metal protective base coats containing no. 353 frit, by Dwight G. Bennett and W.J. Plankenhorn. Illinois. Engineering Experiment Station, Urbana, Ill. May 1951. 7p. Order from LC. Mi $1.80, ph $1.80. PB 125963

Covers specifications for manufacture of no. 353 frit and for preparation and application of several metal protective base coats containing it. Frit composition, mill batch formulas, coating preparation, metal preparation, coating application and firing procedure are given. AD 150790. Unclassified Sep 30, 1955. AF TR 6543.

Inorganic Chemicals

Energy transfer processes in the thermal decomposition of nitryl chloride, by Harold S. Johnston. Stanford University. Dept. of Chemistry, Stanford, Calif. Jun 1955. 17p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 124000

The thermal decomposition of nitryl chloride has been reinvestigated at low pressures in a 50-liter Pyrex flask from 180 to 250°C. The mechanism of Schumacher and Sprenger has been confirmed. The results show quite clearly that the reaction is first order in reactant throughout a single run, and the first-order rate constants themselves are first-order in initial concentration. Thus these results are definitely in the second-order region of the unimolecular reactions, and the rate is determined by the rate of energy transfer. To study the effect of structure of the activating molecule on the rate of energy transfer to the reactant, the decomposition of nitryl chloride has been studied in the presence of 16 different gases at 203°C. Accompanied by: Thermal decomposition of nitryl chloride. Second order unimolecular rate study, by H.F. Cordes and H.S. Johnston. (Reprinted from Journal of the American Chemical Society, v. 76, 4264 (1954). - Mechanism of the reaction between ozone and nitrosyl chloride, by H.S. Johnston and F. Leighton (Reprinted from the Journal of the American Chemical Society, v. 75, 3612 (1953). - Energy transfer processes in the thermal decomposition of nitryl chloride, by H.S. Johnston and Milton Volpe (Preprint). Contract N6 onr-25131, Project NR 051-246, Technical report 5.

Modulus of rupture of zxt 45 ADP crystals, by B.J. Faraday and D.J.G. Gregan. U.S. Naval Research Laboratory. Aug 1957. 6p diagrs, graphs. Order from OTS. 50 cents. PB 131255

The modulus of rupture (bending strength) of ammonium dihydrogen phosphate (ADP) of the zxt 45 orientation has been determined by the three-point loading method. These measurements were performed with the aid of a breaking apparatus designed for the application of a constant loading rate commencing with the specimen in a zero-load condition. No significant variation of the modulus was observed for different crystal width to length ratios. NRL R 5001.

Study of the oxygen electrode with isotopic techniques, by Myron O. Davies, Milton Clark, Ernest Yeager and Frank Hovorka. Western Reserve University. Dept. of Chemistry. Electrochemical Research Laboratory, Cleveland, O. Aug 1956. 27p. Order from LC. Mi $2.70, ph $4.80. PB 127878

Previous work has indicated that the oxygen electrode on an active carbon surface in alkaline solution is reversible with respect to the oxygen-peroxide couple. Isotopic techniques involving tracer and equilibration experiments with oxygen 18 have been used to develop better knowledge of the electrochemical systems involving the following neutral and ionized particles and their interactions: O_2, H_2O, OH^-, O_2H^-, O_2(absorbed), O_2^-, and electron shifts. For Technical report no. 7 see PB 125200. Contract Nonr-581(00), NR 359-277, Technical report no. 6.

Analytical Chemistry

Analysis of fluorinated organo-metallics. Part II: Determination of fluorine, boron and silicon in organic fluoro-silicon or fluoro-boro-silicon compounds, by Otto Schwarzkopf and Rosemarie Heinlein. Schwarzkopf Microanalytical Laboratory. Jun 1957. 32p tables. Order from OTS. $1.00. PB 131088

For the determination of fluorine and silicon present in organo-fluoro-silicon compounds a method has been devised wherein fluorine is determined as PbCl F and silicon as SiO_2 in the filtrate from PbCl F. A more satisfactory method was the determination of silicon as oxine-silicomolybdate. It was possible to determine silicon either in the presence of fluorine after converting fluoring to fluoboric acid, or to precipitate PbClF and determine silicon in the filtrate. The three methods were tested with a variety of test samples. The preferred method is the determination of fluorine as PbClF and the determination of silicon as oxine salt of silicomolybdic acid after conversion of fluoride to fluoborate. The precision of this method was found to be ±0.3% (absolute). AD 130781. Project 7360, Task 73602. Covers work from 1 Apr 1956 - 30 Nov 1956 under Contract AF 33(616)-3552. AF WADC TR 56-19, Part 2.

Development of a nondestructive test for evaluation of adhesion of electrodeposits on steel as in silver-plated aircraft bearings, by Arch L. Walters and Samuel A. Wenk. Battelle Memorial Institute, Columbus, O. Nov 1953. 65p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 131226

Nondestructive test methods currently being used for the inspection of silver-plated aircraft bearings. The shot peening test, wherein the surface of the silver plate is lightly shot peened under controlled conditions is principally used on bearings having a copper strike. The nickel strike bearings are tested by heating the bearing to 950°F, followed by rough boring, or machining to size and then X-raying the bearing surface. Shot peening will produce wrinkles in poorly bonded areas. The heating method produces blisters, which are readily revealed by X-ray examination following machining. Changes in the Technical Order for the purpose of improving the procedure for silver plating and reducing the occurrence of poorly adherent silver plate at Air Force depots overhauling aircraft engines are proposed. AD 27643. Contract AF 18(600)-124. AF WADC TR 53-218.

Miscellaneous Chemicals

Final report under Contract Nonr-554(00), NR 120-159, by C. Neuberg. New York Medical College, New York, N.Y. Dec 1955. 2p. Order from LC. Mi $1.80, ph $1.80. PB 124551

This contract, originally approved in 1951, centered around the problem of solubilization and migration of insoluble matter in nature as well as of reintegration of solubilized material. It includes the cycles of the elements calcium and phosphorus. Summary will appear in Advances of Enzymology, vol. 17, 1956. Investigations were carried out at Woods Hole on the carbamate reaction, and reported in Arch. Biochem. Biophys. v. 48, p. 169-177, 1955.

ELECTRICAL MACHINERY

Electronics

Correlators for signal reception, by James J. Faran, Jr., and Robert Hills, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Sep 1952. 128p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 125996

An investigation of the possible application of correlation techniques to acoustic receiving systems is under way at this Laboratory. In this first technical memorandum on the subject are presented findings which pertain especially to electronic correlators, including theoretical analysis and practical circuit design. Contract N5 ori 76, T.O. X, NR 384-903. HU ARL TM 27.

Densities and inperfections of single crystals, by A. Smakula, J. Kalnajs and V. Sils. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1955. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124072

The densities of Si, Al, CaF_2, CsI, Ge, TlCl, TlBr and SiO_2 (quartz) have been computed from lattice constants and molecular weights, obtained from International Atomic Weights, and compared with densities as determined by hydrostatic weighing of large single crystals. Contract N5 ori-07801. Contract DA 19-020-ORD-3429. MIT LIR TR 96.

Energy transfer in the high intensity arc, by Marilyn Alder Marquis, Laurence Mead, Samuel Korman and Charles Sheer. Vitro Corporation of America. Vitro Laboratories, West Orange, N.J. Contract AF 18(603)-3. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Steady state treatment of endothermic processes near the anode surface. Apr 1956. 21p graphs, tables. Mi $2.70, ph $4.80. PB 124286

The purpose of this paper is to show, in terms of available experimental data, the applicability of the concept of a steady state approach of input energy supplied to the high intensity arc. The region of interest is that occupied by the vapor phase immediately adjacent to the anode surface. A major concern is with the endothermic processes involved in the establishment of a steady state concentration of vapor species close to the anode surface. Such a steady state vapor phase is characterized by parameters such as the percentage ionization, the average excitation energy, and the average apparent temperature. Values of these parameters are derived and discussed. Experimental data are taken from FIAT Report 1052 (PB 81644) and Journal of Applied Physics, vol. 20, p. 468(1948). AD 87051. AF OSR TN 56-178.

Part II: Qualitative theory of the anode sheath. Date is 1955 or later. 22p graphs. Mi $2.70. ph $4.80. PB 125163

A modification of Finkelnburg's theory of the anode mechanism involving a transfer of energy to both the anode itself and the vapor of the anode in the region of the fall space has been proposed. These modifications appear to be adequate in explaining the super-heating effect, the rise in anode potential, and positive resistance characteristics observed in the high intensity arc. Appendix I: Derivation of approximate formula for potential distribution in the anode sheath of the high intensity arc. - Appendix II: Estimation of the anode sheath thickness for the high intensity arc. AD 87052. AF OSR TN 56-179.

Errors in spectrum analysis by a set of narrow-band selecting filters, by K. H. Haase and F. Vilbig. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Communications Laboratory, Bedford, Mass. Nov 1956. 16p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 126365

This is concerned with the electric spectrum of speech. It is a theoretical investigation of analysis of the spectrum of a speech band. AD 110197. AF CRC TR 56-121.

Evaluation of the principle of a noise-operated AGC system, by Irwin Pollack. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Operational Applications Laboratory, Bolling Air Force Base, Washington, D.C. Aug 1956. 8p tables. Order from LC. Mi $1.80, ph $1.80. PB 126140

Noise levels associated with afterburner operation of jet aircraft have become so intense that speech interphone channels must be set at levels which are potentially damaging to the ear. It has been suggested that a desirable feature of a speech interphone system, designed to work in extremely high noise fields, would be automatic gain adjustment, sensitive to the overall noise level. Only at the highest noise levels, the speech channel could operate at a lower gain. And, thus, the system would not expose personnel continuously to extremely high speech levels. The principle of the system may be termed a "noise-operated" AGC (Automatic Gain Control) interphone system. The present paper merely investigates the feasibility of such a system. No attempt is made to develop the circuitry which could realize such a system, since standard techniques are available for such realization. AD 98816. AF CRC TN 56-4.

Industrial preparedness study on high voltage silicon diodes. Third quarterly progress report, 30 Nov 1956 to 28 Feb 1957, under DA 36-039-sc 72679 (L), by Robert W. Hull and Bernard Kravitz. General Instrument Corporation. Automatic Manufacturing Division, Newark, N.J. Feb 1957. 60p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 128066

Early models of the alloying furnace and the etching machine were put into routine production operation. Preliminary yield figures are given. A coating is described which does not reduce the breakdown voltage.

New method for obtaining maximum gain from Yagi antennas, by H. W. Ehrenspeck and H. Poehler. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Bedford, Mass. Aug 1956. 21p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 125988

In conventional Yagi design, a number of parameters--height, diameter, spacing of director and reflector, and the array length--need to be adjusted separately for optimum performance. By introducing the notion of a surface wave traveling along the array, it is possible to demonstrate experimentally only on the phase velocity of surface wave (which is a function of height, diameter, and spacing of the directors) and on the choice of the reflector. A design procedure is presented that maximizes the gain for a given array length. AF ERD CRRDA TM 56-123.

On the functions of the parabolic cylinder, by David I. Epstein. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Jun 1956. 26p. Order from LC. Mi$2.70, ph $4.80. PB 124855

An addition theorem is obtained for the separated solutions of the reduced wave equation in parabolic cylinder coordinates; it is based on the property that the reduced wave equation is invariant under translations and rotations of the coordinate system. A brief discussion is devoted to the problem of expanding any separated one-valued regular solution in terms of the solutions belonging to the basic set. Certain integrals which arise in diffraction problems and involve functions of the parabolic cylinder are evaluated asymptotically for large values of a parameter. The parameter in question is the reciprocal wavelength of the incident electromagnetic field. AD 88990. Contract AF 18(600)-367. NYU RR BR 19. AF OSR TN 56-270.

Precision density determination of large single crystals by hydrostatic weighing, by A. Smakula and V. Sils. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. May 1955. 11p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 124071

In connection with a study of crystal imperfections precision determinations of density (better than 1×10^{-4} g/cm^3) have been made on large single crystals of Si, quartz, CaF_2, CsI, Ge, TlCl and TlBr. In addition, polycrystalline Al was measured. Contract DA 19-020-ORD-3429. Contract N5 ori-07801. MIT LIR TR 95.

Research on the mechanism of electric conductivity in semiconductors, metals and superconductors. Technical report 2 for period 1 Dec 1955 - 29 Feb 1956 under Contract AF 18(600)-1506, by L. Brillouin. Columbia University. Dept. of Physics, New York, N.Y. Apr 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 124016

CU-2-56-1506, physics. For first report see PB 120403. 1. Waves, Electromagnetic - Coupling 2. Conductors, Semi - Electrical conductivity 3. Contract AF 18(600)-1506, Technical report no. 2.

Simulation study for the period 1 Feb - 30 Apr 1956 under Contract AF 19(604)-1572. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories, New York, N.Y. 66p diagrs, (part fold) graphs. Order from LC. Mi $3.90, ph $10.80. PB 125099

The simulation program as outlined in the basic contract includes the development of a digital multitarget radar simulator of high realism and precision, and the further improvement and extention of an existing single-target radar simulator in connection with its application to beam splitting and automatic track-while-scan problems. For 1st-2nd, 4th-5th reports see PB 118824, 118857, 122375, 123416. C-2-56-AF-1572-EE. Progress rept. P-6/133. AF CRC TN 56-970.

Study of the developmental history of selected complex electronic systems, by Robert B. Miller. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Maintainance Laboratory, Lowry Air Force Base, Denver, Colo. Dec 1956. 10p. Order from LC. Mi $1.80, ph $1.80. PB 125975

Information concerning the developmental history of the MA-2 bombing-navigation system and the A-3A fire control system was obtained through interviews with personnel and through examination of records and publications. Data was analyzed to determine: 1. Information relevant to factors in the maintenance job; 2. Usefulness for forecasting maintenance requirements; and 3. Time and sequence in which they normally are developed. AD 098904. Project 7709, Task 37304. Contract AF 18(600)-1203. AF PTRC TR 56-1.

Unconventional electrical power sources, by Paul A. McCollum. Oklahoma Agricultural and Mechanical College. School of Electrical Engineering, Stillwater, Oklahoma. Sep 1955. 75p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.00. PB 131218

The research covered by this report has been directed toward gaining additional information concerning the theoretical and practical limitations and capabilities of generating electrical power by means other than rotating machinery, conventional batteries, or radioactive devices. Data and theory is presented on oscillating electromagnetic induction, the thermocouple, the ion exchange membrane, the fuel cell, and the solar battery. Results of laboratory experimentation is presented on oscillating electromagnetic induction, the thermocouple, and the ion exchange membrane. Objectives of the study and experimentation included the determination of efficiency of energy conversion, weight and size per unit power output, range of voltage and current, life and reliability. Project no. 6058, Task no. 60280. Contract AF 33(616)-2237. AF WADC TR 54-409, Part 2.

Utilization of electromagnetic forces in biological research, by Alexander Kolin. Chicago. University. Division of Biological Sciences, Chicago, Ill. Nov 1955. 73p photo, drawings, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 123912

Summarizes work on three projects: 1. Electromagnetic flow meter; 2. Electromagnetophoresis; 3. Electrophoretic spectra. Final report for the period 1 Mar 1954-30 Sep 1955 under Contract N6 ori-02048. Includes Calculation on electromagnetophoresis by Daniel Leenov; Calculations on electromagnetic convective cooling, by William Lichten; Design of high-frequency generator and accessories, by Cornelius Woods. Accompanied by reprints of articles listed on page 7.

Generators, Motors, Transmission

Feasibility of using magnetic amplifiers with 2 Vanadium Permendur cores, at temperatures up to 500°C, by W. H. Raskin. U.S. Naval Ordnance Laboratory, White Oak, Md. Oct 1956. 9p graphs, diagrs. Order from OTS. 50 cents. PB 131050

Saturable reactor amplifiers were constructed, using 2 Vanadium Permendur cores, which operated successfully at temperatures from -68°C to 500°C. Although the amplifiers were operable at these temperatures, some gain was lost, due to the increased copper resistance at elevated temperatures. NAVORD 4390.

Forced shock oscillations in diffusers, by Joseph G. Logan, Jr. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Apr 1950. 28p photos, drawing, diagr, graphs. Order from OTS. 75 cents. PB 131309

An experimental technique for the study of shock motion in diffusers under the influence of downstream pressure oscillations is described. The results of preliminary experiments indicate that the maximum pressure amplitude of these disturbances that will permit the shock to be retained in a diffuser is, approximately, a linear function of diffuser length and frequency. These experimental results are compared with those predicted theoretically by Kantrowitz. (NACA TN 1225). Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL DD 420-A-32. CAL TM 12

Operational suitability test of generator set, precise power output, type MD-3, GED. Final report. U.S. Air Force. Air Proving Ground Command, Eglin Air Force Base, Florida. Sep 1955. 42p photos, tables. Order from LC. Mi $3.30, ph $7.80. PB 126142

AD 73717. Project APG/CSC/489-A. 1. MD-3, GED (Generator set) 2. Generators, Aircraft -

Electrical properties 3. Generators, Aircraft - Tests

Resistors, variable, wire-wound, precision. Final report on Task IV, Contract DA 36-039-sc-63136, by J.D. Roehm, L.H. Stember, Jr., and P.G. Perry. Battelle Memorial Institute, Columbus, O. Jul 1954. 67p photos, drawings, diagrs, (1 fold), graphs, tables. Order from OTS. $1.75. PB 131216

This is the final report on an air investigation of precision wire-wound, variable resistors (potentiometers). The specific requirement of Task IV is to conduct all related studies, investigations, and tests leading to the establishment of a series of tests and test requirements that will define a minimum quality level for production of these resistors acceptible for military service. For most applications, these resistors are used as precise voltage dividers in accurate control circuits. Dept. of the Army project no. 3-26-00-600. Signal Corps project 2006-A. Contract DA 38-039-sc-631, Task IV, Final report.

Wave action and and movement near Anaheim Bay, California, by Joseph M. Caldwell. U.S. Beach Erosion Board. Feb 1956. 24p photos, maps, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122587

1. Waves, Ocean - Measurement - Anaheim, Calif. 2. Sands, Beach - Movements - Anaheim, Calif. 3. Beaches - Erosion - Prevention - Anaheim, Calif. 4. Profiles, Beach - Tidal action 5. ENG BEB TM 68.

FOOD AND KINDRED PRODUCTS

Interdepartmental radiation preservation of food program. First report. Interdepartmental Committee on Radiation Preservation of Food. Feb 1957. 31p diagr, fold table. Order from OTS. $1.00. PB 131169.

The Interdepartmental Committee was established in May 1956 to develop methods of utilizing ionizing radiation to preserve food and to develop the economics of the process. The report outlines what has been done to date and what is planned for the future.

