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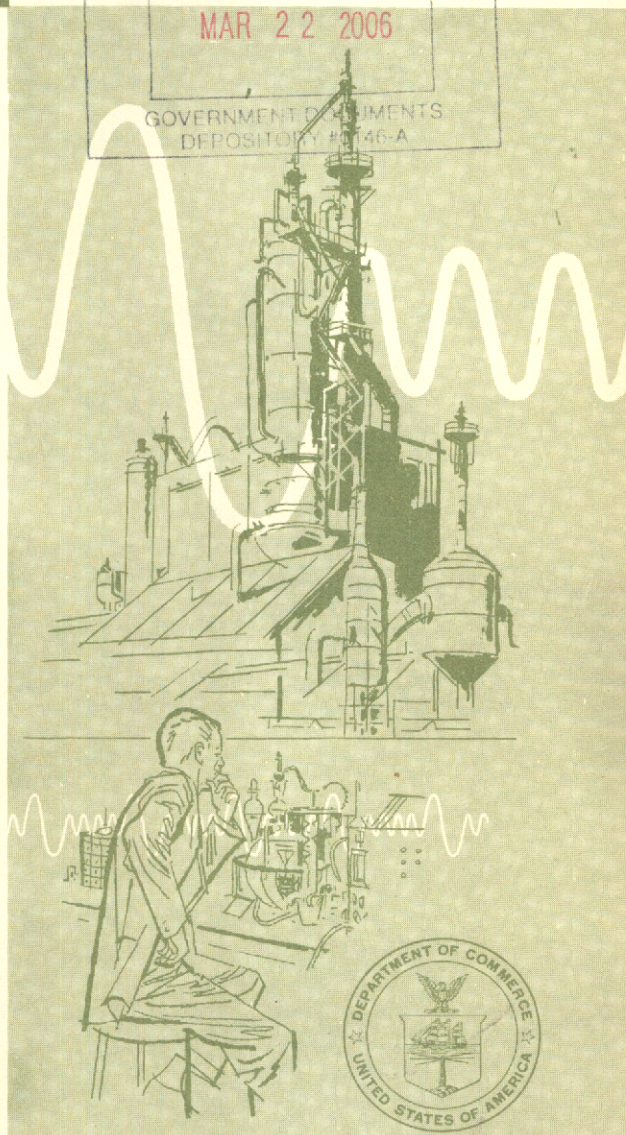

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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 26, No. 3 September 14, 1956

Contents

Printed Reports Available from OTS Announced in This Issue

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Colloidal properties of the phenylstearates of the alkali and alkaline earth metals in benzene, by John G. Honig and C. R. Singleterry. U. S. Naval Research Laboratory. Jul 1956. 31p photos, graphs, tables. Order from OTS. $1. PB 121240

Alkali metal phenylstearates in dilute, anhydrous benzene solutions (c = 1 - 2.5%) form viscous, slightly non-Newtonian systems analogous to linear polymeric solutions. Such structures are believed to result from the formation of linear soap polymers through coordinate linkages between the metal ions and carboxylate oxygens. The effectiveness of the alkali soaps in forming these structures varies inversely with the size of the cation involved. Some of the alkaline earth soaps also form high viscosity structures in dilute anhydrous solutions. Appendix: A method for determining the size and shape of micelles. NRL R 4772.

Effect of hydrocarbons and other gases upon the explosibility of acetylene, by G. W. Jones, R. E. Kennedy and I. Spolan. U. S. Bureau of Mines. Jan 1948. 10p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 120095

1. Explosions, Acetylene 2. Acetylene chemistry - Research 3. Hydrocarbons - Reactions with acetylene 4. BM RI 4196.

Fiber project. Technical report no. II under Contract no. Nonr-839(01), Project no. 330-028, by J. Farber. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. May 1955. 40p diagr, graphs, tables. Order from OTS. $1. PB 111806

Various syntheses of 1,n polyamides are described and the reaction products are studied. It is shown that the methods of synthesis used by previous workers resulted in partially crosslinked products which are practically insoluble and melt only under previous decomposition. Linear 1,n polyamides could be synthesized by a two step synthesis. It is shown that the necessary presence of large amounts of strong acid in the reaction mixture, results in an equilibrium between the formation and the degradation of the chains. Various N-substituted derivatives of the linear 1,n polyamides were prepared. An indirect method for the synthesis of high molecular weight 1,n polyamides was found.

Fundamental study of foams and emulsions. Final report under Contract no. Nonr-656(04), Task no. NR 092-110, for Sep 1, 1953 to Dec 31, 1954, by Emil J. Burcik and Robert C. Newman. Pennsylvania State University. Mineral Industries Experiment Station, State College, Pa. 1954. 26p diagr, graphs, tables. Order from OTS. 75 cents. PB 111796

In a report by The University of Oklahoma Research Institute, the surface plasticity of sodium myristate solutions was described. In this report the surface plastic behavior of other sodium soap solutions are described. The previous results on sodium myristate were confirmed and it was shown that the transition temperatures were progressively higher as the molecular weight of the soap was increased. The transition temperature was decreased by an increase in pH, indicating that the surface plasticity was apparently due to the products of hydrolysis. The transition temperature was also markedly influenced by the presence of relatively small amounts of higher molecular weight soaps present as an impurity. Contamination of the solution with atmospheric carbon dioxide also tended to make the solution more surface plastic. Includes Surface plasticity of sodium myristate solutions, by Emil J. Burcik, James R. Sears, and Albert Tillotson (Reprinted from Journal of Colloid Science, vol. 9, no. 3, p. 281-284, June 1954). Covers work during the period from Jun 1, 1951 to Dec 31, 1954.

Large scale laboratory preparation of 1, 3, 5-trinitro-2, 4, 6-tribromobenzene, by Marion E. Hill. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1953. 14p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122046

Several pounds of 1,3,5-trinitro-2,4,6-tribromobenzene were prepared by nitrating 1,3-dinitro-2,4,6-tribromobenzene with a mixture of potassium nitrate and fuming sulfuric acid at 125°C. 1,3-dinitro-2,4,6-tribromobenzene was prepared by nitration of symtribromobenzene with a mixture of fuming nitric acid and concentrated sulfuric acid at 60°C. This procedure was an improvement over previous methods, as only commercially available materials were used, less time was required, and the yield was raised over two-fold. Task NOL-Re2c-19-1-53. NAVORD 3709.

Reaction heats of organic halogen compounds, by J. R. Lacher, A. Kianpour and J. D. Park. Colorado. University, Boulder, Colo. Contract AF-18(600)-1151. Order separate parts described below from LC, giving PB number of each part ordered.

Part VII. Aug 1955. 16p graphs, table. Mi $2.40, ph $3.30. PB 120015

This report covers the heats of hydrogenation of CF_2-CFCl, CF_2-CH_2 and CF_2CCl_2 obtained in our low temperature calorimetric reactions along with a summary of the syntheses of various fluorinated compounds. The physical properties and infrared spectra are also reported. U. C. Technical note 1. AF OSR TN 55-390, Note 1.

Part VIII. Oct 1955. 6p diagrs, tables. Mi $1.80, ph $1.80. PB 122897

The heats of chlorination of perfluorobutene-1, perfluoroisobutene and perfluoropentene-1 were carried out and found to be -44,966, -42,222 and -44,966 cal/mole respectively. The physical properties of the adducts were also determined and the infrared spectra of the compounds determined. U.C. Technical note 2. AF OSR TN 55-390, Note 2.

Research on boron polymers, by William L. Ruigh, Frank C. Gunderloy, Jr., Michael Sedlak and P. A. Van Der Meulen. Rutgers University. School of Chemistry, New Brunswick, N. J. May 1956. 47p diagrs, tables. Order from OTS. $1.25. PB 121374

A new, simple, and efficient synthesis of boron substituted borazoles has been developed. Butylboron dichloride reacts with ammonia to give a high yield of B-tributylborazole. This synthesis will be broadened by the employment of substituted amines. Some of the resulting B-N substituted borazoles may serve as the basis of thermally and hydrolytically stable semi-inorganic polymers and the liquid borazoles will be evaluated as lubricants and hydraulic fluids. The preparation of benzeneboronic acid, tri-n-butylborine, butylboron dichloride and phenylboron dichloride as intermediates for our new borazole synthesis has been studied. A new catalytic recirculating apparatus for preparing phenylboron dichloride from benzene and boron trichloride by Pace's method is described. Project no. 7340. Covers period of work from Dec 1954 to Dec 1955. For Parts 1-2 see PB 111689 and PB 111892. AF WADC TR 55-26, Part 3.

Plastics and Plasticizers

Chemical finishes for glass fiber, by P. Erickson and L. Silver. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 29p fold. tables. Order from OTS. 75 cents. PB 121165

Twenty chemical finishes for glass fibers have been synthesized and evaluated in a program aimed at the development of superior strength properties of resin-glass cloth laminates under dry and wet conditions. Several theories are discussed concerning the mechanism of attaching the finish to the glass and the reaction of functional groups in the finish with polyester and epoxy resins. Continued in PB 121172. NAVORD 2802.

Development of a lightweight plastics cartridge case: Report no. 3, by F. Robert Barnet and W. T. Johnson. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1955. 34p photos, diagrs, tables. Order from LC. Mi $3, ph $6.30. PB 120979

1. Cartridges - Cases - Plastic 2. Guns, Howitzer 3. NAVORD 3988

Development of electrical conducting transparent coatings for acrylic plastic sheet, by George A. Dalin and Ivan Flores. Balco Research Labora-

tories, Newark, N. J. Dec 1954. 61p diagrs, graphs, tables. Order from OTS. $1.75. PB 121262

Project no. 7312, Task no. 73125. For Part 1 see PB 121104.
1. Coatings, Transparent - Electrical properties 2. Coatings, Transparent - Deposition - Methods 3. Plastics, Acrylic - Coatings 4. Coatings, Cadmium - Sputtering 5. Contract AF 33(616)-111 6. AF WADC TR 53-378, Part 2.

Effect of solvent-type cements on the shatter resistance of stretch oriented acrylics, by Herschel L. Smith. U. S. Naval Research Laboratory. Jul 1956. 18p photos, graph, tables. Order from OTS. 50 cents. PB 121038

This report gives the results of an investigation of the shatter resistance of stretched material when subjected to solvent-type cements such as those presently used in aircraft for canopy edge attachments. The small loss in toughness when cement alone was used, a maximum of 8%, was more than compensated for when fiberglas strips were cemented onto the specimens. Because of their basic compatibility with acrylics and because little loss in toughness was found it was not considered necessary to investigate cements other than the monomer-polymer-solvent variety. NRL R 4792.