Precooked frozen foods, a symposium, edited by Marion Bollman and Martin S. Peterson. U.S. Quartermaster Food and Container Institute, Chicago, Ill. Dec 1955. 82p photos, tables. Order from Quartermaster Food and Container Institute, 1819 Pershing Road, Chicago 9, Ill. PB 125953

Contents: Introduction, by John D. Peterman. - Scope and purpose of the symposium, by Donald K. Tressler. - Precooked frozen foods in use: Precooked frozen food research in the Air Force in-flight feeding program, by Edythe L. Robertson. - Precooked frozen food research by the Navy, by Arthur C. Avery. - Use of precooked frozen products in hotels, restaurants, and railroad dining cars, by Paul P. Logan. - Preparation and processing: Precooked frozen meat products, by Gladys E. Vail. - Texture stability in frozen sauces, gravies, and other foods, by Helen Hanson. - Frozen cooked rice, by E.B. Kester and Mildred M. Boggs. - The nutritive value of precooked frozen foods, by Faith Fenton. - Monosodium glutamate and food flavors, by David R. Peryam. - Quality control and stability: Use of antioxidants in precooked frozen foods, by H.R. Kraybill. - Use of quality control programs, by C.F. Evers. - Keeping quality during storage of precooked frozen foods, by J.G. Woodroof and Ethyl Shelor. - Microbiological aspects: Need for sanitation standards in production and processing, by Millard F. Gunderson. - Current microbiological standards of quality for precooked frozen foods and their basis, by Morton M. Rayman, D.A. Huber and Helen Zaborowski. - What can be expected of temperature indicators, by Z.I. Kertesz. - Discussion.

FUELS AND LUBRICANTS

Application of spectrography to the study of reaction mechanisms in low pressure flames. Instrumentation and preliminary studies in the ultraviolet, by G.H. Rothgery and J.T. Grey. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Nov 1948. 34p photos, drawings, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 128890

The scope of this project has been defined as follows: - In connection with jet propulsion engines - to study the mechanism of combustion and attendant reactions through the application of spectrographic and other techniques. This initial technical memorandum deals primarily with the description and operation of the low pressure burner together with the accessory instrumentation plus the spectrographic equipment now being used at the Cornell Aeronautical Laboratory in the study of combustion phenomena at low pressure. Spectrographic examination of stable flames, burning over a wide range of pressures and oxygen/fuel ratios, have been made in the ultraviolet region of the spectrum. For other reports under this contract see PB 128892 and 131315. Project Squid. Contract N6 ori-119, NR 220-041. CAL TM 22. CAL DD 420-A-22.

Flame stability of liquid-vapor air mixtures, by James A. Browning and Merle L. Thorpe. Dartmouth College. Thayer School of Engineering, Hanover, N.H. Oct 1952. 40p diagrs, graphs. Order from OTS. $1.00. PB 131307

The flame stability diagrams for mixtures with air of normal-heptane, iso-octane, and benzene burned in the open atmosphere above Bunsen tubes have been determined under varying conditions of stream temperature and tube diameter. Results are nearly identical to those obtained for gaseous fuels except at low temperatures and high fuel concentrations when a portion of the fuel remains in the liquid phase. The use of a short outer tube enclosing the base of an air-fuel flame serves as an efficient stabilizing device. Flow velocities through the Bunsen tube can be increased to very high values without danger of overheating the stabilization device. Project Squid. Contract N6 ori-105, T.O. III, NR 098-038. Technical memorandum DART-2.

Friction of solid films on steel at high sliding velocities, by Robert L. Johnson, Douglas Godfrey and Edmond E. Bisson. U.S. National Advisory Committee for Aeronautics. Apr 1948. 48p photos, diagr, graphs, tables. Order as TN 1578 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124357

Kinetic friction experiments were conducted on steel specimens with thin inorganic solid films over ranges of sliding velocities between 50 and 8000 feet per minute and loads from 169 to 1543 grams (initial Hertz stress 108,000 to 225,000 lb/sq in.). NACA TN 1578.

Free radicals as fuels, by Karl Scheller, Henry C. Thacher, Jr. and James A. Bierlein. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Feb 1957. 29p graphs, tables. Order from OTS. 75 cents. PB 131076

Certain free radicals--notably H, N, and NH--have been suggested as high energy fuels for aircraft propulsion. The theoretical performance of these substances in rockets and turbojets is examined; improvements in fuel economy of 100% to 700% over conventional fuels are possible in some cases. The practical problems of producing, storing, and using bulk quantities of energetic free radicals are discussed and are shown to be extremely formidable. Active research effort to explore fully the dimensions of these problems is well justified in view of the potentially high payoff in propulsion capability, but such a program must be accepted as a speculative undertaking having relatively low probability of generating a practical development. AD 118101. Project 7013, Task 70350. AF WADC TN 56-538.

Influence of wall material on combustion. Summary report, by P.E. Erbe, J.T. Grey and J.L. Beal. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Sep 1952. 20p diagr, graphs, tables. Order from OTS. 50 cents. PB 131312

The possible catalytic effect of various wall materials and surface conditions on the combustion of premixed fuel and air has been investigated in heavily insulated tubes of small internal diameter. In comparison with Inconel, various metals and their respective oxides exhibited no appreciable difference. Silica, however, exhibited a positive effect. No significant effects could be traced to the internal surface condition of the tube. Project Squid. Contract N6 ori-119, T.O. I, NR 220-041. CAL TM 40.

Low-temperature, heat and oxidation stable materials as possible lubricants and elastomers, by Murray Hauptschein and Charles S. Stokes. Nov 1953. 52p tables. Order from LC. Mi $3.60, ph $9.30. PB 125043

As part of the program of correlating properties with structural features of various types of fluorinated ester-type compounds, a good deal of research was carried out on devising methods for the syntheses of di-, tri-, tetra- and poly-esters. Correlations on the viscosity and surface tension characteristics of the various series of ester-type materials have been made. Contract AF 33(038)-10844. AF WADC TR 53-303.

Spectroscopic study of combustion, by G.H. Rothgery and J.T. Grey. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Project Squid. Contract N6 ori-119, NR 220-041. Order separate parts described below as indicated, giving PB number of each part ordered.

Relative intensity of OH, CH, and C_2 bands in methane flames at low pressure. Mar 1949. 34p photos, diagr, graphs. Order from LC. Mi $3.00, ph $6.30. PB 128892

The study of combustion phenomena at low pressure has been continued through the spectrographic examination in the ultraviolet region of stable flames, burning over a range of pressures and oxygen-fuel ratios. The variation in the intensity of the OH, CH, and C_2 bands as a function of pressure, mass flow, partial pressure of the hydrocarbon, and oxygen-fuel ratio has been evaluated. A correlation between the variations noted in the intensity vs. pressure curves for the OH, CH, and C_2 bands and the mechanism of formation of CH radicals is suggested. For description of equipment used see PB 128890. CAL DD 420-A-24. CAL TM 24.

Summary report. Sep 1951. 21p graphs. Order from OTS. 75 cents. PB 131315

A study of combustion phenomena at low pressure has been made through a spectrographic examination of stable flames. A range of burner pressures and oxygen-fuel ratio has been investigated. The relative intensity of the OH, CH, and C_2 bands has been studied as a function of the combustion parameters,

burner pressure, mass flow, oxygen-fuel ratio, and partial pressure of fuel. A correlation between the variations found for the relative intensity of these bands as a function of pressure and a previously suggested mechanism of formation of CH radicals has been noted. CAL TM 34.

Structure of flames burning in tubes. Part I: Flame structure in slow-burning mixtures of hydrocarbons, air and nitrogen, by George H. Markstein. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Oct 1950. 41p photos, diagr, graphs, tables. Order from OTS. $1.25. PB 131314

In studies of flames burning in tubes, slow-burning flames in rich mixtures of higher hydrocarbons, air and nitrogen assumed a cellular structure, given a non-turbulent approach stream. Lean mixtures gave smooth flames, the transition from cellular to noncellular occurring at stoichiometric composition. A close connection between cellular flame structure and vibratory flame motion was indicated. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL TR 24. CAL 53-P-R.

Study of sprays formed by two impinging jets, by Marcus F. Heidmann, Richard J. Priem and Jack C. Humphrey. U.S. National Advisory Committee for Aeronautics. Mar 1957. 32p photos, diagrs, graphs. Order as TN 3835 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125678

The spray pattern developed by two impinging liquid jets over a velocity range of 5 to 100 feet per second is photographically and numerically described. Surface tension and viscosity effects on the spray pattern are presented for low jet velocities. Characteristics of the jets prior to impingement were also studied. Supersedes TN 2349. NACA TN 3835.

HIGHWAYS AND BRIDGES

Study of ice formation in soils, by Kenneth A. Jackson and Bruce Chalmers. Arctic Construction and Frost Effects Laboratory. New England Division, Boston, Mass. and Harvard University. Division of Engineering and Applied Physics. May 1956. 44p diagrs, graphs. Order from OTS. $1.25. PB 131243

A theory of nucleation of ice in water during freezing is outlined. Nucleation temperatures in water are discussed in terms of surface energy of water molecules, contact angles, and cluster size. Major factors involved during freezing of soil moisture are outlined. The application of the nucleation theory to the freezing of soils is discussed. It is indicated that the force of heaving is dependent upon the amount of supercooling present in the soil moisture. An attempt is made to develop a qualitative theory of soil freezing and heaving. Appendix A. - Freezing temperature of a soil. - Appendix B. - Discussion of cooling curves. - Appendix C. - Outline of theory of frost heave. Contract DA 19-016-ENG-3903, Technical report 65.

Excavations in frozen ground. Part I. Explosion tests in Keweenaw silt, by C.W. Livingston and others. Mining Research Corporation, Inc. Jul 1956. 122p photos, map, diagr, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 124727

Explosion tests in frozen Keweenaw silt were conducted to determine: (1) the most efficient type of explosive for blasts in frozen ground, (2) the fundamental relation between weight of explosive and depth of charge, (3) the proper position of the charge relative to the frozen-ground interface, (4) the feasibility of fracturing the frozen layer by placing a charge in the underlying unfrozen material, and (5) the effect of the diameter of the forehole and of the shape of the charge upon the results of blasting. Dept. of the Army project: 8-66-02-004. Contract DA 11-eng-8, Final report. SIPRE 30.

INSTRUMENTS

E-21 paper tape gas detector. Radio Corporation of America. RCA Victor Division, Camden, N.J. Dec 1949 - Nov 1954. 417p drawings only. Order from LC. Mi $11.10, ph $63.60. PB 129033

Drawings are listed on A8865320 (11 sheets) Drawings are A-C and K series only. 1. E-21 (Gas detector) 2. Detectors, Gas - Design

Film numbering device for numbering sheet photographic film, by Laurence R. Crisp and John M. F. DeBroske. U.S. National Institute of Health. Instrument Section. Jun 1957. 7p drawings. Order from OTS. 50 cents. PB 131230

Describes an optical numbering device constructed around an electrical digital counter, optical system, light source and an external photographic exposure timer.

Functional simulation of complex systems by means of an analog computer with the F-86D, E-4 system as a specific example. Part I, by George A.

Harter and Paul M. Fitts. Ohio State University. Dept. of Electrical Engineering and Laboratory of Aviation Psychology, Columbus, O. Dec 1956. 17p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 126756

Part I of this report describes a technique for analyzing certain types of physical systems for the purpose of determining how the system can be described mathematically and represented by an appropriate set of equations in an electronic computer. Part II describes how the techiques were applied to the development of a specific simulator for representing the F-86D aircraft and its E-4 fire system. AD 098909. Project 7716, Task 77292 and 57050. Contract AF 18(600)-1201. AF PTRC TN 56-133, Part I.

Longitudinal airplane dynamics wind tunnel test equipment, by O.B. Tufts, G.R. Duryea, Jr., R.C. MacArthur and A.H. Zimmerman. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jul 1955. 245p photos, drawings, diagrs, graphs, table. Order from OTS. $4.00. PB 121677

The design and construction of equipment for making longitudinal dynamic stability tests in a wind tunnel is described. The equipment includes a flexible oscillator-support, a calibration model airplane and instrumentation. To the present, the flexible oscillator-support has been operated to about two-thirds design amplitude limits with various ratios of model pitching to plunging motion. The frequencies have included 3 to 9 cps. with tunnel speeds from .30 to .75 Mach number. The structure of the model, which was designed to carry a static load of 1200 pounds, has not been subjected to near capacity load. Contract AF 33(616)-91. AF WADC TR 54-184.

Semi-automatic, size-differentiating droplet counter, by Jack H. Rupe. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Feb 1952. 31p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124759

The study of injector sprays by direct sampling methods has always been hampered by the tedious and time-consuming job of counting and measuring the droplets obtained in a spray sample. In order to facilitate the compilation of size-distribution data, a semi-automatic device capable of counting and segregating the images of droplets into size groups was developed. Power Plant Lab. projects MX801 and MX527. Progress report no. 20-162. Contract W-535-ac-20260. Contract W-33-038-ac-4320. CIT JPL 20-162.

Special ceramic humidity element for use in physiological evaluation of cold weather clothing. Final report. American Instrument Company, Inc., Silver Spring, Md. Jun 1955. 17p drawings (part fold), graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 126108

Includes description of the element, directions for operation and maintenance, and detailed drawings. Prepared for U.S. Navy Clothing Supply Office, Naval Supply Activities, Brooklyn, N.Y. Aminco Reference R-7555. Contract Nonr-1446(00), 1741803.10.

Stress-life relation of the rolling-contact fatigue spin rig, by Robert H. Butler and Thomas L. Carter. U.S. National Advisory Committee for Aeronautics. Mar 1957. 23p photos, diagr, graphs, tables. Order as TN 3930 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125673

The rolling-contact fatigue spin rig was used to test groups of SAE 52100 9/16-inch diameter balls lubricated with a mineral oil at 600,000-, 675,000-, and 750,000-psi maximum Hertz stress. Cylinders of AISI M-1 vacuum and commercial melts and MV-1 (AISI M-50) were used as race specimens. Stress-life exponents produced agree closely with values accepted in industry. The type of failure obtained in the spin rig was similar to the subsurface fatigue spalls found in bearings. NACA TN 3930.

MACHINERY

Effect of corrosion preventives and initial barrier wrappers on preservation of anti-friction bearings, by Linden H. Wagner. U.S. Arsenal, Rock Island, Ill. May 1956. 51p photos, diagr, tables. Order from OTS. $1.50. PB 131262

Because anti-friction bearings removed from storage were observed to be in various degrees of deterioration, the present work was conducted to detect the compatibility of the corrosion preventives and the packaging materials used in their preservation. The investigation disclosed that polyethylene laminates, aluminum-foil, and mold-proofed wrappers showed the most suitable compatibility with corrosion preventives. Ordnance project TB 5-1101E, Report 3. D.A. project 591-07-001. RIAL R 56-1245.

Preliminary studies leading to the development of a submerged combustion boiler. Third annual status report, by L.R. Middleton and G. Golub. Experiment, Inc., Richmond, Va. Jan 1956. 15p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125928

The purpose of the investigation herein reported was to study the applicability of the chloride salt bath as a heat-transfer medium with compact burners. The

motivation for such a study lies in the potential use of the liquid chloride salt, combined with high-heat-release burners, in steam-generating processes that would have capacities of four times the presently used U.S. Navy steam generators for any given volume or package size. This calculated ability results from the higher over-all heat-transfer coefficients of liquid salts over the heat-transfer coefficients of combustion gases and the higher heat release of compact burners over burners now in use. For reports 1-2 see PB 116138 and 120027. EXP 131. TM 792. Contract Nonr-1149(00), Report no. 3.

MEDICAL RESEARCH AND PRACTICE

Final report under Contract N8 onr-60302, by J.M. Severns. Creighton University. School of Medicine. Dept. of Microbiology, Omaha, Nebr. May 1955. 48p tables. Order from LC. Mi $3.30, ph $7.80. PB 124031

Discusses six experiments on the effect of vitamins (biotin, p-aminobenzoic acid, various B complex vitamins, pyridoxine) on vaccinia virus infections in the embryonated chicken egg. Serial M-346-51.

Genetics of laboratory populations of Drosophila. Final report for the period 1 Apr 1952-31 Mar 1955 under Contract Nonr-710(02), by David J. Merrell. Minnesota. University, Minneapolis, Minn. May 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 124058

Objectives of the project were: 1. Study of the adaptive value of specific genes and the roles of natural selection and genetic drift in determining their frequencies. 2. Clarification of the role of sexual isolation and selective mating as evolutionary forces. 3. Study of the development of DDT resistance in experimental populations of Drosophila. 4. An analysis of the gentic and environmental factors causing the development of amelanotic tumor in Drosophila.

Physical, chemical, and biophysical characterization of viruses and virus systems. Final report for the period Sep 1946 to Sep 1954 under Contract N6 ori-168, T.O. II, NR 135-197, by Thomas F. Anderson. Pennsylvania. University, Philadelphia, Pa. May 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 124063

Methods have been developed and used for the study of bacteriophages that are having wide applications not only to other virus problems, but to research in biology and medicine in general. The complex functional anatomy of the T set of bacteriophages has been elucidated and the mechanism of their adsorption on host cells has been studied in detail. Intracellular multiplication of the phages has been followed by a number of methods and has led to an appreciation of the biophysical and chemical processes involved in the virus fields of medical importance to the Navy. For report for 1953 see PB 115879.

Rod-cone interaction in the dark-adapted eye, by John L. Brown and Lois K. Woodward. U.S. Naval Air Development Center. Aviation Medical Acceleration Laboratory, Johnsville, Pa. Apr 1956. 38p diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 125186

The amount of light required to identify correctly the orientation of a pattern of parallel lines was measured with a series of colored lights ranging from blue to red. Subjects were dark adapted and measurements were based on short flashes of light. The situation was analagous to one in which a pilot must read illuminated instruments in short glimpses while most of the time his gaze is directed toward regions illuminated at levels much below that of the instruments. The results indicate that the relative effectiveness of different wavelength distributions of light depends on the fineness of the lines in the test pattern. With a transition from coarse lines to fine lines, there is a change in the relative effectiveness of different colored lights which corresponds to a change from the rod to the cone receptors. For lines of intermediate thickness, correct identification of line orientation appears to depend on the combined function of rods and cones. NMRI Proj NM 001 110 300, Report no. 1. NADC MA 5604.

Studies on a group of oximes as chemotherapeutic compounds in Sarin poisoning (U), by L. Dultz, M.A. Epstein, G. Freeman, E.H. Gray and W.B. Weil. U.S. Chemical Corps. Chemical Warfare Laboratories, Army Chemical Center, Md. Sep 1956. 13p graphs, tables (1 fold). Order from LC. Mi $2.40, ph $3.30. PB 125599

A series of oximes were studied in relation to Sarin poisoning. Several of these compounds have chemotherapeutic activity in protecting poisoned animals from death. The most effective, 2-oximino-3-bitanone (DAM) protects mice against three LD_{50}'s of Sarin and rats against 20 LD_{50}'s. The fate of this compound in vivo has been presented in some detail and a preliminary evaluation has been made of its toxicity following repeated administration. Project No. 4-08-02-018-04. CC CWL R 2069.

Studies on erythrocyte-antibody reactions and on mechanisms of erythrocyte destruction. Technical report no. 14 for period 1 Sep 1946 - 30 Jun 1955 under Contract N6 ori-126-v, NR 102-174, by Lawrence E. Young. Rochester. University, Rochester, N.Y. Jul 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 124009

Covers: I. Development of laboratory methods; 2. Studies on erythrocyte-antibody reactions, and

III. Studies on mechanisms of red cell destruction not involving demonstrable antibodies. Final report. Project carried title "Immunologic studies on red blood cells", from 1946-1950.

METALS AND METAL PRODUCTS

Crystal plasticity, a survey: Part II: Experimental studies of the plastic deformation of single crystals, by Lawrence Malvern. Brown University. Graduate Division of Applied Mathematics, Providence, R.I. Nov 1948. 155p diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 126168

Experimental studies were made of the plastic deformation of single crystals. The relationship between cold working and change in hardness, energy stored, magnetic properties, density, elastic constants and electrical resistance are discussed from the point of view of the dislocation theory of plastic deformation. Internal friction in single crystals has been interpreted in terms of dislocations. Mechanical studies were also made of plastic deformation of metals. The deformations measured were the elongation of gauge lengths between small indentations previously made in the surface. The indentation hardness measurements complemented the deformation measurements and gave a better idea of the variation within a grain. The results are further supported by the evidence from microscopic observation of slip lines. Contract N7 onr-358, T.O. 1, NR 041-032. GDAM A 11-S3.

Cyclic loading effects on the creep properties of sheet materials, by F.J. Gillig and G.J. Guarnieri. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Sep 1951. 35p photots, graphs. Order from OTS. $1.00. PB 131311

An investigation was made to determine the effects of cyclic loading on the high temperature creep deformation rate of metals, particularly as related to conditions encountered in jet propulsion engines. Armco iron and commercial high purity aluminum were used to establish generalizations concerning the following variables: (a) amplitude of cyclic load between O and 50% of the mean stress, (b) temperature (cold working and annealing ranges), and (c) frequency of load variation from 1.5 to 4,200 cycles per minute. The data show that the superposition of a cyclic load upon a static tensile load in a creep test on Armco iron will not necessarily cause deformation to proceed at an increased rate provided the frequency is high enough for conditions of stress and temperature which prevail. Only a limited amount of data was obtained for the aluminum prior to termination of the project. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL DD 420-A-38. CAL TM 38.

Development of precision forgings. Final report, by R.D. Huffington. Boeing Airplane Company, Seattle, Wash. Apr 1956. 234f photos, drawings (part fold), diagrs, graphs, tables. Order from LC. Mi $10.20, enl pr $36.30. PB 128996

The object of this study is to investigate the design limitations and manufacturing requirements for precision forgings in order to make possible improved configurations which would reduce the cost of final airplane parts. Five aluminum-alloy precision forgings currently machined from conventional forgings were redesigned so that they could be made from close-tolerance forgings. Of these, two low-draft and two no-draft precision forgings were ordered into experimental production. The forgings received were subjected to detailed dimensional inspection, strength tests, and machining tests. AD 97465. B-52 Manufacturing processes analysis. Study no. 2. D-14460-F-2. Contract AF 33(600)-23223.

Effect of elevated temperature on the fatigue strength of sintered-aluminum powder, by W.S. Hyler and H.J. Grover. Battelle Memorial Institute, Columbus, O. Aug 1955. 50p photos, drawings, graphs, tables. Order from OTS. $1.25. PB 131225

Three sintered aluminum products were shown to have equal or better unnotched fatigue strength at 800 F than do most wrought aluminum alloys at 400 to 500 F. However, notched specimen behavior suggests that these materials at 800 F and above may be notch sensitive. All three materials were observed to have metallurgical discontinuities in the form of a second phase or as inclusions. Metallographic observation showed that such discontinuities frequently were associated with the origin of the the fatigue failure. AD 74150. Project 7351, Task 70627. Contract AF 33(616)-434. AF WADC TR 55-212.

Effect of vibrations on the yield strength of a low-carbon steel. First technical report, by Gale E. Nevill, Jr. and Franz R. Brotzen. Rice Institute, Houston, Tex. Apr 1957. 31p photo, diagrs, graphs, tables. Order from OTS. $1.00. PB 131260

Experimental results show that, when a specimen is subjected to vibration in the frequency range from 15 kc to 80 kc, the steady stress necessary to cause plastic deformation is appreciably reduced. This reduction is examined under different conditions of vibrational amplitude, frequency, strain, and temperature. Several possible explanations for this decrease in yield strength have been considered on the basis of dislocation theory. A discussion and a detailed picture of the responsible mechanisms are included. AD 126463. Contract AF 49(638)-78. AF OSR TN 57-170.

Investigation of materials fatigue problems, by H.N. Cummings, F.B. Stulen and W.C. Schulte. Curtiss-Wright Corporation. Propeller Div., Caldwell, N.J. Mar 1957. 221p photos, graphs, tables. Order from OTS. $5.50. PB 131288

The studies of high-hardness steels that were begun under Contract AF 33(616)-493 were continued. S-N curves were obtained for SAE 4340 air-melted steel of 230 ksi UTS and vacuum melted steel of 190 ksi UTS. Several steels of 300 ksi UTS were investigated by Prot tests, and S-N curves were obtained for a 4350 steel of the same UTS. Studies of the relation of non-metallic inclusions to fatigue life and strength of the steels were continued and exploratory studies were made of crack initiation and propagation. The applicability of the Prot method of testing to four non-ferrous metals was also included in the work done under the present contract. Projects 7360 and 3346, Task 73604 and 73497. Covers work from 1 Apr 1955-31 Dec 1956 under Contract AF 33(616)-2876. AF WADC TR 56-611.

Isothermal sections in the systems molybdenum-tungsten-carbon and molybdenum-titanium-carbon, by Henry J. Albert. Massachusetts Institute of Technology, Cambridge, Mass. Jun 1955. 13p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124159

In the molybdenum-carbon phase diagram, the existence of an MoC phase at high temperature has been confirmed. This phase decomposes to Mo_2C and carbon on cooling. In the Mo-W-C isothermal section at 1710°C, a single phase field was found to extend between Mo_2C and W_2C. No appreciable solubility of molybdenum in WC or tungsten in MoC was found. A small solubility of titanium in Mo_2C was found in the Mo-Ti-C isothermal section at 1710°C. To a much lesser extent, titanium is soluble in MoC. Molybdenum is very soluble in TiC and at 50 atomic percent carbon almost all the titanium may be replaced by molybdenum. Thesis - Massachusetts Institute of Technology. Contract N5 ori-07817, NR 039-008, Technical report no. 5.

Limiting high temperature creep and rupture stresses of sheet alloys for jet applications, by G.J. Guarnieri and J. Salvaggi. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Sep 1951. 51p graphs, tables. Order from OTS. $1.50. PB 131310

The high temperature creep and fracture stresses have been determined for 24 alloys in sheet form over the range of service temperatures and times of interest to designers of jet aircraft parts. Included are steels representative of the low alloy ferritic and austenitic stainless types, cobalt base alloys, Inconel X, 24S-T3 alclad aluminum and FS-1H magnesium. While the data presented were obtained from a single heat for each material, they provided a design basis for efficient utilization of sheet alloys in high temperature service. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL DD 420-A-39. CAL TM 39.

Physical properties of titanium and titanium alloys, by W.J. Lepkowski and J.W. Holladay. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Jul 1957. 87p graphs, tables. Order from OTS. $2.25. PB 121629

This report summarizes the information in the literature on the physical properties of titanium alloys. In some cases, an evaluation of the published results was made so that the most accurate value for the properties could be indicated. In other instances, insufficient background information accompanied the original data to permit an evaluation. The latter was the usual case when information on commercial alloys was presented. Revision and extension of TML R 39 (PB 121613). BMI TML R 73.

Porosity in formed titanium, by R.A. Wood, D.N. Williams, H.R. Ogden and R.I. Jaffee. Battelle Memorial Institute. Titanium Metalurgical Laboratory, Columbus, O. May 1957. 42p photos, graphs, tables. Order from OTS. $1.25. PB 121628

A new type of material failure has been found in parts formed of commercial-purity titanium. Surface pitting and internal voids are formed in areas of the part which have been highly strained. The phenomenon has been named strain-induced porosity. A study of the occurrence of this phenomenon showed that deformation temperature, amount of strain, strain rate, state of stress, and amount and kind of impurity could affect the degree of the porosity. The same kind of porosity has been found to occur in many other metals and alloys, and it is believed to be a normal part of the mechanism of deformation in ductile materials. BMI TML R 72.

Preliminary metallographic studies of ball fatigue under rolling-contact conditions, by H. Robert Bear and Robert H. Butler. U.S. National Advisory Committee for Aeronautics. Mar 1957. 38p photos, diagrs, table. Order as TN 3925 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125679

The metallurgical results produced on balls tested in rolling-contact fatigue spin rig were studied by metallographic examination. Origin and progression of fatigue failures were observed. These evaluations were made on SAE 52100 and AISI M-1 balls fatigue tested at room temperature (80°F) and 200° to 250°F. Most failures originated subsurface in shear; inclusions, structure changes, and directionalism adversely affected ball fatigue life. Structures in the maximum-shear-stress region of the balls of both materials were stable at room temperature and unstable at 200° to 250°F. Failures were of the same type as those found in full-scale bearings. NACA TN 3925.

Record of conference on fatigue of metals at high temperatures, by Philip K. Porter and H.J. Yearian. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. May 1950. 177p photos, drawings, diagrs, graphs, tables. Order from OTS. $4.50. PB 131313

Sponsored by the Materials Panel of Project Squid, in Washington, D.C. on 24 May 1950. Contents: 1. Past work on the fatigue of metals in the high temperature field, by Thomas J. Dolan. - 2. Current theories of fatigue, by A.M. Freudenthal. - 3. Elevated temperature fatigue testing at Air Materiel Command, by F.B. Fuller. - 4. High temperature fatigue program of the Bureau of Aeronautics, by N.E. Promisel and E.L. Olcott. - 5. Strain rate aspects of fatigue testing, by N.J. Grant. 6. Effect of notches and shot peening on high temperature fatigue properties, by W.E. Jones and G.B. Wilkes. - 7. High temperature fatigue program at C.A.L., by L.W. Smith. - 8. Creep and rupture properties of temperature resistant materials under unidirectional and reversed fatigue stress, by B.J. Lazan. - 9. Some high temperature tensile fatigue data on gas turbine alloys, by Ward F. Simmons and Howard C. Cross. Contract N6 ori-119, T.O. 1. CAL 60-R.

Short time high temperature bending fatigue properties of sheet materials, by F.J. Gillig. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Sep 1949. 32p photos, drawing, graphs, tables. Order from OTS. $1.00. PB 131319

Qualitative short-time high-temperature fatigue studies were made for three heat resistant alloys. The complexity of the mechanism of high temperature fatigue failure was established. The investigation brought out the limitations of the constant deflection type fatigue machines for high temperature work. Project Squid. Contract N6 ori-119, T.O. 1, Phase 3, NR 220-041. CAL TM 30

Stainless steel and titanium sandwich structures, by W.J. Lewis, G.E. Faulkner and P.J. Rieppel. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Aug 1957. 39p drawings, tables. Order from OTS. $1.00. PB 121633

This report is a summary of the available information in published literature and Government research reports on stainless steel and titanium sandwich structures, and also information obtained in surveys of companies fabricating and developing sandwich structures. The report includes a discussion of the fabrication techniques used to produce sandwich structures and methods of evaluating them. Sections are also included on the development work under way on sandwich structures. BMI TML R 79.

METEOROLOGY AND CLIMATOLOGY

Approach to quantitative precipitation forecasting, by Mariano A. Estoque. Chicago. University. Dept. of Meteorology. May 1956. 15p maps, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 125067

A quantitative method of predicting precipitation due to large-scale vertical motions is described. A two-level prediction model is applied at the 1000 and 500 mb pressure levels. Solutions are obtained by a graphical procedure which enables one to obtain a 24-hour forecast in about two hours. Tests on 10 cases of major cyclone developments show some success. Contract AF 19(604)-1293, Scientific report no. 7. AF CRC TN 56-490.

Arctic sense. U.S. Office of Naval Operations. Aviation Training Division. 1944. 33p drawings. Order from LC. Mi $3.00, ph $6.30. PB 125768

1. Airplanes - Climatic effects 2. OPNAV 33-17 3. NAVAER 00-80Q-13

Atlas of representative cometary spectra, by P. Swings and L. Haser. Liége. University. Institute of Astrophysics, Cointe-Sclessin, Belgium. n.d. 171p photos, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 125048

The need for an atlas of this type has long been recognized by astrophysicists and by research scientists working in solar and upper air physics, combustion phenomena and flame spectroscopy. This atlas illustrates as many aspects as possible of cometary spectroscopy. Related laboratory spectra are also reproduced. Each plate is accompanied by short description of the main features and observational data. For additional information see PB 125615. Contract AF 61(514)-628. AF CRC TR 56-267.

Atmospheric attenuation at K-band radio wavelengths, by J.E. Gibson. U.S. Naval Research Laboratory. Aug 1957. 23p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 127337

Absolute measurements of K-band radiation from extraterrestrial sources require the determination of attenuation due to atmospheric oxygen and water vapor. Prior theoretical work of Van Vleck and Schulkin has given expressions for the attenuation of these atmospheric gases along a path through a uniform atmosphere. In the present report the incremental fractional absorption as a function of height is calculated for wave-lengths of 0.86, 1.8, and 3.0 cm. NRL R 4966.

Atmospheric perturbations, by B. Haurwitz. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Dec 1956. 39p. Order fromLC. Mi $3.00, ph $6.30. PB 125095

On the basis of the still rather scanty observational data and with the aid of reasonable theoretical concepts an attempt has been made to construct a new mean picture of the wind field in the mesosphere for the summer and winter seasons, at least for the Northern hemisphere. A possible mechanism is described for the formation of internal solitary waves, and a case study is discussed in support of this mechanism. It is suggested that these conditions are often responsible for the formation of tornadoes. A theoretical model of a tornado has been developed which consists of pure sink and a pure vortex. The case of a severe duststorm is studied empirically and theoretically. The physics of dust raising is critically reviewed. The hypothesis is advanced that severe duststorms may be associated with pressure jump lines, and it is shown that the synoptic case studied supports this conjecture. Contract AF 19(604)-1006. Project 299, Final report. AF CRC TR 56-468.

Continental water balance, ground water inventory and storage times, surface ocean mixing rates and world-wide water circulation patterns from cosmic ray and bomb tritium, by Friedrich Begemann and W.F. Libby. Chicago. University. Enrico Fermi Institute for Nuclear Studies, Chicago, Ill. Nov 1956. 38p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124916

The tritium produced during the Castle Operation in the spring of 1954 has been used to study the circulatory rates for waters in the Northern Hemisphere, particularly in the northern Mississippi Valley. It is observed that rains following Castle are lower in tritium content than the ground water and this difference has revealed that about 67 percent of the rain in the Mississippi Valley is ocean water and about 33 percent re-evaporated ground water. This allows the total inward transport of ocean water to be calculated. Studies of the circulatory pattern of hot springs have shown that in the main hot spring waters are rainwater that has been stored for relatively brief periods. Study of groundwaters has shown that in large areas, the water issuing from wells dug for normal use is fossil in origin in the sense that it is older than 50 years. AD 110381. Contract AF 18(600)-564. AF OSR TN 56-561.

Coupling between moving loads and flexural waves in floating ice sheets, by James T. Wilson. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Sep 1955. 34p photo, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 124726

The elementary theory of coupling or resonance between a moving load and the flexural waves generated by it in a floating ice sheet is developed and verified by experiments. Experiments were carried out, using one and two vehicles as moving loads on ice sheets one to two feet thick. Attempts to solve the problem of a semi-infinite plate on an elastic foundation with a free edge under concentrated load (ice-breaker problem) are reported. No satisfactory solution was obtained. Project 2143. Dept. of the Army project 8-66-02-004. Contract DA 11-190-Eng-8, Final report. MU ERI Proj 2143. SIPRE 34.

Evaluation of the physical processes occurring at and near the tropopause, by Dean O. Staley. Washington. University. Dept. of Meteorology and Climatology, Seattle, Wash. Sep 1956. 88p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 124714

The major physical processes at and near the tropopause are evaluated. It is suggested that turbulent enthalpy flux is divergent for positive curvature of the temperature profile and thereby creates a tropopause by increasing curvature of the temperature profile. Turbulent enthalpy flux is reformulated to verify that the flux can be divergent for positive curvature of the temperature profile. Occasional report 5. Air motions study, II. Contract AF 19 (604)-314, Scientific report no. 2. AF CRC TN 56-864.

Experiment in prognostication, by S. Petterssen, M.A. Estoque and Lawrence A. Hughes. Chicago. University. Dept. of Meteorology, Chicago, Ill. Jul 1956. 34p diagrs, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 125079

An experiment was conducted during the period 11 January to 21 February, 1956 for the purpose of determining the manner in which graphical integration can best be used in providing prognostic charts for sea level and for the 500 mb level. While the graphical integrations were used as a first approximation, supplementary techniques were applied to obtain final forecasts of the pressure distribution at sea level. The results of the verification are discussed and compared with those pertaining to other forecasting procedures. The geographical distribution of errors is discussed and interpreted. Contract AF 19(604)-1293, Scientific report no. 12. AF CRC TN 56-673.

Final report under Contract AF 19(122)-409, by V. F. Hess and H.A. Miranda, Jr. Fordham University. Dept. of Physics, New York, N.Y. n.d. 11p. Order from LC. Mi $2.40, ph $3.30. PB 124772

This report summarizes the work described in Scientific Reports number 1-7, inclusive. The bulk of the work was concerned with the components causing ionization in the atmosphere. AD 110203. Date is 1956 or later. For Scientific Report no. 7 see PB 125617. AF CRC TN 56-454.

Final report under Contract no. AF 19(122)-470, by R.W. Nicholls. University of Western Ontario. Dept. of Physics, London, Ontario, Canada. Jun 1956. 113p tables. Order from LC. Mi $5.70, ph $16.80. PB 124709

Those researches of the Molecular Excitation Group, University of Western Ontario, which have been supported during 1951-1956 by Contract AF 19(122)-470 are reviewed in detail and contributions which the group has made to the knowledge of molecular excitation processes and basic molecular properties are emphasized. AF CRC TR 56-451.

Forecasting rules and techniques used in Tokyo Weather Central, by Donald E. Martin. Tokyo Weather Central. 1st Weather Wing, Tokyo, Japan. Aug 1956. 157p maps (part fold), diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 125184

Color will not reproduce. Special study 105-2. 1. Weather charts - Japan 2. Weather forecasting - Aids - Japan 3. Weather forecasting - Methods - Japan 4. Meteorological research - Japan

Investigation of atmospheric radio noise. Scientific report no. 12 for the period 1 Apr - 30 Jun 1956 under Contract AF 19(604)-876, by A.W. Sullivan. Florida. Engineering and Industrial Experiment Station. Dept. of Electrical Engineering, Gainesville, Fla. Aug 1956. 22p diagrs (part fold). Order from LC. Mi $2.70, ph $4.80. PB 125147

For 1st-10th reports see PB 113559, 113764, 116122, 116123, 116501, 116979, 117733, 119364, 119807 and 123165. 1. Noise, Atmospheric - Measurement 2. Radio - Noises 3. Instruments, Measuring - Noise 4. Analyzers, Noise - Design 5. Contract AF 19(604)-876, Scientific Report no. 12 6. AF CRC TN 56-557

Marine meteorology: a critique of methods of estimating large-scale vertical motions in the atmosphere, by Emanuel M. Ballenzweig. Woods Hole Oceanographic Institution, Woods Hole, Mass. Sep 1955. 44p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124889

A synoptic study of the heating of cold air as it flows off the coast of North America was initiated. It was found that an important parameter, the vertical motion, could not be determined reliably by the Bellamy-Sheppard technique. It was thought that a review of the various methods of estimating vertical velocity would lead to a better understanding of the problem. The conclusion reached is that the calculation of vertical motion by most kinematic techniques to a reliability better than ±50 per cent borders on the impossible over the ocean; the only hopeful avenues are (1) the application of vorticity methods, using geostropic vorticity, and (2) a crude kinematic technique founded on an empirical rule with an indeterminate physical basis. Contract Nonr-1721(00), NR 082-021, Technical report no. 36. WHOI Ref 55-53.