Refractive index and density of polystyrene and polyvinyl toluene latices, by Thomas L. Pugh. Wayne University, Dept. of Chemistry, Detroit, Mich. Jul 1954. 52p drawings, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 122549

Average densities of polystyrene and polyvinyl toluene were 1.0569 $\pm$.0019 and 1.0258 $\pm$.0012, respectively. Refractive indices of three significant figures were determined for 16 different latex samples. The refractive indices of polystyrene and polyvinyl toluene polymers decrease as their particle size increases. The phenomenon may be due to a breakdown of the mixture rule at large particle sizes. Research on the size and shape of large molecules and colloidal particles, Report no. 7. For reports no. 2-6, 9-10 under this contract see PB 117034, 114756, 117386, 117419, 117533, 117780-117787. Contract Nonr-736(00), NR 330-027, Technical report no. 7.

Simulated shipboard fire test evaluation of plastic piping. U. S. Philadelphia Naval Shipyard, Philadelphia, Pa. Industrial Test Laboratory. May 1951. 33p photos, fold diagr, table. Order from LC. Mi $3, enl pr $7.80. PB 122181

This report is concerned with the study of the comparative performance in fire of a proposed new plastic salt-water piping system provided for test by the Bureau of Ships. It was fabricated of resin impregnated fibrous glass cloth and was externally coated with a thin, brittle layer of "Albi R" fire retardant. For comparative purposes, piping of copper-nickel (70:30), the type currently used for salt-water lines aboard ship, and of aluminum alloy were included in the investigation. ITL report no. 2329-A. NS-068-001.

Static and dynamic calibration of a photo-elastic model material, CR-39, by Austin B. J. Clark. U. S. Naval Research Laboratory. Jun 1956. 9p photos, drawings, diagrs, graphs, table. Order from OTS. 50 cents. PB 121269

Measurements of strain and birefringence were taken for effective loading times in the range of 10 minutes to 10^{-4} seconds. Two methods of determining the effective gage factor for wire-resistance strain gages on this plastic material were used. One was by comparing simultaneous measurements by an extensometer and the wire-resistance strain gage; the other was by collecting the momentum imparted to the test bar in a throw-off bar and equating it to the area under the strain-time curve obtained from the wire-resistance strain gage. NRL R 4779.

Study of the birefringence of hot-stretched polymethyl methacrylate, by Mary J. Kramer. U. S. Naval Research Laboratory. Jun 1956. 24p diagrs, graphs, tables. Order from OTS. 75 cents. PB 121160

The relationship of the birefringence to the toughness and to the stretching history has been studied for acrylics which have been commercially hot-stretched under a variety of conditions. A statistical treatment has been given to the correlation between the birefringence and the toughness, as measured by the C_{oc} test. It is shown that, by reducing the number of histories to be considered, the correlation may be improved. The application of these results to the testing of aircraft glazing is discussed. An analogy is drawn between the optical behavior of hot-stretched acrylics and that of rubbers stretched at room temperature. Appendix A: The conoscope. NRL R 4751.

Universal type chemical finishes for glass fibers used in reinforced plastics, by P. Erickson, L. Silver and H. A. Perry, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 17p table. Order from OTS. 50 cents. PB 121172

Five new chlorosilane-type finishes for glass fibers used in reinforced plastics have been synthesized and evaluated. Four of these have been found to exhibit general purpose characteristics, leading to outstanding dry and wet flexural strength properties in glass fabric laminates with polyester, epoxy and phenolic resins. Continuation of work reported in NAVORD 2802 (PB 121165). NAVORD 3811.

Paints, Varnishes and Lacquers

Development of a coating, pretreatment, for metals (wash primers). Vita-Var Corporation, Newark, N. J. Contract DA44-009 Eng-1737. Order separate parts described below, giving PB number for each part ordered.

Report no. 4 for the period 1 Nov-31 Dec 1953 under Contract no. DA 44-009 Eng-1737, project no. 8-93-14-002, by F. Liberti and M. Shor. Dec 1953. 84f photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, enl pr $13.80. PB 122640

AD-28436.
1. Paints, Priming - Anti-corrosive 2. Metals - Coatings, Protective 3. Coatings, Strontium chromate - Tests.

Final report for the period 1 May 1953-30 May 1955 under Contract no. DA 44-009 Eng-1737, project no. 8-93-14-002, by M. Shor, A. O. Allen and T. M. Murray. May 1955. 122p tables. Order from OTS. $3.25. PB 121362

The purpose of this project is the development of a one package pretreatment, wash primer, for use on steel, aluminum and magnesium having sufficient package stability so that it can be shipped and stored in a single package requiring no special mixing at the point of application. Detailed tabulated data covering extensive formulas and tests are furnished. AD-73915.

Inorganic Chemicals

Isentropic P-V-T data for carbon dioxide and nitrogen, by Donna Price and George T. Lalos. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1955. 41p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120982

Dynamic calibration of the NOL 100,000 psi adiabatic compressor requires known isentropic P-V-T data for one or more gases. This report derives the necessary isentropic data for carbon dioxide and nitrogen. For both gases, an adequate interpolation procedure has been developed for the P-V isentropes. At low pressures (200 atm and below), an analytical method is used. For higher pressures, numerical interpolation of the data tabulated in this report is used. NAVORD 3964.

Ordnance Chemicals

Decomposition and mechanistic studies of propellant and propellant additives. Quarterly report for the period May 1-Jul 31, 1954 under Contract no. DA 33-019-ORD-1476, project no. TB2-0001, by M. L. Wolfrom, A. Chaney, F. Shafizadeh, E. C. Horswill and G. P. Arsenault. Ohio State University. Dept. of Chemistry, Columbus, Ohio. Aug 1954. 24p drawings. Order from LC. Mi $2.70, enl pr $6.30. PB 122180

The objectives of this research are: 1) Investigation of RS2,4-dinitrophenylhydrazine derivatives by column and by paper chromatography; 2) Production of radioactive cellulose (d-glucose-1-C^{14} and cellulose-1-C^{14}); 3) Tosylation of cellulose; 4) Fractionation of cellulose derivatives; 5) Analysis and preparation of polyvinylamine perchlorate. OSURF Proj 591, Report no. 22.

Miscellaneous Chemicals

Adhesives handbook. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Engineering principles, by H. A. Perry, Jr., L. Hardis, H. E. Mathews, Jr., L. Briggs, E. W. Eagleson and R. S. Fey. Feb 1952. 137p drawings, diagrs, graphs, tables. Mi $6.90, ph $21.30. PB 120812

This preliminary report presents some aspects of the physical and engineering principles as presently understood, for the design, assembly and inspection of adhesives bonds and for the testing of adhesives. Bibliography pp. 14-17. NAVORD 2272.

Part II: Engineering data, by H. E. Mathews, Jr. and R. Fey. Feb 1952. 228p photos, drawings, graphs, tables. Order from LC. Mi $9.90, ph $34.80. PB 120813

This report is a compendium of typical data and information on proprietary adhesives such as may be found in various specifications, manufacturers' literature, periodicals, and reports by commercial and government laboratories. A number of specific applications involving various adhesive-adherend systems are presented. NOL Task Relb-450. NAVORD 2273.

Corrosion preventive additives, by E. J. Schwoegler and L. U. Berman. Armour Research Foundation, Chicago, Ill. Contract AF-33(038)-9202. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 2. Mar 1954. 168p graphs, tables. $4.25. PB 121113

This project was undertaken to develop new corrosion inhibitors that may supplement or replace petroleum sulfonates. With certain amine salt inhibitors a study was made to determine the effect of heating at 150°C for three hours on corrosion inhibition. A large number of organic compounds were screened by the use of a galvanic specimen test in order to discover inhibitors that might be effective for inhibiting corrosion in the bimetallic system, 52100 steel-

Muntz metal brass. In the course of this investigation, conditions of temperature, humidity, etc. were studied to arrive at conditions best suited for screening these compounds. Initial studies were made on the mechanism of corrosion inhibition of 1020 steel. Many organic compounds were synthesized to assist in the development of new inhibitors and in the elucidation of the mechanism of corrosion inhibition. These included morpholine and ethylenediamine derivatives, amine salts of mono- and dicarboxylic acids, fatty acid derivatives and substituted glyoxalidines. An infrared study on 2- and 1,2-substituted glyoxalidines was made in an effort to arrive at an effective method of verifying these structures. Appendix A: Experimental procedures. - Appendix B: Code for chemicals tested. AF WADC TR 53-16, Part 2.

Part 3. Dec 1954. 65p tables. $1.75. PB 121108

Over 200 compounds have been evaluated in the JAN-H-792 cabinet. Twelve of these passed the 100-hr requirement. Before using this test method, a study was made to determine reasons for lack of correlation between the results of the Armour Research Foundation cabinet and those of the Wright Air Development Center cabinets, and methods of correlating the cabinet conditions were found. The study of the mechanism of corrosion inhibition as related to structure and functional groups of the polar organic compounds was made on the data obtained from the galvanic system tests with a 52100 steel disk and cartridge brass clip. Several additional compounds were synthesized from data obtained from previous test results but these did not show corrosion-inhibiting properties. Project no. 3044, Task no. 73311. Report of work during the period 31 Mar 1953 to 31 Mar 1954. AD 59642. AF WADC TR 53-16, Part 3.

Study of magnesium fire extinguishing agents, by L. M. Greenstein and S. I. Richman. Francis Earle Laboratories, Inc., Peekskill, N. Y. May 1955. 149p diagr, graphs, tables. Order from OTS. $3.75. PB 121375

Quantitative fire tests for evaluating extinguishing agents for magnesium fires were developed, efficiency being measured in terms of the time of extinguishment, the quantity of agent required, and the quantity of unconsumed magnesium remaining at the conclusion of the test. By definition, a fire was said to be extinguished when the magnesium had been cooled to a temperature below its ignition point. Agents were studied both for cooling efficiency and for the protection against reignition which they imparted to the burning magnesium. The most successful agents consisted of solutions in chlorobromomethane of liquids with high heat absorbing capacity. Project no. 6075. AF WADC TR 55-170.