Notes on cometary spectra, by P. Swings and L. Haser. Liége. University. Institute of Astrophysics, Cointe-Sclessin, Belgium. n.d. 22p table. Order from LC. Mi $2.70, ph $4.80. PB 125615

Provides additional information on topics briefly considered in introductory text of the "Atlas of Representative Cometary Spectra" (PB 125048). Section I is devoted to a discussion of instrumental and observational factors. Section II deals with various aspects of comet models. Contract AF 61 (514)-628-C, Technical report no. 2.

Penetration of the secular field through a mantle with variable conductivity. Part I, by Keith Leon McDonald. Utah. University. Dept. of Physics, Salt Lake City, Utah. Apr 1956. 47p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125619

An extrapolation of the geomagnetic secular variation from the earth's surface to the core-mantle boundary has previously been carried out for an insulating mantle (PB 119923). An improved estimate requires a knowledge of the electrical conductivity throughout the mantle. The work reported on here is an investigation of the radial distribution of σ. Technical report 19 under Contract Nonr-1288(00): Earth's magnetism and magnetohydrodynamics.

Properties of single crystals of ice, revealed by internal melting, by Ukichiro Nakaya. U.S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ind. Apr 1956. 191p photos, diagrs, graphs, tables. Order from LC. Mi $8.00, ph $30.30. PB 125901

Internal melting of a single crystal of ice causes a cavity, shaped like a flower of six petals, which is called a "Tyndall figure." This cavity is filled with water except for a vapor bubble. When refrozen this bubble remains in the ice as a hexagonal disk which is called a "vapor figure". The deformation of the vapor figure under isothermal conditions was investigated and considered to be chiefly due to vapor transfer rather than migration of water molecules on the ice surface. Project 22. 1-3. Dept. of the Army project: 8-66-02-004. SIPRE RP 13.

Radon content of the atmosphere in the New York area as measured with an improved technique, by H.A. Miranda, Jr. Fordham University. Dept. of Physics, New York, N.Y. Sep 1956. 51p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 125617

A method has been developed for determining the radon concentration of the air, both at the ground, and in the upper atmosphere, employing cocoanut charcoal as a concentrating agent. The method as adapted for upper air sampling, is capable of measuring a radon concentration of 4.4×10^{-15} curie per liter. Four determinations of the radon distribution with height up to 10,000 feet were carried out, with a view to testing the feasibility of the method. Large and unexpected variations in radon concentration from one level to another were observed. AD 110201. Contract AF 19(122)-409, Scientific report no. 7. AF CRC TN 56-850.

Review of sound propagation in the lower atmosphere, by Wesley L. Nyborg. Brown University. Dept. of Physics, Providence, R.I. May 1955. 232p map, drawing, diagrs, graphs, tables. Order from LC. Mi $10.20, ph $36.30. PB 128410

A critical review is given of available information on sound propagation through the lower atmosphere. The application is to the prediction of sound fields due to aircraft (in flight or on the ground), especially, at distances up to a few miles from the aircraft sound sources. Treatment of the prediction problem requires consideration of a number of topics including (1) absorption processes in the air, (2) boundary effects caused by the earth and (3) refraction of sound due to spatial variations in air temperature and wind. Although a fair amount of information is now available on these topics, a considerable amount of research remains to be done before practical solutions will be available. AD 67880. Project 7212, Task 71709. Contract AF 33(616)-340. AF WADC TR 54-602.

Rotational frequencies and absorption coefficients of atmospheric gases, by S.N. Ghosh and H.D. Edwards. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Physics Laboratory, Bedford, Mass. Mar 1956. 40p graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 126113

AD 98763. 1. Waves, Electromagnetic - Absorption 2. Waves, Electromagnetic - Radiation 3. Waves, Electromagnetic - Transmission 4. Gases, Atmospheric - Absorption 5. AF CRC TN 56-202 6. AF GRD SG 82

Space and time variations of the atmospheric-electric field. (Prostranstvennye i vremennye variatsii electricheskogo polia v atmosfere), by P.N. Tverskoi. Translated by Michael M. Dane and David Kraus. Feb 1956. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124164

The present article constitutes a short summary of the results of some recent investigations which might help solve the problem: why does the earth's surface have a negative charge and why is this negative charge constantly maintained? Translated for the Geophysics Research Directorate, AF Cambridge Research Center by the American Meteorological Society under Contract AF 19(604)-1364 from Vestnik Leningradskogo Universiteta 2(12): 3-21, 1947.

Study of certain problems in the field of absorption of microwave energy in the atmosphere. Quarterly progress report no. X, covering period 1 Oct 1955 - 31 Dec 1955 under Contract AF 19(604)-831, by Edwin K. Gora. Providence College. Dept. of Physics, Providence, R.I. Jan 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 124019

For Quarterly progress reports no. 1-4, 6-7 and 9 see PB 112611, 113557, 115001, 115056, 116955, 117639 and 119452. Discusses Technical report no. 2 (PB 124018). 1. Radio waves - Absorption - Theory 2. Ozone - Spectrographic analysis

Study on the morphology of magnetic storms: Arc-lengths along the lines of force of a magnetic dipole. Scientific report no. 3 under Contract AF 19(604)-1048, by Sydney Chapman and Masahisa Sugiura. Alaska. University. Geophysical Institute, College, Alaska. May 1956. 6p diagr, tables. Order from LC. Mi $1.80, ph $1.80. PB 124863

Formulae and tables for the arc-length along the lines of force of a magnetic dipole are given with reference to the earth treated as a sphere. These tables may prove useful in connection with the study of radio whistlers and of the motion of charged particles along the line of geomagnetic force. AF CRC TN 56-492.

Summary of climatic observations, 1954. Drexel Institute of Technology. Laboratory of Climatology, Centerton, N.J. 1955. 10p tables. Order from LC. Mi $5.70, ph $16.80. PB 125100

Publications in climatology, vol. VIII, no. 2. 1. Tables, Meteorological 2. Climatology - Research 3. Contract AF 19(604)-1118, Scientific report no. 1. AF CRC TN 57-250

Tables of thermodynamic properties of argon-free air to 15,000°K, by Joseph Hilsenrath and Charles Beckett. U.S. National Bureau of Standards. Thermodynamics Section, Washington, D.C. Sep 1956. 44p tables. Order from OTS. $1.25. PB 131276

The thermodynamic properties ($Z = PV/RT$, E/RT, H/RT, S/R, and Pressure) are given for equilibrium mixtures of dissociated and ionized molecules and atoms of the elements nitrogen and oxygen having the low temperature composition of .78847 N_2 and .21153 O_2. The tabulated properties of this

mixture (a close approximation to the properties of air) are given at close intervals from 2000° to 15,000°, for 41 densities spaced uniformly in log ρ/ρ_o - between 10 and 10^{-6} times the normal density. The results are based on chemical equilibria between the species O_2, O_2^+, N_2, N_2^+, NO_2, N_2O, NO, NO^+, O^-, O, O^+, O^{++}, N, N^+, $N^{++}$and electrons. The method of presentation permits later corrections for the effect of argon and CO_2 and the contribution of intermolecular forces. The calculations are based on 9.758 e.v. as the dissociation energy of molecular nitrogen and 1.45 e.v. as the electron affinity of atomic oxygen. AD 98974. AF AEDC-TN-56-12. MIPR-AEDC-1.

Theoretical studies of infrared spectra of atmospheric gases, by William S. Benedict. Johns Hopkins University. Laboratory of Astrophysics and Physical Meteorology, Baltimore, Md. Jun 1956. 73p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 125188

A summary is given of the results of several investigations concerned with the intensities and shapes of spectral lines in the infrared region. First, a theoretical study was made of the intensities of all of the vibrational transitions in CO_2 that give rise to absorption in the infrared beyond 1.4 microns. The basic theory, making use of second-order perturbed harmonic-oscillator wave-functions, is developed and comparison is made with existing experimental data on the strengths of over twenty bands. The second topic concerns the intensity of lines and bands in H_2O. The third topic concerns the general methods of determining the strength, width and shape of spectral lines from infrared laboratory measurements. A discussion is given of methods by which the strengths, widths and shapes of spectral lines may be derived from measurements obtained with spectrometers whose resolving power is sufficient to separate individual spectral lines but is insufficient to portray accurately the true line contour. Contract AF 19(604)-1001, Final report. AF CRC TR 56-275.

Velocity spectrum of cosmic ray particles at thirteen grams atmospheric depth, by E. Nelson Mitchell. Minnesota. University. Dept. of Physics, Minneapolis, Minn. 1955. 74p photos, diagrs, drawings, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 124708

Two balloon flights have been made at geomagnetic latitude of 55 degrees carrying a Cerenkov detector whose mean pulse height is velocity dependent and is thus capable of providing an independent check on the velocity spectrum at this latitude. The Cerenkov detector was operated in coincidence with a Geiger counter telescope on both flights, and the detector was surrounded by a ring of guard counters on the second flight. It was found that the detector performed approximately, but not entirely, as Cerenkov theory predicts. On the first flight, data was gathered which made it possible to examine the variation of the shape and position of the pulse height distribution with altitude. From this study, qualitative information was obtained concerning the nature of the transition of the primary flux as it passed down through the atmosphere. On the second flight data was collected at thirteen millibars which gave quantitative information on the primary flux and the total flux at that altitude. Research conducted by Cosmic ray group. Thesis - University of Minnesoata. Contract N6 onr 246.

Weather radar research. Final report, by Pauline M. Austin. Massachusetts Institute of Technology. Dept. of Meteorology, Cambridge, Mass. Mar 1956. 25p graphs. Order from LC. Mi $2.70, ph $4.80. PB 125169

Dept. of the Army project: 3-99-07-022. Signal Corps project: 24-172B. Reviews work from 1 Mar 1955-29 Feb 1956 under Contract DA 36-039-sc-64472.

MINERALS AND MINERAL PRODUCTS

Evaluation of the engineering properties of titanium carbide base cermets, by John C. Redmond, Robert J. Reintgen, James R. Fenton and Maurice E. Simon. Kennametal Inc., Latrobe, Pa. Jul 1956. 67p photos, drawings, graphs, tables. Order from OTS. $1.75. PB 131026

The work included tensile stress-strain to rupture, fatigue and two types of impact testing. The tensile stress-strain test proved very useful in rapidly evaluating compositions both with regard to their potential high temperature strength and their toughness. Based on this, some newer compositions with a nickel-chromium-tungsten alloy phase were found to have much more toughness than heretofore available with useful high temperature strength up to 1800°F. The stress to rupture testing revealed some compositions possessing 100-hour strength of 18,000 psi at 1800°F, the highest yet attained in titanium carbide base cermets. The fatigue testing widened the variety of compositions so evaluated and showed they all have good fatigue strength. In impact testing some compositions were found to be very much superior to older ones having strengths approaching 20 inch-pounds together with better failure characteristics. AD 110721. Final report. Covers work from May 1954 - Jun 1956 under Contract AF 33(600) - 26978. AF WADC TR 57-25.

Melting point depression and its structural interpretation, by Tormod Forland. Pennsylvania State University. College of Mineral Industries, University Park, Pa. Apr 1955. 31p diagr, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 124095

1. Latent heat - Determination 2. Melting point - Determination 3. Silica - Crystal structure 4.

4. Beryllium fluoride - Crystal structure 5. Magnesium chloride - Crystal structure 6. Contract N6 onr-269, T.O. 8, NR 032-264 7. ONR TR 63

Study of the impact behavior of high-temperature materials, by H.B. Probst and Howard T. McHenry. U.S. National Advisory Committee for Aeronautics. Mar 1957. 23p photos, drawings, diagrs, graphs, tables. Order as TN 3894 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125674

The impact behavior of titanium carbide base cermets and high-temperature alloys was investigated from room temperature to 1750°F. The effects of amount of binder, binder composition, microstructure, temperature, and stress concentration on the impact strength of cermets are discussed. The NACA drop test was used in order to eliminate "toss energy," and the test variables which affect impact energies measured by the drop test are discussed. NACA TN 3894.

Study of the "toss factor" in the impact testing of cermets by the Izod pendulum test, by H.B. Probst and Howard T. McHenry. U.S. National Advisory Committee for Aeronautics. Feb 1957. 13p photos, graphs, table. Order as TN 3931 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125668

The test method presented shows that the "toss energy" contributed by the apparatus for brittle materials is negligible. The total toss energy is considered to consist of two components, (a) recovered stored elastic energy and (b) kinetic energy contributed directly by the apparatus. The results were verified by high-speed motion pictures of the test in operation. Impact energies of some titanium carbide base cermets and high-temperature alloys, as measured by the low-capacity Izod pendulum test, compare well with impact energies measured by the NACA drop test. NACA TN 3931.

PACKING AND PACKAGING

Evaluation of popcorn as a cushioning material, by R.K. Stern. U.S. Forest Products Laboratory, Madison, Wis. May 1957. 34p graphs, tables. Order from OTS. $1.00. PB 131162

This investigation has the purpose of determining if popcorn could be used as a cushioning material. Conventional cushioning materials such as bound hair and cellulosic wadding were used as a basis for comparison. Stress-strain curves were established for popcorn, bound hair, and cellulosic wadding under several conditions of temperature and humidity. Repeated loading tests on these materials were also performed. The mold resistance and the effect of high humidity on treated and untreated popcorn were established. Combustibility of the materials was also investigated. AD 118314. Project 7312, Task 73127. Covers work from Sep 1954 - Jan 1957 under Contract DO 33(600)53-4023. AF WADC TR 56-660.

Performance of tests required in specification MIL-P-116C, by S. Stambler. U.S. Naval Supply and Development Facility, Bayonne, N.J. Mar 1957. 77p photos, drawings. Order from OTS. $2.00. PB 131332

This report outlines the development of testing procedures and the requirements for testing in MIL-P-116C. This specification outlines basic requirements for the preservation of all military equipment. Project NT 003017(i), sub-project SE 54-94. Engineering report no. 2.5005, Summary report no. 2.

Proceedings of the second Joint Military-Industry Packaging and Materials Handling Symposium, Washington, D.C., Oct 9, 1956. Sponsored by the Air Force with the cooperation of the Dept. of the Army, Dept. of the Navy, Dept. of Commerce, and the National Security Industrial Association. 1956. 307p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $17.10. PB 128964

For 1st symposium see PB 121350. 1. Packaging - Congresses 2. Packaging - Costs 3. Package cushioning 4. Material handling.

PAPER AND ALLIED PRODUCTS

Cross-flow inlets, a hydrodynamic analysis, by Börje Steenberg and Sune Pettersson. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 6p diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 124747

Starting with a simplified form of the general equation of flow, mathematical analyses of the flow properties in a cross-flow inlet are given. The purpose of the calculation was, on one hand, to determine the variations in flow emerging from a given inlet construction, on the other to determine which construction will give a uniform flow over the width of the paper machine. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 209. Reprinted from Magazine of Canada, Convention issue 1956.

Determination of mercury in paper mill white-water, by Ove T. Carlson and Barbro Alderin. Sevenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 3p drawing, table. Order from LC. Mi $1.80, ph $1.80. PB 124742

Phenyl mercury compounds are often added to paper mill water systems for two reasons, to reduce slime growth in the mill and to act as a fungicide in the manufactured pulp. In both cases it is of interest to know the distribution of mercury compounds in the water system of the mill. The purpose of this paper is to discuss the application of the method of Carlson and Bethge to the determination of mercury in pulp in very dilute solutions and suspensions of fibres therein, such as pulp mill whitewater. Reprinted from Svensk Papperstidning, nr. 59 (1956) 271-273. Summaries in Swedish and German. Svenska Träforskningsinstititutet. Träkemi och Pappersteknik. Meddelande 204.

Flocculation at sedimentation. Part I: A study of two-particle interaction, by Olle Andersson. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 6p photo, diagrs, graphs. Order from LC. Mi $1.80, ph $1.80. PB 124749

The deviation from the vertical path of sedimentation during interaction between two particles is derived from fundamental hydrodynamic equations, and it appears that disregarding other than hydrodynamic forces spherical particles will never touch each other during sedimentation. The validity of the equations was tested by recording the motion of pairs of glass balls sedimenting in glycerol. In these experiments a specially designed two-dimensional traveling microscope was used. The apparatus is described briefly. Reprinted from Svenska Papperstidning, 59 (1956): 15, 540. Summaries in German, English and Swedish. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 211.

Influence of drying on beaten stock, by Olle Andersson and Bo Fahlin. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 6p photo, graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 124748

When beaten stock is dried and repulped most of its strength properties are supposed to be lost. The purpose of this study was to gather some quantitative information about this strength loss. The results indicate that the strength loss arises on redefibration. Reprinted from Svenska Papperstidning, 59 (1956): 14, 503. Summaries in Swedish, German and English. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 210.

Pitch control by combined alkali and aluminum sulfate addition. Some principles in controlling pitch troubles, by Ernst Back. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Sep 1956. 7p photo, graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 124746

Reprinted from Svensk Papperstidning 59 (1956): 9, 319. Summaries in Swedish and German. 1. Pitch control - Sweden 2. Pinus sylvestris - Pitch control - Sweden 3. Picea excelsa - Pitch control - Sweden 4. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 208.

Prazision und reproduzierbarkeit bei bestimmung von bruchlast und bruchdehnung von kraftpapier. (Precision and reproducibility in testing elasticity and breaking load on kraft paper), by J. Bergstrom. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 6p tables (Text in German). Order from LC. Mi $1.80, ph $1.80. PB 124743

The smallest statistically significant difference between the averages of two test series, being made under identical condition on one paper, is used as a measure of the precision of the test. When the measurements are made at two different laboratories, the corresponding difference is used as a measure of the reproducibility of the test. Four kraft paper samples were tested on ten tensile testers of the pendulum type. Four instrument models representing four different makes, were used. Reprinted from Svenskpapperstidning, no. 8, 1956, p. 305-9. Summaries in Swedish and English. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 205.

Slem och slemkontroll inom papersindustrin, en oversikt. Slime and slime control in the paper industry, by Stig K. L. Freyschuss. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 6p (Text in Swedish). Order from LC. Mi $1.80, ph $1.80. PB 124744

Reprinted from Svensk Papperstidning, nr. 7, 1956. Summaries in English and German. 1. Paper industry - Slime control - Sweden 2. Svenska Träforskningsinstitutet.Träkemi och Pappersteknik. Meddelande 206.

Stossartige beanspruchungen an papier. (Impact stresses on paper), by Olle Anderson. Svenska Träforskningsinstitutet. Träkemi och Pappersteknik. 1956. 2p photo, diagrs, table. (Text in German). Order from LC. Mi $1.80, ph $1.80. PB 124745

Reprinted from Allgemeine Papier-Rundschau heft 6, 1956. 1. Paper - Stresses - Sweden 2. Svenska Träforskningsinstitutet. Träkemi och pappersteknik. Meddelande 207.