ELECTRICAL MACHINERY

Electronics

Analysis of eddy current loss in laminated core material, by O. J. Van Sant, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1953. 22p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120909

The eddy current loss in a laminated, constant permeability (i.e. non-ferromagnetic) core material is derived rigorously starting with Maxwell's equations. By comparing the results of this rigorous derivation with the expression commonly given in the literature, the limitations of the popular expression become immediately apparent. It is also emphasized that neither the popular nor the rigorous results can be applied properly to the ferromagnetic case, although such an application is commonly referred to in the literature. NAVORD 2772.

Capacitance effects in thin conductive films, by J. N. Humphrey, F. L. Lummis, and W. W. Scanlon. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 17p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120974

The frequency dependence of the resistance of thin films of lead sulfide and tellurium are analyzed on the basis of the effects of distributed capacitance and intercrystallite capacitance. It is shown that while for some films the observed behavior can be accounted for by distributed capacitance effects alone, others require both effects. A correlation between photoconductivity and the presence of intercrystalline capacitance was not found in these experiments. NAVORD 2457.

Extraction of weak signals from noise by integration, by Frank R. Dickey, Jr., Alfred G. Emslie and Harry Stockman. U. S. Air Materiel Command. Cambridge Field Station, Cambridge, Mass. Sep 1948. 44f photos, diagrs, graphs, tables. Order from LC. Mi $3.30, enl pr $9.30. PB 122625

The fundamentals of signal storage in the presence of noise are reviewed, and experimental results obtained with a particular storage device are given in detail. The detection of weak signals imbedded in noise was achieved by marking a sequence of transmitted pulses in order to permit the use of an efficient storage system, and by using a synchronization scheme that automatically provided signal excitation in the right phase. The limitations of the system are discussed. U-3061. AF CRL E 5038.

Ferrite applications: Electronic properties of ferrites and their application to microwave devices. Interim report no. 2 under Contract AF 30(602)-

923, by D. W. Healy, Jr. and R. A. Johnson. Revised. Syracuse University Research Institute. Electrical Engineering Dept., Syracuse, N. Y. May 1956. 63p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 122890

The unusual coupling of magnetic and electric properties possessed by ferrites has made them of great interest in the microwave electronics field. The bulk of this report describes observations made of the Faraday rotation observed when a cylindrical wave guide is loaded with hollow cylindrical ferrite samples. Experimental measurements are made of the variation with magnetic field of the wave lengths of the modes propagating in the ferrite. All the data collected was taken at the X-band frequencies and the ferrites discussed in this report are sintered ferrites obtained commercially. S.U.R.I. report no. EE 279-557 T2.

Handbook of industrial radiology, by J. J. Hirschfield, N. Modine, D. T. O'Connor, E. L. Criscuolo and D. Polansky. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1954. 153p graphs, tables. Order from OTS. $4. PB 121182

A general review of industrial radiology is given along with a discussion of the various factors affecting radiographic quality. Gamma ray techniques are discussed, as well as X-ray procedures. A comprehensive compilation of data in tabular and graphic form is included, to serve as a ready reference for radiology and related types of material evaluation. NAVORD 3649.

High impedance fixed and continuously variable delay lines with ferrite cores, by W. S. Carley and J. F. Peoples. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 27p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120952

A preliminary feasibility study of artificial delay lines using ferrite cores was made. The results of tests on these lines using both sine wave and rectangular input signals are given. Lines with characteristic impedances as high as 22,000 ohms are obtained. Two methods of obtaining continuously variable time delays are described. Time delay variations of from 0 to 1 microseconds in a 1 microsecond line were achieved. The variation in time delay with frequency for sine wave input signals is shown for both fixed and variable types of delay lines. The response of the delay lines to rectangular pulses of several pulse widths is shown. NAVORD 2300.

Ionography, a new process of radiographic imaging, by E. L. Criscuolo. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1955. 25p photos, diagrs, graphs, tables. Order from OTS. 75 cents. PB 121180

A new radiographic imaging process called ionography is described. This system utilizes a differential X-ray ionization of a layer of air immediately above a charged insulating surface, creating an electrostatic image corresponding to the differential ionization pattern. The latent electrostatic image is made visible by liquid deposition of fine particles. Although this system is not fully developed or evaluated, results to date indicate that useful images can be produced with significant advantages in speed and economy by using an inexpensive, reusable plate. NAVORD 4033.

Measurements and evaluation of electrical potentials between oxide systems. Pennsylvania State University. College of Mineral Industries, State College, Pa. Dec 1954. 65p diagrs, graphs, tables. Order from OTS. $1.75. PB 111795

Reports no. 59-60. Contents: Introductory remarks, by W. A. Weyl. - Measurements and evaluation of electrical potentials between oxides and fused glasses, by Emile P. Plumat. - Measurements and evaluation of electrical potentials between glasses, by Megumi Tashiro. PSC SMI TR 59. PSC SMI TR 60. Contract N6 onr-269, T. O. 8, NR 032-264.

Natural charge distribution and capacitance of a finite conical shell, by Samuel N. Karp. New York University. Washington Square College of Arts and Science. Mathematics Research Group. Sep 1951. 56p diagrs. Order from LC. Mi $3.60, ph $9.30. PB 122629

The natural charge distribution for a conical cup has been obtained without approximation. From the knowledge of the natural charge distribution the capacitance of the conical cup is obtained as well as the behavior of the charge densities at the apex and the circular edge of the cup. ATI no. 131281. NYU RR EM-35. Contract AF 19(122)-42.

Note on Van Der Ziel's model of secondary electron emission at low primary energies, by Wayne R. Gruner. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 14p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120973

Van der Ziel has suggested that by examining asymptotic behavior of secondary electron emission yield curves for low primary energies one can avoid having to consider inward diffusion of primary electrons and outward diffusion of secondaries. In an effort to improve matters, the author has attempted to correct for back scattering and to employ more realistic estimates of some parameters of the theory. No improvement results. The author suggests that the model used by Van der Ziel is too simplified to succeed and that one must consider the distribution in energy of the excited metallic electrons. NAVORD 2469.

Photoconduction in phosphors. Final report covering the period Sep 1, 1949-Nov 30, 1953 under Contract no. N6 onr-26313, by J. J. Dropkin.

Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Jun 1954. 157f diagrs, graphs, tables. Order from LC. Mi $7.50, enl pr $25.80. PB 122117

The basic theme of this report is that photoconducting phosphors have electrons in the conduction band. The first part of the report shows that the measured D.C. photocurrent is time dependent, and that the amplitude and phase of the measured A.C. photocurrent is frequency dependent. It is also shown that extrapolated conductances behave as though they were proportional to the number of electrons in the conduction band. Part two discusses the properties of two infrared sensitive storage phosphors, ZnS-Cu-Co and SrS-Ce-Sm, and shows how a study of trapping, luminescence, and photoconductivity helps to elucidate the mechanism of luminescence in these phosphors. AD 41210.

Physical limitations on antennas, by John Ruze. Massachusetts Institute of Technology. Research Laboratory of Electronics. Oct 1952. 88f diagrs, graphs. Order from LC. Mi $4.80, enl pr $15.30. PB 122852

Investigation of the physical realizability of a specified radiation polar diagram from an antenna aperture of finite size is presented in three related parts: Limitations imposed by (1) aperture distribution errors; (2) the synthesis procedure; (3) the aperture "Q". AD 62351. Dept. of the Army project 3-99-12-022. Signal Corps project 132B. MIT RLE TR 248.

Pinning of dislocations by X-irradiation of alkali halide crystals, by R. B. Gordon and A. S. Nowick. Yale University. Hammond Metallurgical Laboratory, New Haven, Conn. Dec 1955. 49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120011

A study is made of the effect of X-irradiation on the room temperature elastic modulus of NaCl crystals. A modulus increase is observed on irradiation which is shown to correspond exactly to the elimination of the modulus decrease due to oscillating dislocation loops through the creation of pinning points along the dislocations. A quantitative theory is developed for the variation of modulus with X-ray dose. The effects of irradiation at low temperatures are also reported. Project R-355-40-14. AF OSR TN 55-479. Contract AF 18(600)-850.

Preliminary analysis of methods for determining antenna patterns in flight, by J. S. Prichard. Airborne Instruments Laboratory, Inc., Mineola, N. Y. Feb 1947. 78f diagrs, graphs, tables. Order from LC. Mi $4.50, enl pr $13.80. PB 122185

This report presents the results of a study of the possible means of determining the absolute radiation pattern of an antenna on an aircraft in flight. The general requirements of a system for determining radiation patterns are first considered. Since the manner in which the radiation is propagated is of primary importance, the suitability of three systems are described, viz: (1) An air to air system using only the direct wave component of space wave propagation: (2) An air to ground system in which both the direct and ground reflected components of the space wave are used; (3) An air to ground system in which the space wave and the surface wave are both used. A comparison of the relative advantages and disadvantages of the three systems shows that the first system is the most complicated, but it is the only system capable of providing the complete information desired. Report no. 106-1. ATI no. 37380.

Progress report of the Solid State Division, by Louis R. Maxwell. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from LC, giving PB number of each part ordered.

Calendar year 1952 (Part I). May 1953. 27p photos. Mi $2.70, ph $4.80. PB 120976

Second annual progress report.
1. Solids - Research 2. NAVORD 2859.

Calendar year 1953. Mar 1954. 18p photos. Mi $2.40, ph $3.30. PB 120977

1. Solids - Research 2. NAVORD 3668.

Calendar year 1954. May 1955. 54p graphs. Mi $3.60, ph $9.30. PB 120978

A summary of studies in semiconductors, electroluminescence, intermetallic semiconductors, and magnetism in solids. NAVORD 4036.

Pulsers for the Stanford linear electron accelerators, by Paul A. Pearson. Stanford University. W. W. Hansen Laboratories of Physics. Microwave Laboratory. Nov 1952. 274f photos, drawing, diagrs, graphs. Order from LC. Mi $11.10, enl pr $45.60. PB 122832

This is a discussion of the requirements, developmental and engineering problems, and solutions for the klystron pulsers used with the 35 million electron-volt and one billion electron-volt linear electron accelerators, at Stanford. Design procedures, specifications, and performance of the pulser components are given. U 25434. SU ML R 173. Contract N6onr-25116, NR 022-026.