PERSONNEL APTITUDE TESTING

Construction of a proficiency examination for maintenance personnel on a new weapon system, by Donald H. Buckner. U.S. Air Force. Air Research and Development Command. Air Force

Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Tex. Aug 1956. 21p tables. Order from LC. Mi $2.70, ph $4.80. PB 124788

The requirements of good test construction can be adequately met during the early part of the procurement period. In the present instance suitable test outlines and items are developed for two examinations covering the B-52 aircraft, one for general mechanics, and one for engine mechanics. AD 098880. Project 7950, Task 17075. Contract AF 18(600)-1352. AF PTRC TN 56-105.

Prestige of Air Force career fields, by Harold W. Richey and Forrest R. Ratliff. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Jun 1956. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 125885

Project 7950, Task 79505. 1. Job analysis 2. AF PTRC TN 56-78

"Shortage" of scientific and engineering manpower in the United States, 1957 by C.A. McMahan and Associates. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Feb 1957. 44p drawings, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 127310

The results of this study indicate that to date no definitive evaluation of the general shortage of scientific and engineering manpower has been provided, nor is it likely that any can be provided with the information and analytical techniques at hand. This is due in part to conflicting assumptions and definitions employed, but primarily to the fact that no clear measure of manpower requirements on a national scale is in evidence. AD 098930. Project 7722, Task 17101. AF PTRC TN 57-25.

PHOTOGRAPHIC AND OPTICAL GOODS

Experimental investigation of optical methods for measuring turbulence, by Leslie S.G. Kovasznay and Patricia Clarken. Johns Hopkins University, Baltimore, Md. Jan 1952. 85p photos, diagrs, graphs. Order from OTS. $2.25. PB 131306

Optical methods were explored for measuring statistical properties of turbulent density fluctuations. Analysis of shadow pictures of turbulent regions in wake of special "grid projectiles" can yield microscale of turbulent density fluctuations of right order of magnitude. Experimental comparison was made between hot wire anemometer and optical methods performed in flow field where both types of measurements were feasible. Project Squid. Contract N6 ori-105, T.O. III, NR 098-038. JHU 3-R.

Streamlined lens-radomes, by Alan F. Kay. Technical Research Group, New York, N.Y. Dec 1956. 49p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 131041

The purpose of this work was to investigate the feasibility of unifying the design of a lens focussing element with a radome for streamlined nose radar applications. A design technique was developed for variable refractive index lens-radomes with the desired streamlining which satisfied the requirements of (1) perfect axial focussing and (2) the Abbe sine condition. The resulting lens-radomes were analyzed for weight, dielectric losses, fabrication techniques, and methods of feeding. AD 118131. Project 4158, Task 41552. Contract AF 33(616)-2646. AF WADC TR 56-527.

PHYSICS

General

Approximation by bounded analytic functions, by J.L. Walsh. Harvard University, Cambridge, Mass. Sep 1956. 24p. Order from LC. Mi $2.70, ph $4.80. PB 125227

AD 96783. 1. Approximate computations 2. Mathematical equations and solutions 3. Contract AF 18(600)-998 4. AF OSR TN 56-440

B-sets and fine cyclic elements, by Christoph J. Neugebauer. Purdue University. Dept. of Mathematics, Lafayette, Ind. Jul 1956. 40p. Order from LC. Mi $3.00, ph $6.30. PB 125023

PRF 1203. AD 95442. Project: 17501: Analytical theory of continuous transformations. 1. Areas - Measurement 2. Transformations (Mathematics) 3. Surfaces (Mathematics) - Theory 4. Contract AF 18 (600)-1484, Technical note 4 5. AF OSR TN 56-356

Bloch equations with diffusion terms, by H.C. Torrey. Rutgers University, New Brunswick, N.J. May 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 123158

The phenomonological Bloch equations in nuclear magnetic resonance are generalized by the addition of terms due to the transfer of magnetization by diffusion. The revised equations describe phenomena under conditions of inhomogeneity in magnetic field,

relaxation rates or initial magnetization. As an example the equations are solved in the case of the free procession of magnetic moment in the presence of an inhomogeneous magnetic field following the application of a 90^{o} pulse with subsequent applications of a succession of 180^{o} pulses. The spin-echo amplitudes agree with the results of Carr and Purcell from a random walk theory. AD 87055. Contract AF 18(603)-6. AF OSR TN 56-182.

Contributions to multivariate analysis including univariate and multivariate variance components analysis and factor analysis, by Ramanathan Gnanadeskan. North Carolina. University, Chapel Hill, N.C. Nov 1956. 191p graph. Order from LC. Mi $8.40, ph $28.80. PB 125609

The main emphasis throughout this dissertation is on confidence bounds, simultaneous and/or individual, on parameters or parametric functions which are natural measures of departure from certain usual null hypotheses. All parent populations from which our random samples are drawn, are assumed to be univariate or multivariate normal, as the case may be. On this assumption of the underlying distributions being normal, first certain general results are obtained and then a more detailed discussion is made of various problems in the sectors of variance components (both univariate and multivariate) and factor analysis. AD 110378. For other reports under this Contract see PB 119236 and 122408. Institute of Statistics. Mimeograph series no. 158. Contract AF 18(600) 83. AF OSR TN 56-558.

Contributions to the statistical analysis of categorical data, by Sujit Kumar Mitra. North Carolina State College. Institute of Statistics, Raleigh, N.C. Dec 1955. 162p tables. Order from LC. Mi $7.80, ph $25.80. PB 126160

The problems considered in this report can broadly be classified into two types. 1. Multivariate analysis - when we have samples from one population categorised according to several characteristics. 2. Analysis of variance - when we have samples from several populations; each of them categorised according to one and the same characteristic. Hypotheses appropriate for each of these situations are posed and tested. AD 80555. Institute of Statistics Mimeograph Series no. 142. CIT report no. 22. Contract AF 18(600)-83. AF OSR TN 56-43.

Counterexample to a theorem of Hamilton, by C.E. Capel and W.L. Strother. Miami University, Coral Gables, Fla. Aug 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 125233

AD 96058. 1. Hamiltonian equations 2. Transformations (Mathematics) 3. Contract AF 18(600)-1449, Report no. 7 4. AF OSR TN 56-400

Distributions possessing a monotone likelihood ratio, by Samuel Karlin and H. Rubin. Stanford University. Dept. of Statistics, Stanford, Calif. Aug 1955. 14p. Order from LC. Mi $2.40, ph $3.30. PB 123444

This report is concerned only with the case in which the test statistic has the property of sufficiency which roughly means that the risk of error in the test is controlled just as well by the proper single test statistic as if the detailed data provided by the individual observations were used. Contract N6 onr-251, T.O. III, NR 042-993. SU AMSL TR 33.

Evaluation of explicit difference formulas for parabolic differential equation, by Andrew T. Ling. Massachusetts Institute of Technology. Division of Industrial Cooperation, Cambridge, Mass. Aug 1955. 48p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123131

AD 70976. Project DIC 6915: Machine methods of computation and numerical analysis. 1. Equations, Differential 2. Computers - Correlation functions 3. Contract N5 ori-60, Technical report no. 5

Extension of Marbe's law to the recall of stimulus-words, by W.A. Bousfield, B. H. Cohen and J.G. Silva. Connecticut. University, Storrs, Conn. May 1955. 7p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 124059

For reports 1-5, 9 and 10 see PB 107924-107926, 113942, 113943, 116913 and 117628. 1. Psychological tests 2. Words - Association 3. Words - Memory 4. Marbe's law (Psychology) 5. Contract Nonr-631(00), Technical report no. 12

Finite difference methods for the first boundary value problem of $\Delta u(x, y) = r(x, y, u)$ and curved boundaries, by Werner Uhlmann. Jul 1956. 41p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124218

AD 96048. 1. Equations, Differential - Linear - Germany 2. Boundary layer - Mathematical analysis - Germany 3. Contract AF 61(514)-881 4. AF OSR TN 56-390

Flow equations for multicomponent fluid systems. Part I: General equations. Part II: Binary boundary layer equations, by Newman A. Hall. Minnesota. University. Institute of Technology. Dept. of Mechanical Engineering, Minneapolis, Minn. Aug 1955. 35p. Order from LC. Mi $3.00, ph $6.30. PB 126572

In this development a limited number of assumptions will be made in general with certain additional specific assumptions introduced at certain points. In addition to the stated limitation to multicomponent, non-reacting fluid systems, the general assumptions are: 1. The fluid medium is isotropic. 2. The

medium is single phase and locally homogeneous, i.e., no relaxation phenomena occur. 3. No external force field acts on any component. 4. Transport phenomena are linearly dependent on property gradients. 5. Differences between the kinetic energy of motion of the several components are negligible, i.e., diffusion velocities are small in absolute magnitude. AD 70114. Contract AF 18(600)-1226, Technical report no. 2.

Generalization of Richardson's criterion of turbulence, by Ivar Dugstad. Texas Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. Aug 1956. 37p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 124753

A review of Reynold's theory of turbulence in an incompressible fluid is given. Based on this theory Richardson's criterion of turbulence in the atmosphere is extended to include also horizontal wind shear and curvature of the mean flow. It is shown that the application of Richardson's criterion to the atmosphere under estimates the number of instances of increasing turbulence. AD 98756. A & M project 57, Reference 56-24T. Contract AF 19(604)-599, Scientific report no. 11. AF CRC TN 56-687.

Inequalities for eigenvalues of supported and free plates, by L. E. Payne. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Jun 1956. 27p. Order from LC. Mi $2.70, ph $4.80. PB 124860

In this report are established certain isoperimetric inequalities for the eigenvalues in the classical vibration and buckling problems for supported and free plates. These inequalities involve the geometry of the plate and the eigenvalues of membranes having the same shape as that of the plate. AD 89491. Contract AF 18(600)-573. AF OSR TN 56-281. UM BN 75.

Inversion of matrices by Monte Carlo methods, by Herbert A. Meyer, Ernest J. Lytle, Jr., Landis S. Gephart and Norman L. Rasmussen. Florida University. Statistical Laboratory, Gainesville, Fla. Jan 1954. 48p. Order from LC. Mi $3.30, ph $7.80. PB 125139

It is intended here to describe the methods of inverting certain matrices by use of Monte Carlo techniques. Following the introductory remarks, there is a description of the methods used. This in turn is followed by an adaptation of these methods to the use of IBM machines, in particular the 403 tabulator. Some detailed examples are included. AD 27730. Contract AF 33(616) -285. AF WADC TR 54-56.

Logic of automata, by Arthur W. Burks and Hao Wang. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Dec 1956. 50p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 124771

Classes of automata are distinguished: fixed and growing, deterministic and probabilistic. Then the report presents methods for analyzing and synthesizing fixed, deterministic automata by four kinds of state tables. Use of these tables gives a decision procedure for determining whether or not two automaton junctions behave the same. Matrix theory is applied to some of the state tables, and theorems are proved about the resulting matrices and a corresponding normal form automaton. Finally, fixed, deterministic automaton nets are analyzed in terms of cycles. AD 110358. Contract AF 18(603)-72. AF OSR TN 56-539. MU ERI Proj. 2512-2-F.

Non degenerate surfaces of finite topological type, by W. H. Fleming. Purdue University. Dept. of Mathematics, Lafayette, Ind. Jul 1956. 8p. Order from LC. Mi $1.80, ph $1.80. PB 125022

PRF 1203. AD 95443. Project: 17501: Analytical theory of continuous transformations. Some pages may not reproduce well. 1. Transformations (Mathematics) 2. Areas - Measurement 3. Surfaces (Mathematics) - Theory 4. Contract AF 18 (600)-1484, Technical note no. 5 5. AF OSR TN 56-357

Note on computing all optimal solutions of a dual linear programming problem, by Patrick Suppes. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Nov 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 124830

1. Linear systems - Computing methods 2. Contract Nonr-225(17), NR 171-034 3. SU AMSL TR 2

On postulates for general quantum mechanics, by David B. Lowdenslager. California. University. Dept. of Mathematics, Berkeley, Calif. Apr 1956. 8p. Order from LC. Mi $1.80, ph $1.80. PB 125629

Examples of systems with various pathologies and to classify the three dimensional systems. Contract Nonr-222(37), NR 041-157, Technical report no. 2.

On restricted infrapolynomials, by M. Fekete and J. L. Walsh. Harvard University, Cambridge, Mass. Jun 1956. 32p. Order from LC. Mi $3.00, ph $6.30. PB 125042

AD 88983. Project no. R-354-10-51. 1. Polynomials 2. Mathematical equations and solutions 3. Contract AF 18(600)-998 4. AF OSR TN 56-263

On Stokes' stream function in compressible small-disturbance theory, by Milton D. Van Dyke. U.S. National Advisory Committee for Aeronautics. Feb 1957. 15p graphs. Order as TN 3877 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125671

Stokes' stream function is studied for subsonic or supersonic flow past axisymmetric bodies of small slope. The first-order equation is found to be nonlinear. It can be linearized if one seeks only the formal order of accuracy of the slender-body approximation. In any case, serious loss of accuracy results from imposing the condition of tangent flow at the body on the mass flux rather than on the velocity. In a second approximation, neglect of the nonlinearity leads to a false solution even in the slender-body expansion. NACA TN 3877.

On surfaces of the type y, by Lamberto Cosari. Purdue University. Dept. of Mathematics, Lafayette, Ind. Apr 1956. 77p diagrs. Order from LC. Mi $4.50, ph $12.30. PB 125021

AD 95444. Project: 17501: Analytical theory of continuous transformations. PRF 1203. 1. Areas - Measurement 2. Transformations (Mathematics) 3. Surfaces (Mathematics) - Theory 4. Contract AF 18(600)-1484, Technical note no. 3 5. AF OSR TN 56-358

On the conformal mapping of multiply connected regions, by J.L. Walsh. Harvard University, Cambridge, Mass. Oct 1955. 35p. Order from LC. Mi $3.00, ph $6.30. PB 124853

An arbitrary plane region bounded by a finite number of mutually disjoint Jordan curves can be mapped one-to-one and conformally onto a plane region bounded by two level loci of a function which is the product of linear factors with exponents (positive and negative) not necessarily rational. Contract AF 18(600)-998, NR R-354-10-51. AF OSR TN 55-391.

On the iterated wave equation, by Dorothee Krahn. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. May 1956. 35p. Order from LC. Mi $3.00, ph $6.30. PB 124736

This paper establishes a theorem on the decompositions of the general solution of the iterated wave equation in terms of solutions of the Euler-Poisson-Darboux equation. A particular decomposition is then chosen to solve a Cauchy problem for the equation $L_o^n(w) = 0$ with initial conditions on the boundary $t = 0$. It is shown also how the method for solving the Cauchy problem can be used for a more general equation. Thesis - University of Maryland. AD 88359. Contract AF 18(600)-573 UM BN 73. AF OSR TN 56-239.

On the local character of the solutions of an atypical linear differential equation in three variables and a related theorem for regular functions of two complex variables, by Hans Lewy. California. University. Dept. of Mathematics, Berkeley, Calif. Nov 1955. 28p. Order from LC. Mi $2.70, ph $4.80. PB 125190

The result provides an answer to the problem of determining an analytic function of two complex variables when arbitrary boundary values are assigned on a three-dimensional surface subject only to the necessary differential relations on the surface. Contract Nonr-222(25), NR 041-134, Technical report 3.

Optimum directivity patterns for linear arrays, by R.L. Pritchard. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. May 1950. 108p diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 125971

The "sharpest" major lobe of a directivity pattern due to a linear array of equally spaced point elements is achieved when the elements are excited in such a manner that all minor lobes in the pattern have the same relative amplitude. Methods of producing such equal-minor-lobe patterns, originally given in the radio literature, are described in this report from the point of view of the acoustic array. Contract N5 ori-76, T.O. X, NR 014-903. HU ARL TM 7.

Orthogonality and fractional replication of factorial experiments, by Allan Birnbaum. Stanford University. Dept. of Statistics, Stanford, Calif. Sep 1955. 31p tables. Order from LC. Mi $3.00, ph $6.30. PB 123086

A simple characterization of orthogonal factorial designs is derived. This leads naturally to: (a) the definitions of various classes of orthogonal designs, some of them standard (e.g., Latin squares) and some less familiar (e.g., "Latin rectangles"), (b) some lower bounds on the fraction of replication which is consistent with orthogonality; (c) some elementary methods of construction of orthogonal fractional replicates, which in some cases can be shown to consist of a smallest possible fractional. Examples of such fractional replicates, including cases of factors at unequal numbers of levels, are given. AD 72773. Contract N6 onr-251, T.O. III, NR 042-993, Technical report 34.

Solution of compressible laminar boundary layer problems by a finite difference method. Part I: Description of the method, by Irmgard Flügge-Lotz and Donald C. Baxter. Stanford University. Division of Engineering Mechanics, Stanford, Calif. Sep 1956. 85p diagr, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 125137

The differential equations of the compressible lami-

nar boundary layer can be conveniently treated by the method of finite differences. Such a method will allow the determination of boundary layer behavior under any combination of pressure gradient and wall temperature or heat transfer rate variation. The stability of the finite difference solution of the boundary layer equations, and of parabolic equations in general, has been investigated and found to place certain restrictions on the mesh sizes which may be used. Contract AF 18(600)-1488. Su ME TR 103. AF OSR TN 56-544.

Statistical mechanics and thermodynamics of irreversible processes, by I. Prigogine and others. Free University of Brussels, Brussels, Belgium. n. d. 89p diagrs. Order from LC. Mi $4.80, ph $13.80. PB 125180

Appendix: Poincaré's theorem for an assembly of oscillators, by R. Balescu. 1. Harmonic analysis - Belgium 2. Oscillations - Theory - Belgium 3. Equilibrium - Theory - Belgium 4. Boltzman equation - Belgium 5. Thermodynamics - Theory - Belgium 6. Quantum mechanics - Belgium 7. Statistical theory - Belgium 8. Contract AF 61(514)-817 9. AF OSR TN 56-417

Technical report under Contract AF 61(514)-846, by M. Mandel, P. Mazur, S. R. de Grott and J. Vlieger. Leiden. Universiteit. Instituut-Lorentz, Leiden, Netherlands. 1956. 53p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 124766

AD 90016. Contents: A. On the theory of the refractive index of non-polar gases. I: Quantum mechanical part, by P. Mazur and M. Mandel. (Reprinted from Physica XXII (1956), pp. 289-298). - B. On pressure and pondermotive force in a dielectric. Statistical mechanics of matter in an electromagnetic field II, by P. Mazur and S. R. de Groot. - C. On the non-equilibrium thermodynamics of discontinuous systems, by J. Vlieger, P. Mazur and S. R. de Groot. AF OSR TN 56-28.

Theory of motion of a thin metallic cylinder carrying a high current, by Charles W. Dubs. Tufts University. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Oct 1955. 32p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124017

A simple non-linear differential equation of motion is found for a thin metallic cylinder carrying a high sinusoidal current. It shows the radius to be its initial value times a function depending only on k, a quantity which lumps together all the physical constants including the initial radius, and on the phase angle of the current. The time for the cylinder to collapse depends only on k and is equal to the current rise time for a unique value k_0 of k. A simple expression is found which is very close to the correct solution for small times and a little low for larger times. An accurate method, also good for other current rise forms, is derived and applied for two values of k. This leads to an accurate value for k_0 and for the collapse time when $k \sim k_0$. Scientific report no. 16. Contract AF 19(122)-89.

Thermal conductivities for several gases, with a description of new means for obtaining data at low temperatures and above 500°C, by Frederick G. Keyes. Massachusetts Institute of Technology, Cambridge, Mass. Oct 1952. 36p diagrs, graphs, tables. Order from OTS. $1.00. PB 131308

Effort has been expended in three directions. First, apparatus for the temperature range 50 to 350°C has been used to obtain thermal conductivity measurements for argon, hydrogen, nitrous oxide, methane and ammonia. Effect of pressure on conductivity of these gases was also obtained. Second, apparatus for low temperature measures of gases and liquids completed, and values of the dE/dt for copper-constantan obtained. Third, equipment for conductivities from 500 to 900°C has been brought to the stage of use for calibration of the platinum-10% rhodium thermocouples. Project Squid. Technical memorandum MIT-1. Contract N5 ori-07855, NR 098-121.

Summations of infinite Schlomilch type Bessel series, by Morris Handelsman. U.S. Air Force. Air Research and Development Command. Rome Air Development Center. Griffiss Air Force Base, Rome, N.Y. Nov 1956. 10p. Order from LC. Mi $1.80, ph $1.80. PB 125610

Summation formulas are presented for infinite series of the Schlomilch type whose terms are Bessel functions. Methods of derivation of these formulas are not presented. Final results are summarized for only a restricted portion of the general subject. AD 97794. AF RADC TN 56-327.

Unbiased estimation of certain correlation coefficients, by Ingram Olkin and John W. Pratt. Chicago. University. Statistical Research Center. n. d. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 125528

Technical report 1. AD 96530. 1. Correlation coefficients 2. Mathematical equations and solutions 3. Contract DA 11-022-ORD-1998

Nuclear

Direct determination of the gamma emission from a PO - BE source, by Henry M. Borella, Sanford C. Sigoloff and Loren C. Logie. U.S. Air Force. School of Aviation Medicine, Randolph Field, Tex. May 1956. 5p diagr, table. Order from LC. Mi $1.80, ph $1.80. PB 125222

The gamma and neutron dose rates from Po- Be

sources have been measured using the Hurst Proportional Counter and the chloroform-phase chemical dosimeters. A shift in the gamma-neutron ratio was noted in sources of different ages. In addition, the gamma field was found to be nonisotropic in the older sources. Work performed at the Radiobiological Laboratory of the University of Texas and the United States Air Force, Austin, Texas. AF SAM R 56-59.

Effect of exposure to the atomic bombs on pregnancy termination in Hiroshima and Nagasaki, by J. V. Neel and W. J. Schull. National Research Council. 1956. 256p maps, graphs, tables. Order as NRC 461 from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. PB 124692

1. Radiation - Genetic effects - Japan 2. Heredity - Research - Japan 3. Pregnancy - Radiation effects - Japan 4. Eugenics - Japan 5. NRC 461

Effects of nuclear radiation on organic fluids. Part I: Gamma radiation stability of certain mineral oils and diester fluids, by William L. R. Rice and James H. Way. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1957. 27p graphs, tables. Order from OTS. 75 cents. PB 131222

A study was made of the stability to gamma radiation of certain refined petroleum oils and diester fluids. Testing of the irradiated fluids by means of lubricant evaluation procedures, such as viscosity, flash point, and oxidation-corrosion resistance, indicated that for the tests conducted, the mineral oils of the type studied should have general resistance to gamma radiation up to a dosage of about 1×10^8 roentgens. The diester fluid di-2-ethylhexyl sebacate (Plexol 201) had very poor stability to gamma radiation over the same range. Addition of 0.5% phenothiazine improved the radiation resistance of this base fluid, except for the loss of oxidative stability experienced at dosage levels of 1×10^7 roentgens and lower. Examination was made of the test data for the irradiated fluids to determine if any property changes followed the radiation exposure history. The changes offering the most promise were the increase in neutralization number of the diester fluid and the gas evolution of the mineral oils. AD 130807. Project 2133, Task 73071. Covers work from Jan 1956 - Mar 1957. AF WADC TR 57-266, Part I.

Final report under Contract N6 ori-102, Task Order V, for the period Jul 1946 - Dec 1954, by Charles C. Lauritsen. California Institute of Technology, W. K. Kellogg Radiation Laboratory, Pasadena, Calif. Jun 1955. 16p. Order from LC. Mi $2.40, ph $3.30. PB 124178

Contains list of papers published under the contract, 1946-1955. Continued under Contract Nonr-220(18) since Jan 1955. 1. Atomic power - Research 2. Synchrotrons - Accelerators 3. Instruments, Nuclear 4. Particles, Charged - Reactions 5. Contract N6 ori-102, T.O. V, Final report

Final report under Contract N6 ori-106, Task Order II, Jun 1946 - Dec 1954, by Walter E. Meyerhof. Stanford University. Dept. of Physics, Stanford, Calif. Jan 1955. 6p. Order from LC. Mi $1.80, ph $1.80. PB 124176

Contents: 1. List of published papers. - II. List of major problems studied with references to the appropriate publications. 1. Atomic power - Research 2. Contract N6 ori-106, T.O. II, Final report.

Negative pion activation of silver, by W. Goishi and W. F. Libby. Chicago. University. Enrico Fermi Institute for Nuclear Studies. Aug 1956. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 125148

The yields of some isotopes of palladium, rhodium, and ruthenium produced by the reaction of π^--mesons with silver were determined radiochemically. These results, together with those from a similar study with bromine, make possible a comparison with the data obtained with photographic plates. The results are consistent with each other within the uncertainties of the experimental data. AD 95436. Thesis - University of Chicago. Contract AF 18(600)-663. AF OSR TN 56-350.

On the generalized radiation problem of A. Weinstein, by H. Melvin Lieberstein. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Nov 1956. 96p diagrs. Order from LC. Mi $5.40, ph $15.30. PB 124767

The generalized radiation problem as formulated by A. Weinstein requires determination of a nonsingular solution of the two-dimensional Euler-Poisson-Darboux equation. The first part of the paper is devoted to uniqueness. The second part deals with the solution of an equation for application of the uniqueness proof to the boundary value problem. AD 115021. Thesis: University of Maryland. Project R 354-10-27. Contract AF 18(600)-573. UM BN 87. AF OSR TN 56-594.

Quarterly progress report no. 12 for the period ending 30 Sep 1956 under Contract AF 18(600)-997, by Fay Ajzenberg-Selove. Boston University. Dept. of Physics, Boston, Mass. Sep 1956. 3p graphs. Order from LC. Mi $1.80, ph $1.80. PB 124804

List of papers submitted or published. 1. Atomic power - Research

Self-consistent determination of the nuclear radius, by Manuel Rotenberg. Massachusetts Institute of Technology, Cambridge, Mass. Sep 1955. 65p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124888

This calculation is concerned with the approximate but self-consistent, solution of the equations of motion for many nucleons bound in a nucleus. It is shown that the problem for many interacting nucleons can be reduced to a far simpler one; each nucleon acts independently of all others, but each moves in a potential field which is created by the short range forces associated with all the other nucleons. This collective potential determines the motion of the nucleons, which in turn determine the potential in which they move. When nucleon wave functions are found that create the collective potential of which they are eigenvectors, the problem is solved. The problem is similar to the Hartree-Fock problem with some complicating exceptions. Project DIC 6915: Machine methods of computation and numerical analysis. Contract N5 ori-60, Technical report 6.

Survey of radioactive waste disposal (U), by Fritz A. Hedman. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Jun 1956. 15p. Order from OTS. 50 cents. PB 131085

A summary has been made of: (1) the responsibility of the Chemical Corps for disposal of radioactive waste, (2) the previously published government directives, (3) the pertinent A.E.C. studies and procedures, and (4) general directions for waste disposal. Covers work from 5 Jul 1955-31 Jan 1956. Project 4-12-10-007-04. CRL R 648.

PHYSIOLOGY

Effects of respiratory impedances on pulmonary ventilation, pattern of breathing, and pulmonary gas exchange in dogs, by F.G. Hall and Fred Zechman, Jr. Duke University. School of Medicine, Durham, N.C. May 1957. 17p photo, graphs, tables. Order from OTS. 50 cents. PB 131163

This report covers three series of experiments conducted on 22 dogs to determine the respiratory effects of increased tracheal impedance to air flow. The influence of four different size orifices on respiratory frequency, tidal volume, tracheal air flow and pressure, heart rate, blood pressure and arterial gas tension is presented. Additional experiments are reported which suggest the relative roles of the chemical and mechanical factors controlling the respiratory response to air flow impedance. AD 118297. Project 7160. Contract AF 33(616)-377. AF WADC TR 56-640.

Genetic factors in temperature stress resistance in dogs, by John L. Fuller, Randall M. Chambers and John Craig, Jr. Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me. 1954. 20p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124618

These analyses were conducted on data obtained from 232dogs whose rectal temperatures were taken by means of a climical thermometer six times during a ten day period. Final report for the period Jan 1, 1954-Aug 31, 1954 under Contract Nonr-1001(02), NR 160-093.

PSYCHOLOGY

Acquisition of response proficiency as a function of rounding error in informative feedback, by Edward A. Bilodeau and John H. Rosenbach. U.S. Air Force. Air Research and Development Command. Human Resources Research Center. Perceptual and Motor Skills Research Laboratory, Lackland Air Force Base, Tex. Jul 1953. 13p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 124083

Project no. 509-020-0007. 1. Feedback - Theory 2. Motor reactions - Analysis 3. Perception - Tests 4. Micrometers - Uses 5. AF HRRC RB 53-21

Experiments on vigilance one-clock and three-clock monitoring, by Harry J. Jerison and Ronald A. Wallis. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. and Antioch College, Yellow Springs, O. Apr 1957. 40p diagrs, graphs, tables. Order from OTS. $1.00. PB 131191

Two experiments on prolonged monitoring of Mackworth-type clocks are reported. These results are discussed in terms of the present state of knowledge about the human operator as a monitor and in terms of recommendations that have been made in the past concerning limitations of length of watches for monitors in order to maintain their efficiency. A brief "Summary and Conclusions" section is included in the report. AD 118171. Project 7193, Task 71610. Second report in a series. For first report see PB 121985. AF WADC TR 57-206.

Human behavior in extreme situations: A survey of the literature and suggestions for further research, by Anthony F.C. Wallace. National Research Council. Oct 1953. 41p diagr. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents. PB 125157

The major types of literature pertaining to disaster and other extreme situations are discussed and their potential usefulness to social and behavioral scientists is suggested. Specific weakness of the existing literature are pointed out. Desiderata of an organized approach to disaster studies and limitations of disaster research are suggested. May be purchased with Disaster studies no. 2-3 (PB 125158 and 125159) for $3.00. Contract DA 49-077-MD-256. NRC 390.

Human factors in the design of systems, by H.W. Sinaiko and E.P. Buckley. U.S. Naval Research Laboratory. Aug 1957. 52p graphs. Order from OTS. $1.50. PB 131248

The process of designing systems generally consists of three steps: (a) developing the system concept, (b) assigning system subtasks to component elements, and (c) deciding how to link the components together. Since each of these steps is influenced by certain human characteristics, information about man will be helpful to the design engineer. Gives ten general characteristics of man as a system component, together with their design implications, which should be considered by the designer: physical dimensions, capability for data sensing, capability for data processing, capability for motor activity, capability for learning, physical and psychological needs, sensitivities to social environment, sensitivities to physical environment, coordinated action, and differences among individuals. The methodology of doing evaluations of man-machine systems is treated in two areas: general principles and cautions for doing human engineering tests, and the uses of statistics and experimental design. An extensive bibliography, representing the major areas of human engineering, is included. Finally, in an appendix, there is a checklist of human factors for the design engineers. NRL R 4996.

Information theory for psychometric analysis. Final report for period 1 Sep 1952-31 Aug 1955 under Contract N6 ori-07146, by Lee J. Cronbach. Illinois. University. College of Education. Bureau of Educational Research, Urbana, Ill. Sep 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 124904

The basic purpose of this project has been to explore the possibilities of a more comprehensive measurement theory to guide the design of psychological tests, choice of tests for practical problems, and interpretation of test data.

Periodic status report XXV for the period 16 Nov 1954 - 15 May 1955 under Contract N5 ori-76, NR 142-201. Harvard University. Psycho-Acoustic Laboratory, Cambridge, Mass. May 1955. 24p. Order from LC. Mi $2.70, ph $4.80. PB 124073

Contains brief abstracts of reports published, research in progress, and checklist of reports issued in PNR series from 1-175. PN-62.

Relation of stimulus, intensity, practice, anxiety and sex to simple RT and temporal generalization, by I.E. Farber and Kenneth W. Spence. Iowa State University. Dept. of Psychology, Iowa City, Ia. Jun 1955. 44p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124012

Following a training series in which the stimuli were presented at regular 12 sec. intervals, Ss were tested in a temporal generalization series at irregular intervals varying between 3 and 24 sec. In the training series, RT was influenced in the expected direction by variations in stimulus intensity, sex, and practice; in addition the difference between men and women was significantly smaller toward the end of practice than it was earlier in practice. In the generalization series also RT was affected by variations in stimulus intensity. Manifest anxiety had no main effect and did not enter into any interactions. The implications of this result with respect to various views of manifest anxiety is discussed. Studies of influence of motivation on performance in learning, Technical report no. 4. For reports no. 1-3 see PB 118095-118096 and 120047. Contract N9onr-93802, NR 154-107.

Reaction of six radar air traffic controllers to conference control of targets simulated on a 19-inch horizonal display, by James C. McGuire and Conrad L. Kraft. Ohio State University. Laboratory of Aviation Psychology and Ohio State Research Foundation, Columbus, O. Dec 1956. 11p. Order from OTS. 50 cents. PB 131177

The question of the relative merits of horizontal versus vertical display of radar information for the purpose of controlling air traffic has become urgent in the effort to develop an optimum air traffic control system. In order to provide some experience with, and to obtain some qualitative reactions to a horizontal control system, a preliminary test was carried out, using a 19-in. Navy VN horizontal plotter. The purpose was not to evaluate the VN, but rather to obtain controller reaction to the horizontal method of control. Pickup and feeder controller positions only were used. Nine simulated targets provided the traffic load for the six experienced radar air traffic controllers who each controlled in each position at different times. AD 110692. Project 7192, Task 71596. Contract AF 33(616)-3612. AF WADC TN 56-542.

Sequential multiple decision procedure for selecting the best one of several normal populations with a common unknown variance, and its use with various experimental designs, by Robert E. Bechhofer. Cornell University. Sibley School of Mechanical Engineering, Ithaca, N.Y. Nov 1956. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 124770

This paper is one in a series which deals with the problem of selecting the best one of several normal populations. It is concerned primarily with Procedure D, a sequential procedure which can be used

when the populations have a common unknown variance. Part I describes the procedure and tells how it can be used with a completely randomized design; Part II tells how it can be used with experimental designs such as randomized blocks, cross-overs, and Latin squares; Part III gives a worked-out numerical example showing how the procedure is applied with a completely randomized design. This paper was prepared for presentation before the Industrial Experimental Design Conference, Raleigh, North Carolina, Nov 9, 1956. Cornell University (Mechanical Engineering) Report no. 10. AD 110370. Contract AF 18(600)-331. AF OSR TN 56-551.

Sequential multiple decision procedure for selecting the multinomial event with the largest probability, by R. E. Bechhofer and M. Sobel. Cornell University, Ithaca, N.Y. Aug 1956. 3p. Order from LC. Mi $1.80, ph $1.80. PB 124293

AD 88026. Preliminary report under Contract AF 18(600)-331. 1. Decision theory 2. Probability - Theory 3. Contract AF 18(600)-331 4. AF OSR TN 56-219

Social aspects of wartime evacuation of American cities, with particular emphasis on long-term housing and reemployment, by Fred C. Ikle and Harry V. Kincaid. National Research Council. Sep 1954. 111p maps, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $2.00. PB 125155

This report is concerned with social and economic problems associated with the wartime evacuation of American cities. Attention is focused on problems which arise from the semi-permanent removal of large numbers of urban dwellers to safer areas as opposed to their temporary dispersal for the duration of a sudden attack. Rather than attempting to formulate plans for evacuation of specific cities, it is concerned with the feasibility of evacuation, the cost in time and resources of instituting a large-scale evacuation policy, the social and economic repercussions of long-range evacuation, the possible resulting dislocations in other spheres of national life, and a clarification of terminology and conceptualization. Disaster study no. 4. Contract DA 49-007-MD-454. Contract DA 49-007-MD-256. NRC 393.

Study of response to the Houston, Texas, fireworks explosion, by Lewis M. Killian. National Research Council. Aug 1953. 29p photos, map, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents. PB 125158

The explosion of a fireworks plant in Houston created considerable blast damage and a mushroom-shaped cloud. Thirteen percent of the sample of people interviewed perceived the explosion as an atomic attack. People tended to interpret the event within a situational context which included their expectation as to whether an atomic attack is likely to occur. Only one person in the sample had a reasonable conception of the salient cues by which an atomic explosion may be identified. A large number of people made telephone calls or rushed to the scene, hampering efforts to deal with the disaster. Disaster study no. 2. May be purchased with Disaster studies no. 1 and 3 (PB 125157 and 125159) for $3.00. Contract DA 49-007-MD-256. NRC 391.

Tornado in Worcester: Exploratory study of individual and community behavior in an extreme situation, by Anthony F.C. Wallace. National Research Council. Oct 1954. 187p photos, maps, diagrs, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. $2.50. PB 125159

A time-space model of human behavior in disaster is developed. Individual, group, and community behavior are reported and analyzed in terms of this model. The following hypotheses are formulated: the "disaster syndrome" and the "counter-disaster syndrome," concerning the behavior of victims and helpers, respectively; the "isolation period," the length of which effects the number of casualties from secondary impacts; and the "cornucopia theory" of supply. Disaster study no. 3. May be purchased with Disaster studies no. 1-2 (PB 125157-125158) for $3.00. Contract DA 49-007-MD-256. NRC 392.

Transfer effects from a single to a double integral tracking system, by George E. Briggs, Paul M. Fitts and Harry P. Bahrick. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Randolph Air Force Base, Tex. Dec 1956. 24p diagrs, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 125974

AD 098912. Project 7716, Tasks 77292 and 57050. 1. Tracking - Training 2. Tracking equipment - Design 3. Tracking, Two dimensional - Tests 4. Tracking - Psychological aspects 5. Simulators, Flight - Operation 6. Contract AF 18(600)-1201 7. AF PTRC TN 56-135

Use of displays showing identity versus no-identity, a study in human engineering aspects of radar air traffic control, by Lowell M. Schipper, Conrad L. Kraft, Alfred F. Smode and Paul M. Fitts. Ohio State University. Laboratory of Aviation Psychology and OSU Research Foundation, Columbus, O. Feb 1957. 30p diagrs, graphs, tables. Order from OTS. 75 cents. PB 131270

This experiment is the sixth in a series of system studies dealing with various aspects of air traffic control. The purpose was to evaluate the perform-

ance of a one-controller system with (a) an omnipresent clock-type identity code vs. (b) the absence of identity on the radar blips. Data were recorded for a total of 1267 movements of jet-type fighter and bomber aircraft, which were accepted at four different entry rates. Four experienced USAF controllers served in the study. AD 110713. Project 7192, Task 71596. For Parts 1-5 see PB 121524, 121773, 121799 and 131266. Contract AF 33(616)-3612. AF WADC TR 57-21.