Radiation characteristics of circular and semicircular surface sources, by A. I. Mahan. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1953. 45p drawings. Order from LC. Mi $3.30, ph $7.80. PB 120994

In this report, a theoretical study of the radiation characteristics for both semicircular and circular surface sources has been made, when these sources radiate uniformly over their surfaces and obey Lambert's Cosine Law. This study includes a pre-

sentation of the history of the development of such formulae from the time of Lambert in 1760 up to the present. Presented in part at the 38th Annual meeting of the Optical Society of America in Rochester, New York, Oct 15-17, 1953. NAVORD 3605.

Radiowave propagation. Part I: Theory of radiowave propagation along the earth's surface (ground wave). Chapter VIII: Various methods of treating the problems of radiowave propagation for a plane, homogeneous earth, by Ia. L. Al'pert, V. L. Ginzburg and E. L. Feinberg. n.d. 20p. Order from OTS. 50 cents. PB 121368

Technical translation no. 13, under Contract AF 19(604)-1476. Translated from Gosudarstvennoe izdatel'stvo tekhniko-teoreticheskoi literatury (1953) 1. 171-183.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-787.

Research and development work on semiconducting materials of unusually high electron mobility, by Albert C. Beer, Theodore C. Harman, Robert K. Willardson and Harvey L. Goering. Battelle Memorial Institute, Columbus, Ohio. Jul 1955. 54p graphs. Order from OTS. $1.50. PB 121288

This investigation was concerned with the preparation and evaluation of semiconducting materials of unusually high electron mobility. The compound indium antimonide was prepared in a state of high purity and its basic electrical properties were analyzed. Studies were made of the zone-refining process for InSb and the effect of a specified number of passes on both p- and n-type impurities. An investigation of impurity scattering effects was carried out by analyzing the electron mobility as a function of impurity concentration. Both theoretical and experimental studies were made of magnetoresistance effects. Project no. 4155, Task no. 41529. AF WADC TR 55-307. Contract AF 33(616)-2640.

Semiconducting materials. Annual report for the period Dec 1954-Nov 1955 under Contract no. Nonr-1503(01), project no. Nr 015-215, by T. J. Gray. New York State College of Ceramics, Alfred, N. Y. Dec 1955. 56f photos, drawings, graphs. Order from LC. Mi $3.60, enl pr $10.80. PB 122633

It has been fully established that zone purification technique of a simple nature can be employed to prepare starting materials suitable for the production of extremely pure single crystal specimens of semiconducting sulphides, selenides and tellurides using C. P. or even commercial materials. The feasibility of producing large crystals of certain selenides and tellurides by the Stockbarger method has been demonstrated and satisfactory specimens prepared for fundamental investigation. AD 79045. Contract Nonr-1503(01), NR 015-215.

Study of the network synthesis approximation problem for arbitrary loss functions, by Ernest S. Kuh. Stanford University. Dept. of Electrical Engineering. Electronics Research Laboratory, Stanford, Calif. Feb 1952. 86f diagrs, graphs. Order from LC. Mi $4.80, enl pr $15.30. PB 122137

In this research, a rigorous method for the approximation problem of an arbitrary loss function has been developed. This is of considerable interest for both academic and practical purposes. Although some of the principles and techniques involved were already known, yet a number of new points are introduced along with the method, as follows: (a) The set-up of a potential problem from the arbitrary loss function by introducing a complex potential without knowing what actually is the charge distribution belonging to the complex potential. (b) The separation of the complicated potential problem into several parts such that we are able to solve them individually, as W_1, W_2, and W_3. (c) The physical reasoning based on the complex potential plane and the idea of moving the charge distribution to obtain a perfect symmetry. Contract N6 onr-251, T. O. 7, NR 078-360. SU ERL TR 44.

Theory of switching. Harvard University. Computation Laboratory. Order separate reports described below from LC, giving PB number of each report ordered.

Bell Laboratories' report no. 1 covering the period 1 Sep 1952-1 Jan 1953. Jan 1953. 98p photos, diagrs, tables. Mi $5.40, ph $15.30. PB 122812

Contents: I. Use of magnetic cores as switching functions, by Robert Minnick. - II. Decomposition of switching functions, by Robert Ashenhurst. - III. Rattle type circuits, by Theodore Singer. - IV. Functions expressible as a sum of transforms, by Robert Ashenhurst. - V. Method for synthesising multiple-output networks sequentially, by Robert Ashenhurst. HU BL 1.

Bell Laboratories' report no. 2 covering the period 1 Jan-1 Apr 1953. Apr 1953. 177p photos, diagrs, graphs, table. Mi $8.10, ph $27.30. PB 122813

Contents: I. Universal logical generating function, by Anthony Oettinger. - II. Method for determining functional invariance, by Robert Ashenhurst. - III. Functions of small m, by Robert Ashenhurst. - IV. Magnetic core switching circuits, by Robert Minnick. - V. Theoretical analysis of the transfer of information from one magnetic core to another, by Robert Minnick. - VI. Preliminary results on periodic f_i generators, by Warren Semon. - VII. Rattle-type circuits (II), by Theodore Singer. HU BL 2.

Bell Laboratories' report no. 3 covering the period 1 Apr-1 May 1953: Use of magnetic cores as switching devices, by Robert Charles Minnick. Apr 1953. 170p photos, diagrs, graphs, tables. Mi $7.80, ph $25.80. PB 122814

Thesis - Harvard University.
1. Circuits, Switching - Theory 2. Cores, Magnetic - Storage properties 3. Information - Transference 4. HU BL 3.

Bell Laboratories' report no. 4 covering the period 1 Apr-1 Jul 1953. Jul 1953. 149p photos, diagrs, graphs, tables. Mi $7.20, ph $22.80. PB 122815

Contents: I. Adding transformations, by Warren Semon. - II. Periodic decomposition of switching functions, by Warren Semon. - III. Decomposition charts as a theoretical aid, by Theodore Singer. - IV. Non-disjoint decompositions, by Robert Ashenhurst. - V. Rattle-type circuits (III), by Theodore Singer. - VI. Multiple-coincidence magnetic storage systems, by Robert Ashenhurst and Robert Minnick. HU BL 4.

Bell Laboratories' report no. 5 covering the period 1 Jul 1953-1 Jan 1954. Jan 1954. 200p diagrs, tables. Mi $8.70, ph $30.30. PB 122816

Contents: I. Simultaneous equations in switching theory, by Robert Ashenhurst. - II. Enumeration of networks by rank, by Robert Ashenhurst. - III. Rattle-type circuits (V), by Theodore Singer. - IV. Bibliography of Russian literature on the theory of contact networks, by Robert Ashenhurst. - V. Translations of Russian papers from Doklady Akademii Nauk SSSR: Application of Boolean matrix algebra to the analysis and synthesis of relay contact networks, by A. G. Lunts (vol. 70, no. 3, 1950). - Application of matrix calculus to the synthesis of relay contact networks, by M. L. Tsetlin (vol. 86, no. 3, 1952). - VI. Magnetic component research, by Robert Minnick. - VII. Theory of abstract two-terminal switching networks, by Robert Ashenhurst. - VIII. Circuit matrices, by Warren Semon. HU BL 5.

For Bell Laboratories' report no. 6 see PB 122115.

Bell Laboratories' report no. 7 covering the period 1 Jan-1 May 1954. May 1954. 108p diagrs, tables. Mi $5.70, ph $16.80. PB 122817

Contents: I. Sorting and arranging, by Robert Ashenhurst. - II. Output wire considerations for pierced multiple-coincidence magnetic storage systems, by Robert Minnick. HU BL 7.

For Bell Laboratories report no. 8 see PB 122116.

Bell Laboratories' report no. 10 covering the period 1 Oct 1954-1 Mar 1955. Mar 1955. 138p diagrs, tables. Mi $6.90, ph $21.30. PB 122818

Contents: I. Calculation of disturbance coefficients for a multi-dimensional magnetic core matrix. - II. Time-sequential method for multiple-output selection in a four tape sorter. - IV. Duality in switching circuits. - V. Notes on the theory of series-parallel circuits. - VI. Uniqueness theorem for abstract two-terminal switching networks. HU BL 10.

Report no. 11: Multiple-output relay switching circuits, by Peter Calingaert. May 1955. 156p diagrs, tables. Mi $7.50, ph $24.30. PB 122819

Thesis - Harvard University.
1. Circuits, Switching - Theory 2. Circuits, Switching - Design 3. HU BL 11.

Report no. 14: Structure of multiple-coincidence selection systems, by Robert L. Ashenhurst. May 1956. 221p diagrs, tables. Mi $9.90, ph $34.80. PB 122820

Thesis - Harvard University.
1. Circuits, Switching - Theory 2. Cores, Magnetic - Storage properties 3. Data storage systems 4. Mathematics, Applied 5. HU BL 14.

Report no. 15: Analytic design of automatic data processing systems, by Frederick P. Brooks, Jr. May 1956. 397p diagrs, graphs, tables. Mi $11.10, ph $60.35. PB 122821

Thesis - Harvard University.
1. Data storage systems 2. Circuits, Switching - Theory 3. Payrolls - Computation 4. HU BL 15.

Water ripple analogue of electro-magnetic wave propagation, by Nelson L. Walbridge, Howard M. Smith, Jr., and Lloyd A. Woodward. Vermont. Engineering Experiment Station, Burlington, Vt. Sep 1952. 88p photos, diagrs, graphs. Order from LC. Mi $4.80, enl pr $15.30. PB 122131

An oscillator controlled a vibrating probe used to generate ripples on the surface of water in a tray with a glass bottom. The same oscillator controlled the pulsing of light which passed up through the tray. The ripples acting as lenses focused the light on a ground glass screen. A meniscus which was convex when viewed from above was produced around the head of the probe. This arrangement produced better ripples. A method of coincidence of images was developed which applies to attenuated ripples. This method and the use of an auxiliary lens improved the accuracy of measurement of amplitudes particularly for small ripples. Several feeds including dipole arrays were simulated and the field patterns were measured. The results of experiments on reflection can be explained by the assumption of a 180° phase change at a line behind the actual reflector. Ripple tanks can be used in the study of radar antennas since no unsolvable problems have been encountered in the experimental development of the analogy. R 7183. Contract Nonr-597(01), Technical report no. 1.

Generators, Motors, Transmission

Design of magnetic control amplifier XM-13A, by Herbert H. Woodson. U. S. Naval Ordnance Lab-

oratory, White Oak, Md. Mar 1953. 18p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120929

1. XM-13A (Amplifier) 2. Amplifiers, Magnetic - Design 3. NAVORD 2737.

Development of a surge generator for determining receiver recovery time constant from surge inputs, by F. C. Isely. U. S. Naval Research Laboratory. Nov 1941. 28p photos, diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 120587

1. Radio receivers - Testing equipment 2. Radio receivers - Recovery time constants - Measuring equipment 3. Generators, Pulse - Design 4. NRL R 1808.

Feedback amplifier for extending the useful frequency range of an accelerometer, by L. D. Anderson. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1953. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120927

A feedback amplifier and corrective network to extend the useful frequency range of accelerometer pickups is described. The method developed here is practical for accelerometers having a response which can be simulated by a simple R-L-C series circuit over a frequency range up to a few times the natural frequency of the accelerometer. The basic idea involved is the incorporation of an electrical analogue of the accelerometer in the feedback loop of an amplifier. Theoretical relations have been developed to show that the resulting combined response is identical to the response of another accelerometer having a higher natural frequency and a smaller damping ratio. NAVORD 2761.

Half-wave auto-transformer magnetic amplifier, by Edward T. Hooper. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1953. 17p photo, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 120930

1. Amplifiers, Magnetic - Design 2. NAVORD 2719.

Handbook for synchro systems, by George H. Weiss and George L. Beyer, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1953. 121p diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.30. PB 120995

This handbook is a compilation of formulas, definitions, symbols, and techniques useful in designing and analyzing synchro systems from a linear lumped parameter point of view. In addition to information on specific synchro systems, a method is presented for the analysis of systems by means of models of its components. NAVORD 3600.

Investigation of the characteristics of Diehl type FPE 25-11 servo motor, by G. B. McCarter. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 65p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120972

Experimental speed-torque and frequency response data were obtained for the Diehl type FPE 25-11 servo motor. Data were obtained for the motor operating under conditions normally encountered in servo applications. NAVORD 1553.

Lead-lag and lead-integral servo compensation using half-wave bridge magnetic amplifiers, by H. H. Woodson, L. S. Weinstein and J. E. Roberts. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1954. 39p drawing, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122003

Theoretical derivations show that a half-wave bridge magnetic amplifier with two feedback loops will exhibit lead-lag or lead-integral characteristics. A stability criterion indicates cases in which it is theoretically possible to design a controller for a specific application. Simple design procedures with either a lead-lag or a lead-integral controller can be readily designed for an application. Experimental results provide a check on the accuracy and demonstrate the usefulness of the design procedures. NAVORD 3560.

Low noise 215-225 Mc converter, by Lawrence Hoffman. U. S. Naval Research Laboratory. Jun 1956. 7p photos, diagrs. Order from OTS, 50 cents. PB 121214

A 215-225 Mc converter has been designed and developed utilizing the General Electric GL-6299 triode. The noise figure of the unit is 3.0 ± 0.2 db over the entire band, the bandwidth is in excess of one Mc, and the output frequency is 30 Mc. The optimum source and output impedances are each 50 ohms. Special tube holders have been designed for the converter to permit quick changing of rf amplifier tubes without disturbing the circuitry. NRL R 4765.

Magnetic amplifiers of the balance detector type, by W. A. Geyger. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1950. 58p drawings, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120966

This report describes the basic principles, characteristics, and applications of the magnetic amplifiers of the balance detector type. It presents two problems concerning special magnetic amplifiers for self-balancing d-c potentiometers and d-c bridge networks. It classifies and explains numerous basic circuits of simple magnetic amplifiers, and describes different push-pull circuits of the balance detector type. Data for single-stage and

multistage amplifiers are given to indicate the performance obtained. This report also considers briefly the speed of response in magnetic amplifiers, the possibility of providing derivative feedback, and design procedure with respect to time lag. NOL R 1123.

Magnetic control amplifiers XM-16A and XM-17A for use with servo motors Mark 7, Mark 8, Mark 14 and Mark 16, by Edward T. Hooper. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1953. 58p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122002

This report describes amplifier construction details, outlines a simple design procedure for adaptation to servo system requirements, and gives system performance curves for a wide variety of applications. For previous report see PB 120933. NAVORD 2833.

Transistor-controlled half-wave magnetic amplifier, by Joseph J. Suozzi. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1953. 24p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120908

A 60 cps, half-wave magnetic amplifier with transistor input is described. With this circuit a novel type of feedback for damping a servo system may be employed. In addition, the advantages of good gain with a comparatively high input impedance, and smaller time delay than are possible with a conventional two-stage, 60 cps, half-wave magnetic amplifier, can be realized. The performance and limitations of the circuit are also discussed. NAVORD 2896.

Van de Graaff generator project. Final report, Feb 1, 1948 to Dec 31, 1954, under Contract no. ONR 260 TO-2. Kansas. University. Dept. of Physics, Lawrence, Kansas. Dec 1954. 50p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122546

Appendices are reprints: Appendix A. Leak localizer for Van de Graaff accelerator tubes, by F. H. Kloepper, L. W. Seagondollar and R. K. Smith (Reprinted from Review of Scientific Instruments, vol. 23, no. 5, p. 245, May 1952). - Appendix B. Sliding vane vacuum valve, by R. K. Smith and L. W. Seagondollar (Reprinted from Review of Scientific Instruments, vol. 23, no. 12, p. 767-768, Dec 1952). - Appendix C. Gamma rays from the proton bombardment of sodium, by J. W. Teener, L. W. Seagondollar, and R. W. Krone (Reprinted from Physical Review, vol. 93, no. 5, p. 1035-1038, Mar 1, 1954). - Appendix D. Gamma rays from proton bombardment of B^{10}, by R. W. Krone and L. W. Seagondollar (Reprinted from Physical Review, vol. 92, no. 4, p. 935-937, Nov 15, 1953). - Appendix E. Scintillation detector for fast neutrons, by L. W. Seagondollar, K. A. Esch, and L. M. Cartwright (Reprinted from Review of Scientific Instruments, vol. 25, no. 7, p. 689-691, July 1954).

Vibration, shock and salt spray test of the1/4 HP Diehl low inertia AC servo motor, by H. M. Ikerd. U. S. Naval Research Laboratory. Aug 1946. 7p photos. Order from LC. Mi $1.80, ph $1.80. PB 120729

1. Motors, Servo - Tests 2. NRL R 2921.

Wiring diagram of the De Vry "1966" amplifier, code and parts list. n.d. 2p diagr. Order from LC. Mi $1.80, ph $1.80. PB 120196

1. Amplifiers - Design 2. Amplifiers - Parts 3. Circuits, Amplifier.

FUELS AND LUBRICANTS

High-temperature antioxidants for synthetic-base oils. Virginia. University. Cobb Chemical Laboratory, Charlottesville, Va. Contract AF 33(038)-22947. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1: Testing methods and preliminary results, by James W. Cole, Jr., Arthur Benton, Alfred Burger and Thomas I. Crowell. Oct 1953. 135p photos, drawings (1 fold.), graphs, tables. $3.50. PB 121077

The literature on oxidation and corrosion inhibitors for the various oils was completely surveyed for the period 1916 to date. Systematic studies were started on the mechanisms of pyrolysis and oxidation of diesters, the chemistry of phenothiazine and the mechanism of its action, the rate of depletion of additives, and the role of metals in the oxidation phenomena. Efforts were directed toward improving syntheses of some of the substances tested and preparing new compounds, together with the study of properties of the more interesting compounds. AF WADC TR 53-293, Part 1.

Part 2: Evaluation of additives, syntheses of new compounds, and mechanism studies, by James W. Cole, Jr., Gordon P. Brown, Alfred Burger and Thomas I. Crowell. Dec 1953. 177p graphs, tables. $4.50. PB 121078

A total of approximately 200 compounds has been evaluated as oxidation-corrosion inhibitors in various ways in a total of 12 synthetic base oils. The base oils used include diesters, phosphonates, silicates and silicones. Various methods of comparing effectiveness of additives are discussed. Mechanism studies have been conducted on the action of additives and the media under conditions of oxidation, pyrolysis and metal catalysis. Studies have been made on the rate of disappearance of phenothiazine in di(2-ethylhexyl) sebacate in the presence and absence of copper, either as the metal or as a salt. AF WADC TR 53-293, Part 2.

Research study of thixotropy of greases, by Arthur C. Borg and Richard H. Leet. Standard Oil Company of Indiana. Research Dept. Whiting Laboratory, Whiting, Ind. Feb 1956. 39p photos, graphs, tables. Order from OTS. $1. PB 121281

Thixotropic changes in consistency of lubricating greases during working and aging are attributed to the structures of the greases. The effect of thickener particle dimensions upon consistency changes was studied. The object was to determine the effect of length-over-width ratio on laboratory and simulated service tests of a series of greases. Final report under Contract no. DAI-11-022-508-ORD-(P)-25. ORD project no. TB5-4010. Covers period of work from Jun 23, 1955 to Jan 15, 1956.

INSTRUMENTS

Abstract model for a ferromagnet, by J. I. Kaplan. U. S. Naval Research Laboratory. Jul 1956. 8p. Order from OTS. 50 cents. PB 121247

An abstract model for a ferromagnet is assumed in which each spin interacts with every other spin with an interaction-$(2J/N)S_1 \cdot S_2$. The energy levels and degeneracies for such a system can be calculated exactly. A correspondence principle argument shows that in the limit of large numbers the magnetization will be identical with that derived from the P. Weiss model for a ferromagnet. This is verified by a direct calculation from the partition function of the magnetization using the calculated energies and degeneracies. NRL R 4777.

Analytical studies of the Mach-Zehnder interferometer, part II, by Ernst H. Winkler. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1950. 77p photo, drawing, graphs. Order from LC. Mi $4.50, ph $12.30. PB 120963

This report is the result of the continuation of the analytical studies of the Mach-Zehnder interferometer presented in NOLR 1077. It discusses the interference phenomena that result from the use of extended light sources having different spectral intensity distributions for various screen positions. The interference effects are considered as a problem in classical physical optics. This report continues NOL R 1077 (PB 97060). NOL R 1099.

Apparatus for measurement of PVT relationships of gases at high temperatures and pressures: Effects of changing the initial operating conditions, by Robert S. Allgaier. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120975

This report is a supplement to NOL M 10,526, which describes the apparatus. The changes in the maximum pressure, maximum temperature, and minimum volume produced by different combinations of reservoir pressure and initial test gas pressure are tabulated, graphed, and discussed. NAVORD 2455.