RUBBER AND RUBBER PRODUCTS

Aircraft tires with modified deflection characteristics for carrier operation. Final report under Contract no. NOas 52-540c, by N. C. Fisk. United States Rubber Company, Detroit, Mich. Aug 1956. 99f photos, drawings, diagrs, tables, graphs. Order from LC. Mi $5.40, enl pr $16.80. PB 128656

Deflection characteristics of aircraft tires have been modified to provide for higher loads at high deflection without changing the normal load for normal operating deflection. This has been accomplished by the development of three types of load supporting members which function inside a tubeless casing: a solid rubber inner cushion, a pneumatic inner chamber resembling a conventional tire, and a closed, beadless, pneumatic inner cushion. Tire assemblies containing these inner members have successfully passed limited indoor dynamic tests. Contract NOas 52-540c, Final report.

Antiozonants for nitrile and natural rubbers, by E. W. Bergstrom. U.S. Arsenal, Rock Island, Ill. Jul 1956. 47p photos, tables. Order from OTS. $1.25. PB 131267

The antiozonant properties of various commercial and especially synthesized chemicals were determined in natural and nitrile rubbers. In addition the following factors were investigated: 1. The effect of adding migratory aids to inhibited natural and nitrile rubbers. 2. The effect of the curing system on the ozone protection afforded natural and nitrile rubbers by certain amine antiozonants. 3. The effect of plasticizers on the ozone protection afforded natural and nitrile rubbers by an amine antiozonant. 4. The ozone resistance of inhibited natural and nitrile rubbers at different ozone concentrations. Accelerated and outdoor ozone exposure tests were employed to obtain the results reported in this investigation. AD 105413. Ordnance project TB 4-521A, Report 21. D.A. project 593-15-008. RIAL R 56-1946.

STRUCTURAL ENGINEERING

Analytical and experimental investigation of stress distributions in long flat plates subjected to longitudinal loads and transverse temperature gradients, by G.H. Sprague and P.C. Huang. Glenn L. Martin Co., Baltimore, Md. Sep 1956. 156p photos, drawing (1 fold), diagrs, graphs, tables (part fold). Order from OTS. $4.00. PB 121680

Stress and strain distributions were studied in long flat plates in order to develop practical analytical procedures for the design analysis of aircraft structures at elevated temperatures. Methods of analysis for calculation of stress distributions under various load-temperature conditions are presented. These include: (1) Thermal stress distributions in the elastic and plastic range; (2) Combined load and thermal stress distribution in both the elastic and plastic range; (3) Load induced compression-buckling stresses at elevated temperature. Experimental verification of the analytical procedures is shown with comparisons between the use of constant room temperature or temperature dependent values of modulus of elasticity and coefficient of thermal expansion. The test specimen, equipment, instrumentation, and experimental program are discussed in detail. Experimental data obtained from the specimen and associated material control coupon tests are presented. AD 97319. Project 1367. Covers period of work from 20 Jun 1954 - 31 Oct 1955 under Contract AF 33(616)-2600. AF WADC TR 55-350.

Thermal stresses and thermal buckling, by Josef Singer, M. Anliker and S. Lederman. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Apr 1957. 120p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.00. PB 131072

Methods available for the analysis of thermal stresses in flat plates of rectangular plan form and of constant or variable thickness are derived, discussed, and generalized to be valid in the case of a variable thickness. Recommendations are made for the practical calculation of the thermal stresses. An experimental verification of the thermal buckling theory of the coverplates of multicellular supersonic wing structures is presented. The experiments were carried out with the aid of the electromagnetic induction heater developed at the Polytechnic Institute of Brooklyn. The experimental results obtained agree well with the predictions of the theory. AD 118287. Projects 5-(1-1347) and 6-(1-1347), Task 70131. Contract AF 33(616)-3214. AF WADC TR 57-69.

TEXTILES AND TEXTILE PRODUCTS

On the bulk compression characteristics of wool fibers, by P.C. deMaCarty and J.H. Dusenbury. Textile Research Institute, Princeton, N.J. Jun 1955. 34p photos, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124004

A method has been found to prepare bulk samples of wool fibers in such a way that reproducible compression tests may be performed upon them. An evaluation of the bulk compression characteristics of 29 widely different wool samples shows that compressive load, rather than resilience, serves to bring out differences among them. This finding suggests that quality differences among wools, as determined by handling, is related to differences in the wools' resistance to compression rather than to differences in compressional resilience. Technical report 15 under Contracts Nonr-09000 and Nonr-09001.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Assessment of the aircraft for its part in a defence system, by R.P. Dickinson. Advisory Group for Aeronautical Research and Development. Feb 1956. 12p diagr. Order from NACA as Agard Report 32. PB 124356

Discusses the relative importance of the various aspects of behaviour of the interceptor fighter aircraft in relation to its part in the overall defence system. Features governing the success of the aircraft in using its weapons effectively are discussed. Presented at the eighth meeting of the Flight Test Panel, held from Feb 20 to 25th, 1956, in Rome, Italy. Summary also in French. AG 32.

Investigation of the crash-fire problems in transport aircraft fuel tanks, by R.I. Field, Melvin F. Miller, and George L. Pigman. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1951. 23p photos. Order from LC. Mi $2.70, ph $4.80. PB 122307

1. Tanks, Fuel - Aircraft 2. Tanks, Fuel - Fire protection 3. CAA TDR 134

Engines and Propellers

Comparison of NACA 65-series compressor-blade pressure distributions and performance in a rotor and in cascade, by Willard R. Westphal and William R. Godwin. U.S. National Advisory Committee for Aeronautics. Mar 1957. 53p photos, drawings, diagrs, graphs. Order as TN 3806 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125672

Supersedes RML51H20. 1. Compressors, Axial - Blades - Flow 2. Cascades (Aerodynamics) - Tests 3. Propeller blades - Pressure distribution 4. NACA TN 3806

Experimental comparison of speed - fuel - flow and speed-area controls on a turbojet engine for small step disturbances, by L.M. Wenzel, C.E. Hart and R.T. Craig. U.S. National Advisory Committee for Aeronautics. Mar 1957. 52p diagrs, graphs, table. Order as TN 3926 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125675

1. Jet engines, Turbo-jet - Controls 2. Jet engines, Turbo-jet - Fuel systems 3. Jet engines, Turbo-jet - Governor 4. NACA TN 3926

Nonsteady flow in straight ducts, by Carlo Ferrari. Translated by R.H. Cramer. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Nov 1951. 42p diagrs. Order from OTS. $1.25. PB 131316

The nonsteady flow of a liquid or gas in a straight duct, whose sides may be deformed by the pressure fluctuations occurring therein, is studied by means of the method of characteristics. Although the behavior of the flow is nonlinear, a closed-form (parametric) solution is derived, and practical application of the result is made to the analysis of the fuel inlet system of a Diesel engine. A generalization of the problem is stated for the case where the changes of state are not isentropic, i.e., for example, when chemical reactions occur within the fluid. Translation of a paper presented at the Colloquium on Nonlinear Vibrations, 18-22 Sep 1951, on the Ile de Porquerolles, arranged by the International Union of Applied and Theoretical Mechanics. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL TM 43.

Protective shot peening of propellers. Part 3: Fatigue and distortion, by Ronald F. Brodrick. Lessells and Associates, Inc., Boston, Mass. Jun 1957. 109p photos, graphs, tables. Order from OTS. $2.75. PB 131273

This report covers additional fatigue tests supplementing those reported in Part 2 and including more severe damage than previously tested. It also covers tests conducted for the purpose of enabling estimates to be made of the limitations imposed by distortion in the peening of actual parts. The results further substantiate the benefits of shot peening as a barrier to the detrimental effects of service damage. Tests on SAE 4340 steel specimens indicated that the benefits increase with increasing hardness of steel. Empirical relations derived from the distortion tests are also included. These relations allow prediction of the curvature to be expected from the peening of flat plates under any practical peening conditions. AD 130784. Project 6-(1-3346), Task 33048. Covers work from 1 Sep 1955 - 30 Nov 1956 under Contract AF 33(616)-2324. For Parts 1-2 see PB 111802 and 121464. AF WADC TR 55-56, Part 3.

Structural and vibrational characteristics of WADC S-5 model propeller blades, by James E. Carpenter and Edward M. Sullivan. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Jun 1957. 131p diagr, graphs, tables. Order from OTS. $3.50. PB 131272

The test blades were instrumented with wire resistance strain gages and were rotated, at various positive and negative blade angle settings, up to speeds of 7000 rpm. The blades were vibrated in the fundamental bending mode, second bending mode and fundamental torsion mode at various blade angles and rotational speeds. The experimental data included steady strain distributions produced by centrifugal force as well as blade natural frequencies, vibratory strain distributions, and blade damping characteristics for each of the investigated modes. The blade vibratory characteristics, in both bending and torsion, were analytically determined for several combinations of blade angle setting and rotational speed. Excellent correlation was obtained between the experimental and analytical results. AD 130787. Project 3346, Task 33048. Contracts AF 33(616)-250 and AF 33(616)-3190. AF WADC TR 56-298.

Theory of self-excited mechanical oscillations of helicopter rotors with hinged blades, by Robert P. Coleman and Arnold M. Feingold. U.S. National Advisory Committee for Aeronautics. Feb 1957. 137p diagrs, graphs, Order as TN 3844 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125669

1. Rotor blades - Flutter - Theory 2. Rotor blades - Oscillation 3. Rotor blades, Hinged - Flutter 4. Helicopter blades - Hinge effect 5. Helicopter blades - Oscillation 6. Helicopters - Vibration 7. NACA TN 3844

Three-dimensional liquid analog for the determination of temperature distribution, by G.A. Sterbutzel and J.L. Beal. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Oct 1952. 37p photos, diagrs, graphs. Order from OTS. $1.00. PB 131317

The development and use of a three-dimensional liquid analog for the determination of steady state temperature patterns in a structure is described. The particular analog model was used to investigate temperatures in a rocket motor whose wall was cooled by a liquid flowing in ducts surrounding the combustion chamber. Project Squid. Contract N6 ori-119, T.O. 1, NR 220-041. CAL TM 44.

Instruments

Development of an automatic recording accelerometer, by Albert London. U.S. Civil Aeronautics Administration.Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1945. 33p photos, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 122299

1. Accelerometers, Recording - Design 2. Airplanes - Acceleration - Measuring equipment 3. CAA TDR 48

Investigation on possible fire hazard in aircraft fuel quantity gages, by C.L. Bartberger. U.S. Naval Air Material Center. Aeronautical Instruments Laboratory, Naval Air Experimental Station, Philadelphia, Pa. Sep 1952. 32p diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 125164

The purpose of this report is to set forth the basic concepts relating to the explosion hazards of aircraft fuel quantity gages, the methods employed in determining whether such hazards exist in individual gages, and the means of providing protection against such hazards. This material is therefore of a general nature. NAES AIL 48-52. NAM AML 7109.

Aerodynamics

Effect of a simple throat distortion on the downstream flow in a hypersonic wind tunnel nozzle, by R.E. Oliver and B.E. Cummings. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Oct 1956. 17p drawings, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 124729

An experimental investigation was conducted in the CALCIT 2-1/2" supersonic wind tunnel to determine the effect of a known distortion of the throat section of a hypersonic nozzle on the flow in the region downstream from the throat. The flow in the nozzle with a rectangular throat section was compared with the flow in the same nozzle with the throat region distorted to produce a throat height which varied linearly across the throat section. The flow was investigated by means of Pitot pressure surveys in the horizontal plane of symmetry of the undistorted nozzle. Army project 5B0306004. Ordnance project TB 3-0118. OOR project 1600-PE. Contract DA 04-495-ORD-19. CIT GAL M 34.

Experimental investigation of the oscillating forces and moments on a two-dimensional wing equipped with an oscillating circular-arc spoiler, by Sherman A. Clevenson and John E. Tomassoni. U.S. National Advisory Committee for Aeronautics. Mar 1957. 20p photo, drawings, graphs. Order as TN 3949 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125677

Supersedes RML53K18. 1. Mach number - Effect 2. Reynolds number - Effect 3. Wings - Aerody-

namics - Effect of spoilers 4. Spoilers - Effect on aileron control 5. NACA TN 3949

Flight tests of a model of a high-wing transport vertical-take-off airplane with tilting wing and propellers and with jet controls at the rear of the fuselage for pitch and yaw control, by Powell M. Lovell, Jr. and Lysle P. Parlett. U.S. National Advisory Committee for Aeronautics. Mar 1957. 28p photo, drawings, diagr, graphs, table. Order as TN 3912 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125681

1. Airplanes - Take-off - Vertical 2. Airplanes, Transport - Models - Flight tests 3. Stability, Longitudinal - Dynamic 4. Stability, Lateral - Dynamic 5. Stability, Directional - Dynamic 6. Controls, Longitudinal - Operation 7. Controls, Lateral - Operation 8. NACA TN 3912

Investigation at low speed of the flow over a simulated flat plate at small angles of attack using pitot-static and hot-wire probes, by Donald E. Gault. U.S. National Advisory Committee for Aeronautics. Mar 1957. 58p photos, graphs, tables. Order as TN 3876 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125680

1. Flow, Laminar - Measurement 2. Flow, Turbulent - Measurement 3. Wings - Boundary layer 4. NACA TN 3876

Mach-number measurements in high-speed wind tunnels, by Jacques A.F. Hill, Judson R. Baron and Leon H. Schindel. Massachusetts Institute of Technology. Naval Supersonic Laboratory. Jan 1956. 131p diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 125165

In this report, the measurement of subsonic and supersonic Mach numbers in air is discussed from the point of view of calibration measurements of an empty wind tunnel, of measurements of local Mach numbers at points in the flow field around a model, and of simulating free-flight Mach number in the presence of wind-tunnel wall interference. The sensitivity of various parameters to change in Mach number is evaluated and instruments for detecting the necessary properties described. Errors in deducting Mach number from particular measurements are discussed and certain measuring procedures recommended. AD 81540. Presented at the Eighth meeting of the Wind Tunnel and Model-Testing Panel of AGARD, Feb 1956, Rome Italy. Contract AF 18(603)-4. MIT DIC Proj. 7303-C. MIT NSL TR 145. AF OSR TR 56-7.

On possible similarity solutions for three-dimensional incompressible laminar boundary layers. III: Similarity with respect to stationary polar coordinates for small angle variation, by Howard Z. Herzig and Arthur G. Hansen. U.S. National Advisory Committee for Aeronautics. Jan 1957. 36p photos, diagrs, table. Order as TN 3890 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124433

1. Coordinates, Polar 2. Equations, Differential 3. Flow, Three dimensional - Theory 4. Flow, Laminar - Theory 5. Boundary layer, Laminar - Flow - Theory 6. NACA TN 3890

Preliminary data at a Mach number of 2.40 of the characteristics of flap-type controls equipped with plain overhang balances, by James N. Mueller and K.R. Czarnecki. U.S. National Advisory Committee for Aeronautics. Mar 1957. 43p photos, drawings, diagr, graphs. Order as TN 3948 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125676

Supersedes RM L52F10. 1. Flow, Supersonic - Measurements 2. Flow, Viscous - Pressure distribution 3. Flaps, Aircraft - Overhang 4. Flaps, Aircraft - Hinge moments 6. Wing flaps - Controls 7. NACA TN 3948

Simple method for calculating the characteristics of the dutch roll motion of an airplane, by Bernard B. Klawans. U.S. National Advisory Committee for Aeronautics. Oct 1956. 16p tables. Order as TN 3754 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124362

1. Equations of motion 2. Stability, Directional - Dynamic 3. Stability, Lateral - Dynamic 4. Airplanes - Rolling - Calculation 5. NACA TN 3754

Theoretical and experimental study of planing surfaces including effects of cross section and plan form, by Charles L. Shuford, Jr. U.S. National Advisory Committee for Aeronautics. Mar 1957. 126p photos, drawings, graphs, tables. Order as TN 3939 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125682

1. Planing surfaces - Hydrodynamics 2. Seaplanes - Hulls - Dead rise 3. Seaplanes - Hulls - Length-beam ratio 4. Chines - Seaplanes hulls 5. NACA TN 3939

Theoretical calculation of the power spectra of the rolling and yawing moments on a wing in random turbulence, by John M. Eggleston and Franklin W. Diederich. U.S. National Advisory Committee for Aeronautics. Dec 1956. 58p drawings, graphs, tables. Order as TN 3864 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124415

1. Stability, Directional - Dynamic tests 2. Stability, Lateral - dynamic tests 3. Wings - Span load distribution 4. Gust loads - Mathematical

analysis 5. Yawing moments - Calculation 6. Rolling moments - Calculation 7. NACA TN 3864

Wind-tunnel investigation at low speeds to determine the effect of aspect ratio and end plates on a rectangular wing with jet flaps deflected 85°, by John G. Lowry and Raymond D. Vogler. U.S. National Advisory Committee for Aeronautics. Dec 1956. 21p drawing, graphs, table. Order as TN 3863 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124414

1. Stability, Longitudinal - Static tests 2. Lift coefficient 3. Wings, Rectangular - Aspect ratio 4. Wings, Rectangular - Lift 5. Wing flaps - Deflection 6. Wing flaps, Trailing edge - High lift devices 7. NACA TN 3863

Wind-tunnel investigation of effect of propeller slipstreams on aerodynamic characteristics of a wing equipped with a 50-percent-chord sliding flap and a 30-percent-chord slotted flap, by Richard E. Kuhn and William C. Hayes, Jr. U.S. National Advisory Committee for Aeronautics. Feb 1957. 72p photo, drawings, diagrs, graphs, table. Order as TN 3918 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125670

1. Propellers - Slipstream 2. Wings - Lift 3. Stability, Longitudinal - Static tests 4. Airplanes - Performance 5. NACA TN 3918

Rockets and Jet Propulsion

On the performance analysis of the ducted pulsejet, by George Rudinger. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Oct 1951. 44p diagrs, graphs. Order from OTS. $1.25. PB 131318

Depending on the shroud configuration, mixing of the pulsejet exhaust with the remaining shroud flow may or may not take place. In the latter case, methods of analysis developed for single-flow engines may be applied, while in the former, only the equivalent steady flow approximation appears to be feasible at the present time. Estimates are derived for the magnitude of the flow pulsations in the shroud and on the basis of this, a discussion of the equivalent steady flow approximation is presented. Project Squid. Contract **N6** ori-119, T.O. 1, NR 220-041. CAL TM 36-M-P. CAL DD 420-A-36.

Marine Transportation

A-B-C's of anti-submarine warfare, by H.C. Hayes. U.S. Naval Research Laboratory. Nov 1942. 17p diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 120683

Unclassified 15 Dec 1953. 1. Anti-submarine warfare 2. Anti-submarine devices 3. NRL S 1959

Approximate solution on the non-stationary pitching of ships in regular waves, by Yoshio Akita. California. University. Institute of Engineering Research, Berkeley, Calif. Mar 1956. 30p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 125091

It is often experienced in motion studies of models towed under constant thrust in regular waves, that the envelope of the time history curves of pitch show an extremely long periodic variation and at the same time the surging motion shows also a long periodic variation besides an ordinary short periodic motion having the same period as the period of encounter. This phenomenon is observed at particular ship speeds near a resonant speed and in waves having a length equal to or longer than a ship length. The object of this paper is to investigate theoretically the possibility of explaining this phenomenon as a coupled motion of pitching and the longitudinal motion of ships. Contract Nonr-222(18), NS 715-102. UC IER Series 61, Issue no. 9.