Calibration of hydrophone M115 serial numbers 102 and 153, by P. C. Rand and S. F. Perebee. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1953. 6p graphs. Order from LC. Mi $1.80, ph $1.80. PB 120904

Two hydrophones, type M115 serial numbers 102 and 153, were calibrated at the NOL Acoustic Facility, Brighton, Maryland, and graphs of the data are presented. NAVORD 2992.

Characteristics of some aircraft anticollision lights, by Cecil B. Phillips and Alan L. Morse. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Jun 1956. 29p photos, diagrs, graphs, tables. Order from OTS. 75 cents. PB 121329

This report describes laboratory and flight tests of some recently developed external lighting units for aircraft. Photometric measurements of the lamps and light units were made in the laboratory. All but one of the light units were installed on a DC-3 airplane, and threshold-visibility distances for each unit were obtained in flight during clear night conditions. For purposes of comparison, the characteristics of the conventional low-intensity position lights were also measured and are reported. CAA TDR 284.

Cloud physics research. Instrumentation of B-17 airplane for cloud physics research, by Kenneth E. Newton. Chicago. University. Dept. of Meteorology. Nov 1955. 126p photos, drawings, diagrs, graphs, map. Order from LC. Mi $6.30, ph $19.80. PB 122351

A detailed description is given of the entire instrumentation system employed for cloud physics measurements using B-17 airplanes. Among the physical variables measured were the following: air temperature, dew-point temperature, cloud-droplet sizes and concentration, liquid-water content, electric-field strength, altitude variations of the airplane and precipitation. Systems for time synchronization and data recording are also described. Wiring diagrams of the electronic circuits and photographs of all instruments are given. The airplanes carrying this equipment were used for two years in various parts of the country for making measurements in cumulus clouds. Operational difficulties experienced with some instruments under field conditions are mentioned and remedial measures are discussed. Technical note no. 4. AF CRC TN 56-257. Contract AF 33(038)-25913. Contract AF 19(604)-618. Contract AF 19(604)-1388.

Dependence of the precision of a stereoscopic rangefinder upon base length. Columbia University. Applied Mathematics Group. Jan 1944. 26f graphs, tables. Order from LC. Mi $2.70, enl pr $6.30. PB 122340

A statistical analysis of acceptance-test records for stereoscopic rangefinders varying in base length from 18 to 46 feet is carried out to ascertain how the precision of stereoscopic rangefinders varies with base length. AMG-C no. 117.

Electronic scheduling machine requirements, by R. G. Canning. California. University, Los Angeles, Calif. Mar 1955. 43p diagrs, graph, table. Order from OTS. $1.25. PB 121117

The object of the paper is to discuss, from a research perspective, the application of electronic digital computers to job shop scheduling in production plants. The cause of the problem is presented, followed by a discussion of a method of performing shop scheduling on electronic computers. Illustrative times and costs based on one plant studied are presented. Desirable computer characteristics are considered. Management sciences research project. Research report no. 29. Contract Nonr-233(02), NR 047-033.

Evaluation of Fourier transforms with Henrici harmonic analyzer, by G. Kinzelman. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1949. 36p photos, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120964

This report develops the equations, rules and tables necessary for use of the Henrici harmonic analyzer in evaluation of Fourier transforms. NOL R 1119.

External trimming to reshape the hysteresis loop of a saturable reactor, by H. H. Woodson and E. T. Hooper. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1953. 14p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122001

1. Reactors, Saturable-core 2. NAVORD 3564.

Frequency modulated magnetic tape recording and playback instrumentation system, by Joseph Petes. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1953. 66p photos, diagrs, graph, table. Order from LC. Mi $3.90, ph $10.80. PB 120931

The development of a frequency modulated system for the recording of pressures and accelerations resulting from high explosive detonations is described. The intelligence from a pressure gage or accelerometer gage frequency modulates a carrier frequency, and after being multiplexed this FM signal is transmitted by cable and remotely recorded on a magnetic tape recorder. In playback the output of a magnetic tape reproducer is fed through band pass filters, which separate the various carrier frequencies of the multiplexed signal; from here each filtered signal is feed to a discriminator unit which converts the frequency modulated signal to an amplitude signal. Finally this amplitude signal is presented to a string oscillograph which produces a photographic record of the signal. NAVORD 2713.

High precision frequency standard and monitoring system, by T. B. Whiteley and W. W. Talbert. Sep 1950. 23p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 120971

A system has been designed and constructed which provides a very precise standard of frequency. The 100 kilocycle standard frequency is derived from a high-precision Western Electric crystal oscillator, the frequency of which can be maintained constant to within one part in 10^8 per day. NAVORD 1529.

High temperature strain gage research. Summary report, by Francis G. Tatnall. Baldwin-Lima-Hamilton Corp., Philadelphia, Pa. Jan 1955. 107p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 122548

Research was undertaken to develop a strain measuring device of any kind which could be applied in the field and which would be stable under static load at 1600°F for 100 hours while exposed to a destructive environment including radioactivity. All reports and contributions are placed in five categories. Class A. Gages which may become available to government agencies. Class B. Gages which seem practical and are advanced to the point of evaluation and criticism. Class C. Gages which require a reasonable amount of additional development. Class D. Ideas providing material for possible future study. Class E. Background data: Notes, references, materials, methods, techniques and pertinent information. Joint report under Contract Nonr-845(00) and subcontract no. 513 under W7405 Eng 26.

Magnetic tape recording system for pressure-time records of underwater explosions, by A. L. Howard. U. S. Naval Research Laboratory. Jun 1956. 26p photos, diagrs, graphs. Order from OTS. 75 cents. PB 121041

A system was designed and successfully employed to measure pressure-time phenomena resulting from the underwater explosion of an atomic bomb, at various points between the bomb and the water surface. The data were obtained from piezoelectric pressure transducers suspended between the bomb and a barge on the surface, and were transmitted over wire circuits to a magnetic tape recording system located on the barge. As a result of an over-all recording system calibration, made automatically less than one minute before the explosion, the pressure-time measurements were highly accurate and reliable. NRL R 4722.

Micro lubricant test methods viscosity-neutralization number, by John B. Christian, Vernon A. Lauer, Arthur L. Miller and Harry M. Schiefer. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1956. 19p diagrs. Order from OTS. 50 cents. PB 121355

This study was initiated to develop miniaturized tests for petroleum, petroleum products, and related materials. Procedures for determining neutralization number, and viscosity are described and their correlation with macro tests provided. The small scale test techniques discussed herein are considered as satisfactory as their full scale counterpart for their intended purpose. Project no. 3044. Covers work conducted from Nov 1953 to Nov 1954. AF WADC TR 55-449, Part 1.

Non-linear resistive element, by Charles M. Davis, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1952. 11p graphs, table. Order from LC, Mi $2.40, ph $3.30. PB 120936

1. Reactors, Saturable-core 2. NAVORD 2700.

Optical shock velocity measuring system for the shock tube, by Robert L. Varwig. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1955. 12p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120815

A shock velocity measuring system which employs two schlieren optical systems with photomultiplier tubes as detectors is described. Briefly, the schlieren systems each produce an electrical signal as the shock passes. The time interval between the signals is measured by a Potter electronic counter chronograph. The distance separating the schlieren systems is measured and the velocity computed. Task N2C-67. NAVORD 3901.

Piezoelectric gauges for underwater pressure-time measurements. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Aging of tourmaline gauges by underwater shockwaves, by Ermine A. Christian and Charles R. Niffenegger. Jul 1953. 9p. Mi $1.80, ph $1.80. PB 120906

A study was made of the tendency of a newly mounted or newly waxed tourmaline gauge to record pressures in the tail of the shockwave which are lower on the first shot than on subsequent shots at the gauge. This response pattern, called the "first-time-gauge effect", was studied with 1-lb pentolite charges. From a limited number of shots, it appears that: (1) The effect will probably be present unless gauges are pre-aged before being used. This might introduce systematic error in the results of a test program. (2) Gauges can be preaged for 1-lb tests by shots with one detonator. NAVORD 2928.

Part II: Preliminary evaluation of barium titanate, by Robert A. Astheimer. Jul 1953. 20p diagrs, graphs, tables. Mi $2.40, ph $3.30. PB 120905

The piezoelectric sensitivity of polarized $BaTiO_3$ discs containing 4% $PbTiO_3$ was measured in the pressure range between 500 and 9,000 psi and at temperatures between 0° and 44°C. The sensitivity was found to be only slightly pressure dependent but to increase sharply with decreasing temperature below about 25°C. A large relaxation effect was observed and studied. Some finished gauges were made up and subjected to explosion tests. They gave rather poor records showing spurious oscillations at the initial peak and relaxation effects. There is some indication that these effects may become negligible at lower pressures. NAVORD 2929.

Rate gyro fundamentals, by C. L. Muzzey. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Dec 1951. 52p diagrs (1 fold), graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 122623

This report presents the theoretical background necessary to understand the behavior of single degree of freedom gyros. Methods are presented for the calibration of rate gyros, and finally a section discusses the design and selection of a gyro instrument. Throughout the report an effort is made to explain and emphasize the physical fundamentals and the important secondary effects which can cause trouble if ignored. The appendices contain certain derivations to supplement the work in the body of the report, together with some reference data and charts which may prove of general interest. CAL FRM 137.

Reed-gage shock-spectrum characteristics of Navy light-weight high-impact shock machine. U. S. Naval Research Laboratory. Order separate parts described below from OTS, giving PB number of each part ordered.

By Arthur F. Dick. Jun 1956. 29p photos, drawing, graphs, tables. 75 cents. PB 121147

Continues a 1952 report of calibration tests covering the operating characteristics as determined by a velocity meter and accelerometers. (PB 106318). A reed gage included in the instrumentation furnished equivalent static accelerators that have been used for this further study of the operating characteristics of the machine. Shock spectra are included. Shock-spectrum reproducibility is good when the repeat blows are in immediate succession but may be erratic when other test setups intervene. NRL R 4750.

By A. F. Dick and R. E. Blake. Jul 1956. 46p diagrs, graphs, tables. $1.25. PB 121158

Theoretical motion equations are derived for the anvil table and test load of a simplified 2-mass-and-a-spring version of the Navy Medium-

Weight High-Impact Shock Machine when the anvil table experiences a step change in velocity. Corresponding acceleration responses and equations for maximum acceleration of a single-degree-of-freedom reed attached to the test load are derived and the derived maximum reed accelerations are used in determining theoretical shock spectra applicable both before and after the anvil table strikes the upper stops. Experimental spectrum points obtained by means of a reed gage on the test load during calibration tests and superposed on the theoretical spectra are in fair agreement with the derived theory at the low-frequency end of the spectrum; at higher frequencies (above 150 cps) the experimental points are substantially higher than the theory indicates, as much as several hundred percent for the heaviest calibration-test loads. Load acceleration spectra in general are fairly level except for the usual peaks due to resonance with the fundamental shock-machine vibration, whereas anvil-table spectra approximate the constant slope form associated with a step change in velocity. On the test load, spectrum reproducibility is good—especially for frequencies not in excess of 220 cps. NRL R 4750.

Review of the literature pertinent to the design and use of effective graphic training aids, by Ezra V. Saul, John H. Cornehlsen, Jr. and others. U. S. Office of Naval Research. Special Devices Center, Port Washington, N. Y. Feb 1956. 219p table. Order from OTS. $5. PB 121399

Material for the present report was derived from a literature search in the areas, disciplines, and problem-oriented specialties of psychophysiology of vision, visual perception, experimental aesthetics, advertising, visual education, psychology of learning, visual art, engineering drawing, and quantitative presentation. Project 20-D-3. SDC TR 494-08-1. Contract Nonr-494-08.

Single vs. triple address computing machines, by Calvin C. Elgot. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1953. 10p. Order from LC. Mi $1.80, ph $1.80. PB 120928

1. Computers, Electronic - Tests 2. NAVORD 2741 3. NOL ARR 149.

Special ceramic humidity element for use in physiological evaluation of cold weather clothing. Preliminary report. American Instrument Co., Inc., Silver Spring, Md. Mar 1955. 12p drawings (2 fold), diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 120025

The purpose of the development reported herein was to adapt the ceramic type humidity element for use in the evaluation of clothing to be worn in cold climates. This entailed the fabrication of an element sufficiently small to be applied to the skin under the clothing of the subject. The sensing element had to be encased in a protective shield which would allow the circulation of air around the element, while, at the same time, protecting the subject from the electrical current passing through the element. Since the element was to be used on a subject remote from the measuring equipment, a means had to be provided for the transmission of the intelligence to the measuring equipment. AMINCO Reference: R-7555. Contract Nonr-1446(00) 1741803.10.

Spin table for calibrating accelerometers, by Robert G. Quick. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 14p photos. Order from LC. Mi $2.40, ph $3.30. PB 120953

This report covers information on the design, construction and operation of a spin table or rotary accelerator for calibrating horizontal and vertical accelerometers within the range of 0.1g to 55g. Accuracies of ± 2% and resolution of .002g have been obtained under field conditions. The design is relatively light weight and intended for carrying loads up to two pounds. NAVORD 2301.

Study of in-place density determinations for soils, by J. F. Redus. U. S. Waterways Experiment Station, Vicksburg, Miss. Oct 1955. 41p photos, drawings, diagrs, graphs, tables. Available from Waterways Experiment Station, Vicksburg, Miss. 50 cents. PB 122882

The Waterways Experiment Station has used several types of apparatus to determine the in-place density of soils by the displacement method in connection with an investigation of moisture conditions under flexible airfield pavements. In several instances results were obtained that were obviously inaccurate since the computed saturation exceeded 100 per cent. In an attempt to eliminate inaccurate data from similar future investigations a study was made to: determine the amount of error inherent in each piece of apparatus in current or proposed use at the Waterways Experiment Station; to examine changes indicated as necessary to any of the apparatus; and to attempt to develop improved techniques for using the various pieces of apparatus in the field. WES TM 3-415.

SYDAQS, Synchro-Data Quantizer and Servo, by J. C. Leifer. U. S. Naval Research Laboratory. Jul 1956. 26p photos, diagrs (2 fold), table. Order from OTS. 75 cents. PB 121242

A two-channel Synchro-Data Quantizer and Servo (SYDAQS) for data transmission over standard voice-communication equipment is under development. The equipment will quantize and reproduce two channesl of two-speed synchro data (with provision for a third channel). NRL R 4773.

MEDICAL RESEARCH AND PRACTICE

Statistical analysis, contaminated wound study units, by Frank L. Meleney. U. S. Office of Scientific Research and Development. Committee on Medical Research. May 1944. 78f tables. Order from LC. Mi $4.50, enl pr $13.80. PB 122914

This report summarizes 2191 records of cases admitted to unit hospitals from Jan 1, 1942 to Oct 31, 1943. 1500 of these cases studied up to Apr 1943 were reported in an article which appeared in Annals of Surgery 118:171, 1943. MRPD-31. Contract OEMcmr-85, Report no. 17.

Studies on cutaneous heat losses, by Clarence N. Peiss, Walter C. Randall, and Altrick B. Hertzman. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Order separate parts described below from LC, giving PB number of each part ordered.

Part 10: Relations of hydration of the skin to the repenetration of water, sweating and evaporation, a preliminary report. Dec 1952. 17f diagrs, graphs, table. Mi $2.40, enl pr $4.80. PB 122825

This report is a preliminary study of the processes of hydration of the skin (palm, sole and forearm) and of the relations obtaining between water uptake, sweating and evaporation. The uptake of water by the skin was studied in immersion experiments (water and salt solutions of various concentrations) and also by the use of specially designed capsules. AD 6897. For Parts 1-9, 11-14 see PB 106376, 106958-106959, 107579, 107466, 107580-107582, 122824, 122826, 114175-114177. The tenth of a series of reports under Contract no. AF 18(600)-96 with St. Louis University. AF TR 6680, Part 10.

Part 11: The effects of ambient temperature and air humidity on the regional rates of sweating. Jan 1953. 79f diagrs, graphs, tables. Mi $4.50, enl pr $12.30. PB 122826

The regional sweating responses of resting nude young males were recorded by the dessicating capsule and iodine-starch paper techniques when the subjects were exposed to the following environmental conditions: (a) a rising ambient temperature, initially about 26°-33°C, increasing at a rate of about 0.1°C per minute to about 41°C, with humidity rising also; (b) a relatively constant ambient temperature, about 30°-42°C, with humidity either "high" or "low". No specific effect of humidity on the sweating responses was observed in these experiments. AD no. 12719. The eleventh of a series of reports under Contract no. AF 18(600)-96 with St. Louis University. AF TR 6680, Part 11.

Studies on the psittacosis-lymphogranuloma venereum group, by M. Michael Sigel. Philadelphia. Children's Hospital. Feb 1955. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 120156

The objectives of this research were: 1. To search for a specific complement fixing antigen. (Investigations completed March 1953). 2. To study mode of growth and multiplication and other biologic characteristics of this group of agents. (Major part of investigations completed prior to July 1953). List of publications pp. 2-4. Contract N8onr-72601, NR 130-706.

METALS AND METAL PRODUCTS

Delayed failure and hydrogen embrittlement in steel, by R. P. Frohmberg, W. J. Barnett and A. R. Troiano. Case Institute of Technology, Cleveland, Ohio. Jun 1954. 61p drawings, graphs, tables. Order from OTS. $1.75. PB 121085

The phenomenon of delayed failure in steel has been correlated with the presence of electrolytically introduced hydrogen. Delayed failure may occur over a wide range of relatively low applied stresses and this stress range is dependent upon strength level, notch acuity, and aging time after the introduction of hydrogen. The observed reductions in ductility are a function of both the depth of hydrogen penetration and the degree or severity of hydrogen embrittlement. AF WADC TR 54-320. Contract AF 33(038)-22371.

Determination of retained austenite by a Geiger counter X-ray technique, by Walter B. Triplett, John J. Hauser, Cyril Wells and Robert F. Mehl. Carnegie Institute of Technology. Metals Research Laboratory, Pittsburgh, Pa. Feb 1954. 25f photo, diagrs, tables. Order from LC. Mi $2.70, enl pr $6.30. PB 122179

A method for determining the amount of retained austenite in steel by means of a Geiger counter technique has been developed. Modifications of the basic General Electric XRD-3 X-ray unit included the additions of a rock salt crystal monochromator and a counter-register, as well as changes in the beam and receiving slits. The procedure for determining retained austenite is described, and the experimental difficulties and sources of error are discussed. Results of austenite determinations on several samples indicate fair agreement between data obtained by the Geiger counter technique and those provided by an independent laboratory using a film technique. Studies of the variation of retained austenite with distance from the quenched end of a 7 in. round revealed that the retention of austenite in slack-quenched steels is markedly influenced by the presence of silicon. AD 33724. AF WADC TR 53-518. Contract AF 33(038)-10218.

Development of an alloy permitting low temperature joining of high strength aluminum alloys. Final report under Contract Noa(s)-9935, by E. H. Kinelski. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Oct 1949. 49f photos, tables. Order from LC. Mi $3.30, enl pr $9.30. PB 122822

In the development of an alloy which would permit the joining of high strength aluminum alloys at low temperatures, a vibration method of soldering aluminum and a new Zn-Cd-Be-Cu aluminum solder were developed. Although the alloy was intended as an age-hardenable alloy, it did not respond to heat treatment. Shear test specimens were evaluated to determine a standard method of evaluating the strength of a soldered joint. Solution potential measurements indicated that all aluminum solders evaluated under this project were susceptible to corrosion. Preliminary attempts were made to braze titanium with brazing alloys for comparison to aluminum. Satisfactory brazed titanium specimens were produced for comparative test purposes with the inert-gas-shielded arc torch. CAL KA-497-M-4.

Development of a forgeable high-strength, high-temperature, chromium-rich, chromium-iron alloy, by D. P. Moon, H. A. Blank, A. M. Hall. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. 26p photos, tables. Order from OTS. 75 cents. PB 121111

Experimental alloys were produced by induction melting charges of commercially available melting stock, casting into molds, and fabricating by various hot-working methods. The intended composition of the alloys produced during this period was 70 parts chromium, 30 parts iron, 6 to 9 parts molybdenum, 2 to 3 parts titanium, and up to 1/2 part aluminum. This composition had been found, in the previous year's work, to possess excellent stress-rupture properties at 1500F. The forging qualities of 4- and 12-pound ingots were found to improve as their soundness was improved by the use of preheated alloy charges and slag materials. A portion of this material was successfully hot rolled to thin strip. Little success was achieved in attempts to forge larger ingots. No room-temperature ductility, as indicated by bend tests, was found in rolled strip before or after heat treating. However, the heat treatments affected the hardness and the microstructure. Specimens machined from forged bars of the alloy exhibited remarkable thermal-shock properties when tested at 1800 to 2000 F. For Part 1 see PB 121112. AF WADC TR 53-451, Part 2. Contract AF 33(616)-222.