Bottom character in Strait of Juan de Fuca. California. University. Oceanographic Division. Aug 1942. 6p 2 fold maps. Order from LC. Mi $1.80, ph $1.80. PB 123138

OSRD Cat. no. 4781. Unclassified. 1. Ocean bottom - Measurement 2. Sediment, Marine 3. NDRC Div 6

Experiments to note the effect of varying the depth of the step on a seaplane float. U.S. David W. Taylor Model Basin, Washington, D.C. Jul 1927. 18p graphs. Order from LC. Mi $2.40, ph $3.30. PB 123944

1. Seaplanes - Floats - Tests 2. DWTMB 170

New theory of Caribbean bottom water formation, by L.V. Worthington. Woods Hole Oceanographic Institution, Woods Hole, Mass. May 1955. 11p map, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 124086

The new data take the form of a hydrographic section which was made in the "Atlantis" in December 1954. This section was planned in order to repeat one of Parr's sections which he made across the Caribbean Sea in March, 1933. The station positions of both these sections are plotted in Figure 1. Before presenting the changes which occurred, a brief description of the Caribbean deep water is given together with Dietrich's theory as to its formation. Unpublished manuscript. Contract N6 onr-27701, NR 083-004. WHOI Ref 55-26.

Preliminary report on some characteristics of the Kuroshio off the south coast of Japan from Jan-Jun 1952, by Masao Hanzawa. Florida State University. Dept. of Meteorology, Tallahassee, Fla. Nov 1955. 97p graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 124588

A general oceanographic description of the Kuroshio current off the coast of Shionomisaki, in the period from January to Jun 1952, is given in terms of cross-sections of temperature, chlorinity, oxygen content and sigma-t, and T-Cl diagrams. Som Some brief comments on watermass characteristics and on short-range changes in oceanic conditions are also given. Contract Nonr-1600(00), NR 082-071, Technical report 3.

Propeller shaft torque fluctuations on the U.S. Tug WAHTAH. Part II, by W.C. Hall. U.S. Naval Research Laboratory. Jul 1941. 12p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120176

1. Shafts, Propeller - Ships 2. Shafts, Propeller - Torsion tests 3. Torque, Propeller 4. NRL O-1760

Thermal signals due to the reflection of sky radiation by the sea, by Wilton R. Holm. U.S. Naval Research Laboratory. Apr 1945. 63p graphs, tables. Mi $3.90, ph $10.80. PB 123356

Unclassified 15 Dec 1953. 1. Radiation, Thermal - Reflection 2. Sea water - Reflectivity 3. NRL H 2506

Torsional characteristics of propeller shafts of USS North Carolina, by W.C. Hall. U.S. Naval Research Laboratory. Jul 1941. 23p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122684

1. Shafts, Propeller - Torsion 2. NRL O 1759

Torsional characteristics of propeller shafts of USS WASHINGTON, by W.C. Hall. U.S. Naval Research Laboratory. Jul 1941. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 122685

1. Shafts, Propeller - Torsion 2. NRL O 1762

U.S. Navy Hydrographic Office synoptic and prognostic wave charts, by John J. Schule, Jr. and John F. Ropek. U.S. Navy Hydrographic Office. May 1955. 26p photos, diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 124163

This report describes a new method for presenting wave conditions over a large area. Techniques for preparing both synoptic and prognostic wave charts are presented, and some of the problems encountered in analysis are discussed. Since these wave charts can be transmitted by radio facsimile, they are ideally suited for operational use. In addition, a series of synoptic charts and 24-hour prognostic charts as well as recommendations for further developmental work are included. AD 71762. HO 16.

MISCELLANEOUS

Geography of Kapingamarangi Atoll in the Eastern Carolines, by Herold J. Wiens. National Research Council. Pacific Science Board, Washington, D.C. Jun 1955. 127p diagrs, graphs, tables, maps (part fold). Order from LC. Mi $6.30, ph $19.80. PB 124197

Scientific investigations in Micronesia 1949. SIM report no. 2 1. Atolls - Caroline Islands 2. Climate - Caroline Islands 3. Biological research - Caroline Islands 4. Physical geography - Caroline Islands 5. Sociology - Research - Caroline Islands 6. Contract N7 onr-291(54), NR 388-001.

Geography of the Pacific lowlands of Colombia and adjacent areas, by Robert C. West. Louisiana State University. Dept. of Geography and Anthropology, Baton Rouge, La. Aug 1955. 485p photos, maps (part fold), graphs, tables. Order from LC. Mi $11.10, ph $74.10. PB 125995

The report has two purposes: (1) A comprehensive geography of the tropical rainforests of the Pacific lowlands from western Colombia to southeastern Panama -- a strip 600 miles long and from 50-100 miles wide; and (2) To describe and interpret the material culture of a predominately Negroid population which has developed in this area during the last 300 years. Bibliography is included. 5 folded maps in separate envelope included. Contract Nonr 454 (00), NR 388-059, Final report.

Investigations in the Goajira peninsula, Columbia, by Homer Aschmann. California. University Riverside, Calif. Mar 1955. 20p map, table. Order from LC. Mi $2.40, ph $3.30. PB 124092

Includes geographical sketch, structure and topography, climate, ground water supplies, natural vegetation, present resources, social conditions, and proposal for further work. Contract Nonr-222 (11), NR 338-067, Preliminary report.

Measurement of regular plant distributions and their occurrence in nature, by Grant Cottam. Wisconsin. University. Jul 1955. 14p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122243

1. Plants - Geographical distribution 2. Contract N8 onr-3600, NR 164-056

Report of NRL progress. U.S. Naval Research Laboratory. Oct 1957. 58p. Order from OTS. $1.25. Also available at annual subscription rate of $10 a year in the U.S.A., foreign rate $13 a year. PB 131386

Contents: Radar echoes from the moon at a wavelength of 10 centimeters, by B.S. Yaplee, R.H. Bruton, K.J. Craig and Nancy G. Roman. - Static and fuels, by K.G. Williams,and H.W. Carhart. - Automatic evaluation of printed circuit receptacles, by E.C. Bean. - Scientific program: Problems accepted: Problem notes: Applications research: Electromechanical tactical plotting boards... Compensatory gain shift of the human operator...Human monitoring of displays...Comparison of pursuit and compensatory tracking displays. - Astronomy and astrophysics: Atmospheric composition data obtained with spectrometers flown in Aerobee-Hi NRL-48...Fission product radioactivity in the air along the 80th meridian--January-June 1957... Trajectory calculation program for Project Vanguard...Mark II minitrack system. - Chemistry: The determination of halogen in gasoline--analysis of organohalogen compounds...Investigations of solid-propellant fuel cartridges for fire extinguishment at polar temperatures...Static electrification of steel cartridge casings with dielectric coatings and the Mk 47 electric primer...Accelerated methods for studying the deterioration of fluorescent paints...Feasibility study of the removal of carbon dioxide from submarine atmospheres by amine resins. - Electricity: Control and protective devices in aircraft electrical systems...Portable precision multipurpose meter for aircraft use. - Mathematics: Electronic computer scheme for following the career of the U.S. satellite. - Mechanics: Investigation of strain-gage transducers in an irradiation field...Inlet air and scavenging system for a valveless pulsejet combustor...Deicer application of the NRL valveless pulsejet combustor. - Metallurgy and ceramics: Reduced-embrittling cadmium electroplating baths...Temperature and stress dependence of the atmosphere effect on Nichrome V...Comparison of the creep-rupture properties of nickel in air and in vacuum...Analysis of specific heat data for palladium-silver alloys... Nil ductility transitions of select ABS-B and ABS-C steels...Embrittlement of steel due to methane formation. - Nuclear and atomic physics: Insulating gas studies in the large NRL Van de Graaf... Multigroup reactor code...Eight-decade logarithmic amplifier for nuclear reactor instrumentation. - Optics: Infrared transmission of the atmosphere. - Radio: Analog method of servo system performance testing...Volumetric scanning GCA antenna design. - Solid-state physics: Symmetry of the H-Center in KCl and KBr...Optical properties of solids...Topological methods of locating critical points...Influence of light upon the magnetization of massive iron. - Published reports. - Papers by NRL staff members. - Patents.

Spatial relations of plants in a maple forest, by J.T. Curtis, Grant Cottam and Gwen Struik. Wisconsin. University. Jul 1955. 14p diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122244

1. Plants - Geographical distribution 2. Contract N8 onr-3600, NR 164-056

Visibility in some forest stands of the United States, by Robert R. Drummond and Earl E. Lackey. U.S. Army. Quartermaster Research and Development Command. Environmental Research and Development Center, Natick, Mass. May 1956. 29p photos, map, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124961

Army personnel deployed in forested areas usually find it critically important to know how far through the vegetation cover associated men may be able to see each other, or the distance away that an enemy may be seen. This study is devoted to the exploration of this visibility problem. Project: 7-83-05-004B. Contract DA 44-109-QM-1019. QMC EP TR 36.

ATOMIC ENERGY COMMISSION REPORTS

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Biology and Medicine

Semiannual report to the Atomic Energy Commission, by Leon O. Jacobson, M. D., Editor and Antreen Pfau, Assoc. Editor. Argonne Cancer Research Hospital, Chicago 37, Ill. March 1957. Contract AT-(11-1)-69. 88p. Order from OTS. $2.25. ACRH-7

Biological and Medical Research Division semiannual report - January through June, 1957. Argonne National Lab., Lemont, Ill. July 1957. Contract W-31-109-Eng-38. 204p. Order from OTS. $5.50. ANL-5732

Effect of Hanford pile effluent upon aquatic invertebrates in the Columbia River, by Jared J. Davis and Calvin L. Cooper. Hanford Works, Richland, Wash. Jan. 1951. Decl. with deletions Feb. 8, 1957. Contract W-31-109-Eng-52. 63p. Order from LC. Mi $3.90, ph $10.80. HW-20055 (Del.)

Long term retention of cesium in the rat following a single intraperitoneal injection, by J. E. Ballou and R. C. Thompson. Hanford Atomic Products Operation, Richland, Wash. Apr. 1957. Contract W-31-109-Eng-52. 13p. Order from OTS. 50 cents. HW-46150

Agricultural research program. Semi-annual progress report for July 1, 1956 to December 31, 1956. University of Tennessee. Knoxville, Tenn. June 1957. Contract AT-40-1-Gen-242. 87p. Order from OTS. $2.25. ORO-163

Effects of chronic exposure to x-rays on a steady-state population of Saccharomyces cerevisiae, by Graeme Perry Welch. California Univ. Radiation Lab., Berkeley, Calif. June 1957. Contract W-7405-Eng-48. 59p. Order from OTS. $1.75. UCRL-3763

Chemistry—General

Theoretical principles of isotope methods for investigating chemical reactions, by S. Z. Roginsky. Academy of Sciences USSR. Institute of Physical Chemistry. Moscow. Translated by: Consultants Bureau, Inc. 1956. 456p. Order from OTS. $2.20. AEC-tr-2873

Survey of metal solubilities in liquid zinc, by M. W. Nathans. Argonne National Lab., Lemont, Ill. July 1957. Contract W-31-109-Eng-38. 65p. Order from OTS. $2.00. ANL-5753

The zirconium-uranium dioxide reaction, by Manley W. Mallett and others. Battelle Memorial Institute. Columbus, Ohio. July 1957. Contract W-7405-Eng-92. 70p. Order from OTS. $2.00. BMI-1210

Analysis of used ion exchange resins, by Elizabeth W. Baumann. E. I. du Pont de Nemours & Co. Savannah River Lab., Augusta, Ga. June 1957. Contract AT(07-2)-1. 24p. Order from OTS. 75 cents. DP-218

Cesium packaging studies conversion of cesium zinc ferrocyanide to a cesium chloride product, by J. L. Hepworth, E. D. McClanahan, Jr. and R. L. Moore. Hanford Atomic Products Operation. Richland, Wash. June 1957. Contract W-31-109-Eng-52. 28p. Order from OTS. 75 cents HW-48832

Supplement No. 2 to manual of the analytical methods used by the control laboratory at the chemical processing plant. Parts I and II, by M. J. Shepherd, Jr. and J. E. Rein. Phillips Petroleum Company. Idaho Falls, Idaho. March 1957. Contract AT(10-1)-205. 34p. Order from OTS. $1.00 IDO-14316 (Suppl. 2)

The (C-H) bond dissociation energy in the methyl group of toluene, by Joseph Ignatius Genco and others. Ames Laboratory. Iowa State College. Ames, Iowa. March 1956. Contract W-7405-Eng-82. 37p. Order from OTS. $1.00. ISC-746

Solvent extraction equilibria for rare earth nitrate-tributyl phosphate systems, by Lester L. Knapp, Morton Smutz and F. H. Spedding. Ames Lab. Iowa State College. Ames, Iowa. August 1956. Contract W-7405-Eng-82. 44p. Order from OTS. $1.25. ISC-766

Kinetics of the reaction between magnesium and water vapor, by Dale S. Gibbs and H. J. Svec. Ames Lab. Iowa State College. Ames, Iowa. June 1956. Contract W-7405-Eng-82. 36p. Order from OTS. $1.25. ISC-779

Semi-annual summary research report in engineering - for July - December, 1956, by Ames Laboratory Staff. Iowa State College. Ames, Iowa. March 1957. Contract W-7405-Eng-82. 24p. Order from OTS. 75 cents. ISC-836

Mechanism of the diffusion of hydrogen through active and inactive palladium, by O. N. Salmon, D. Randall and E. A. Wilk. General Electric Co., Knolls Atomic Power Lab., Schenectady, N. Y. Nov. 1956. Contract W-31-109-Eng-52. 50p. Order from OTS. $1.50. KAPL-1674

An ionization chamber for the study of plutonium hexafluoride, by J. W. Codding, Jr. General Electric Co., Knolls Atomic Power Lab., Schenectady, N. Y. Mar. 1957. Contract W-31-109-Eng-52. 29p. Order from OTS. 75 cents. KAPL-1759

Systematic study of solvent extraction with acetylacetone (thesis), by Anoop Krishen. University of Pittsburgh, Pittsburgh, Penna. 1957. Contract AT (30-1)-860. 138p. Order from OTS. $ 3.75. NYO-6498

Use of acetylacetone extractions in ferrous analysis, (thesis), by James Patrick McKaveney. Univ. of Pittsburgh. Pittsburgh, Penna. 1957. Contract AT (30-1)-860. 129p. Order from OTS. $3.50. NYO-6507

Helium-3 system, by B. J. Massey. Oak Ridge National Lab. Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 4p. Order from OTS. 50 cents. ORNL-2325

Particle-size distribution of thorium oxide by a centrifugal sedimentation method, by O. Menis, H. P. House, and C. M. Boyd. Oak Ridge National Laboratory. Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 36p. Order from OTS. $1.00. ORNL-2345

Chemistry Division quarterly report - March, April, and May 1957. University of California, Radiation Lab. Berkeley, Calif. June 1957. Contract W-7405-Eng-48. 64p. Order from OTS. $1.75. UCRL-3836

Photosynthesis, by Melvin Calvin. University of California. Radiation Lab., Berkeley, Calif. July 1957. Contract W-7405-Eng-48. 32p. Order from OTS. $1.00. UCRL-3848

Spectrographic analysis of graphite raw material for boron and vanadium, by J. E. Peterson, H. D. Whitehead, and R. K. Bennett. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. May 1950. Decl. Mar. 6, 1957. Contract W-7405-Eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. Y-810

Chemistry—Radiation and Radiochemistry

Separation and determination of neptunium by liquid-liquid extraction, by Fletcher L. Moore. Oak Ridge National Lab., Tenn. Sept. 1956. Contract W-7405-Eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-56-9-83

Pilot plant development of a process for separating barium-140 from MTR fuel, by B. M. Legler, and others. Phillips Petroleum Co. Idaho Falls, Idaho. Sept. 1955. Decl. with deletions Feb. 11, 1957. Contract AT (10-1)-205. 169p. Order from LC. Mi $7.80, ph $25.80. IDO-14344 (Del.)

Chemistry Division quarterly progress report - period ending June 30, 1949. Oak Ridge National Lab., Tenn. Sept. 1949. Decl. with deletions Feb. 8, 1957. Contract W-7405-Eng-26. 212p. Order from LC. Mi $9.60, ph $33.30. ORNL-286 (Del.)

Chemistry Division quarterly progress report - period ending September 30, 1952. Oak Ridge National Lab., Tenn. Mar. 4, 1953. Decl. Mar. 9, 1957. Contract W-7405-Eng-26. 71p. Order from LC. Mi $4.50, ph $12.30. ORNL-1432

Chemistry—Separation Processes for Plutonium and Uranium

Application of the packed column to the Redox process, by E. R. Irish. Hanford Atomic Products Operation. Richland, Wash. Mar. 1957. Contract W-31-109-Eng-52. 18p. Order from OTS. 50 cents. HW-29967A

The Purex process - a solvent extraction reprocessing method for irradiated uranium, by E. R. Irish and W. H. Reas. Hanford Atomic Products Operation. Richland, Wash. April 1957. Contract W 31-109-Eng-52. 33p. Order from OTS. $1.00. HW-49483A

Application of the pulse column to the Purex process, by R. G. Geier. Hanford Atomic Products Operation. Richland, Wash. April 1957. Contract W-31-109-Eng-52. 30p. Order from OTS. $1.00. HW-49542A

Removal of fission products from feeds, by M. K. Harmon. Hanford Atomic Products Operation. Richland, Wash. April 1957. Contract W-31-109-Eng-52. 21p. Order from OTS. 75 cents. HW-49544A

Decontamination of thorium-uranium alloy by nonconsumable electrode arc-melting, by E. W. Murbach and A. G. Buyers. Atomics International. Division of North American Aviation, Inc. Canoga Park, Calif. Sept. 1957. Contract AT(11-1)-Gen-8. 14p. Order from OTS. 50 cents. NAA-SR-1989

Comparison of batch and continuous 23 processes, by G. H. Hanson. Oak Ridge National Lab., Tenn. March 1948. Decl. Mar. 7, 1957. 39p. Order from LC. Mi $5.40, ph $15.30. ORNL-20

Laboratory purification and concentration of U^{233}, by D. C. Overholt. Oak Ridge National Lab., Tenn. Aug. 1949. Decl. Mar. 6, 1957. Contract W-7405-Eng-26. 19p. Order from LC. Mi $2.40, ph $3.30. ORNL-122

A solvent extraction method for plutonium analysis, by F. L. Moore and J. E. Hudgens, Jr. Oak Ridge National Lab., Tenn. Sept. 1948. Decl. Feb. 7, 1957. Contract W-7405-Eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. ORNL-153

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Technology—Feed Materials

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A general study of the distribution of impurities in remelted uranium metal and related subjects, by W. A. Oppold. Mallinckrodt Chemical Works, St. Louis. April 1946. Decl. Feb. 27, 1957. Contract W-7405-Eng-29. 14p. Order from LC. Mi $2.40, ph $3.30. MCW-30

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Progress report for November 1951, by J. T. Finkston and Karl S. Willson. Harshaw Chemical Co., Cleveland. Dec. 1951. Decl. Feb. 27, 1957. Contract W-7405-Eng-276. 7p. Order from LC. Mi $1.80, ph $1.80. NYC-1464

Closing research report, December 31, 1951, by J. T. Finkston and Karl S. Willson. Harshaw Chemical Co., Cleveland. Feb. 1952. Decl. Feb. 27, 1957. Contract W-7405-Eng-276. 13p. Order from LC. Mi $2.40, ph $3.30. NYC-1467

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Technology—Raw Materials

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