Development of heat resistant alloys by powder metallurgy techniques, by G. Zuromsky, L. Sama, H. S. Kalish and L. L. Seigle. Sylvania Electric Products Inc., Bayside, N. Y. Mar 1956. 77p photos, drawing, graphs, tables. Order from OTS. $2. PB 121356

Powder metallurgical techniques were utilized in the production of Cr-W-Co alloys, to meet a stress rupture specification of 100 hours life at 870°C and 25,000 psi. Attempts to produce chromium-base alloys with room temperature ductility and/or high density were unsuccessful. Nickel additions lowered the stress-rupture strength but gave increased ductility. Attempts to retain carbon as an alloying addition were unsuccessful. Project 7351. Terminal report on Contract no. AF 33(616)-2401, representing work done from May 1, 1954 through Sep 30, 1955. AF WADC TR 55-501.

Development of X-ray standards for shielded arc welds in aluminum, by J. J. Hirschfield, D. T. O'Connor, J. J. Pierce and D. Polansky. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1950. 65p photos, tables. Order from LC. Mi $3.90, ph $10.80. PB 122064

A set of X-ray standards for shielded arc welds in aluminum has been established on the basis of guided bend and tensile tests of 300 specimens. Agreement between the two types of tests was good. It was concluded that all grades of incomplete penetration, dross, and cracks should be considered rejectable, that scattered porosity and tungsten inclusion do not significantly reduce strength, and that the intermediate and more severe grades of linear porosity and gas holes should be considered rejectable. A book of film standards has been prepared incorporating a summary of the test data. NAVORD 1595.

Effect of vacuum degassing on properties of various aluminum alloys, by E. E. Layne and H. F. Bishop. U. S. Naval Research Laboratory. Jul 1956. 12p photos, drawings, graphs, table. Order from OTS. 50 cents. PB 121325

The improvement in mechanical properties produced in various aluminum alloy castings as the result of vacuum degassing of the melts was determined for different melt compositions, section thicknesses, and mold media. It was shown that further improvements in tensile strengths, yield strengths, and elongations are effected by the vacuum degassing treatment. NRL R 4797.

Effects of interstitial contaminants on the notch-tensile properties of titanium and titanium alloys. Part I: Iodide and sponge titanium, by Eugene P. Klier and Neil Feola. Syracuse University, Syracuse, N. Y. Mar 1956. 105p photos, drawings, graphs, tables. Order from OTS. $2.75. PB 121335

The notch-tensile properties of sponge titanium contaminated with oxygen, nitrogen and carbon have been determined. The merit rating of sponge titanium in the notch-tensile test does not conform to that in the impact test. Limited data for impact tension and sustained load tests are presented and discussed. Project no. 7351. Covers work from Nov 15, 1953 to May 15, 1955 under Contract AF 33(616)-2281. Appendix I. Colorimetric determination of very small amounts of nitrogen in titanium, by A. Aidun and W.

Beck. - Appendix II. Determination of the total C in Ti, by A. Aidun. - Appendix III. Determination of small amounts of oxygen in titanium by vacuum fusion, by D. Akerblom and J. Morrison. AF WADC TR 55-325, Part 1.

Electrodeposition of titanium. Missouri. University. School of Mines and Metallurgy, Rolla, Mo. Contract AF 33(616)-75. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1, by Albert W. Schlechten, Martin E. Straumanis and C. Burroughs Gill. Sep 1953. 57p diagrs, graphs, tables. $1.50. PB 111797

The high resistance of titanium to corrosion, particularly by sea water or nitric acid, makes it very desirable to plate other metals with a protective coating of titanium. Many attempts by many workers have been made to electrodeposit titanium either to form a coating or as a means of producing the metal but little success has been reported. This report describes a large number of experiments using aqueous and fused salt baths. It is doubtful if any true electrodeposits of titanium were obtained, but a procedure is described which will yield a thin but coherent and corrosion resistant titanium coating. Extensive data are also reported on the hydrogen overvoltage on titanium in aqueous electrolytes. For Part 2 see PB 111798. AF WADC TR 53-162, Part 1.

Part 3, by Alvert W. Schlechten, Martin E. Straumanis and Sheng Tai Shih. Mar 1956. 59p photos, diagrs, graphs, tables. Order from OTS. $1.50. PB 111794

Processes are described by which diffusion coatings of titanium can be obtained on iron and steel objects. A fused chloride bath containing a titanium-oxygen alloy powder operated under helium was particularly effective. It was shown that the coating mechanism of this process was only partially due to the formation of titanium lower chlorides. Coatings were also obtained by deposition from the vapor state, using iodide or chloride vapors. The physical properties of the coatings are described. AF WADC TR 53-162, Part 3.

Equipment for testing the creep properties of metals under intermittent stressing and heating conditions. Part 2: Current modifications, by Lawrence A. Shepard, Carl D. Wiseman, C. Dean Starr and John E. Dorn. California. University, Los Angeles, Calif. Aug 1954. 29p photos, drawing, diagrs, graphs. Order from OTS. 75 cents. PB 121265

Four creep testing units were constructed at the University of California to test the creep strength of aircraft metals under intermittent loading and heating conditions. The equipment was designed to permit operations of loading, unloading, heating and cooling of the test specimen to occur automatically and periodically on a preset cycle. Special care was taken to provide smooth and vibration-free function of the equipment. Provisions were made for the accurate and continuous recording of both strains and temperature throughout the test. Test data obtained with this equipment is presented in WADC TR 53-336. AF WADC TR 52-101, Part 2. Contract AF 33(038)-11502.

Fatigue crack propagation in severely notched bars, by W. S. Hyler, E. D. Abraham and H. J. Grover. U. S. National Advisory Committee for Aeronautics. Jun 1956. 31p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D. C. PB 122520

Fatigue tests were made in rotating bending on severely notched bars machined from 2024-T4 aluminum-alloy extruded round rods. Two sizes of specimens were studied, 1/4-inch-diameter and 2-inch-diameter specimens. The smaller specimens were notched with a V-groove and had notch severities K_t of 5.2. The larger specimens also contained V-grooves with notch severities of 5.2 and 13.9. NACA TN 3685.

Hall effect in the silver-palladium alloy system, by A. I. Schindler. U. S. Naval Research Laboratory. Jul 1956. 7p graphs. Order from OTS. 50 cents. PB 121311

Room-temperature Hall coefficient measurements have been made on the silver-palladium alloy system. A comparison of the effective number of conduction electrons calculated using a one-band model with the number obtained for the copper-nickel alloy system shows a similarity in behavior. The results cannot be explained using any of the multiband models proposed to data for the Hall coefficient. NRL R 4788.

High purity nickel project, by Stanwood R. Williams and Philip J. Clough. National Research Corporation, Cambridge, Mass. Mar 1954. 39f graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 122630

This report covers approximately one year's work in which a basic stock of high purity nickel was produced. Melting procedures were developed for the production of binary alloys of closely controlled composition. Pure nickel and seventeen alloys of pure nickel containing 0 to 3% of Si, Al, Ti, Mg, B,W,RTa were produced and fabricated into tube parts for evaluation by Raytheon. Contract Nobsr 63058.

Investigation of metallic bonds for barium titanate, by W. R. Turner. U. S. Naval Ordnance Labora-

tory, White Oak, Md. May 1955. 89p photos, drawings, diagrs, graphs, tables. Order from LC, Mi $4.80, ph $13.80. PB 120983

This report describes the experimental results of an investigation into the bonding of barium titanate to a metallic plate for use within a high vacuum tube. Methods tested and found unsatisfactory include silver brazing using zirconium hydride as a wetting agent, silver brazing using a silver-glass electrode fired onto the barium titanate as a base, and soft soldering using barium titanate metallized by evaporation. The principal work was on a metallic bond. The barium titanate was first coated with chromium by evaporation to form a metallic barrier. Then the bonding alloys were applied by evaporation. Appendix I: Development of grinding machine. NAVORD 3938.

Investigation of plastic behavior of binary aluminum alloys by internal-friction methods, by R. E. Maringer, L. L. Marsh and G. K. Manning. Battelle Memorial Institute. Jun 1956. 44p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. . PB 122518

The relationship between internal friction and plastic deformation in binary aluminum alloys was investigated, with the percentage of alloying element taken as a variable parameter. The effects of strain rate, amount of strain, heat treatment, temperature, and testing frequency on internal friction during plastic deformation were also studied. The experimental observations are analyzed in light of modern dislocation theory. NACA TN 3681.

Investigation of rhenium, by C. T. Sims, C. M. Craighead, R. I. Jaffee, D. N. Gideon, E. N. Wyler, F. C. Todd, D. M. Rosenbaum, E. M. Sherwood and I. E. Campbell. Battelle Memorial Institute, Columbus, Ohio. Jun 1954. 147p photos, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 122857

This report is a summary of the first two years' experimental work. Methods for preparation of fine rhenium powder from potassium perrhenate and ammonium perrhenate are discussed in detail. Various physical, mechanical, and electronic properties were determined. Thermionic emission constants were also determined. Task no. 70646. AF WADC TR 54-371. Contract AF 33(616)-232.

Investigation of the compressive strength and creep lifetime of 2024-T aluminum-alloy skin-stringer panels at elevated temperatures, by Eldon E. Mathauser and William D. Deveikis. U. S. National Advisory Committee for Aeronautics. May 1956. 29p photos, drawing, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122507

The results of strength tests at room temperature and 400° F are compared with predicted strength obtained from methods given in the literature for estimating crippling strength of short panels and for predicting column strength of longer panels. Creep lifetime curves are presented for four values of slenderness ratio and creep characteristics of the panels are discussed. A method which makes use of isochronous compressive stress-strain curves for predicting creep lifetime of panels is presented. NACA TN 3647.

Investigation of the interchange of tensile creep for compressive creep. Part 1: Types 2024-T4 and 1100-0 aluminum, by O. K. Salmassy, R. J. MacDonald, R. L. Carlson and G. K. Manning. Battelle Memorial Institute, Columbus, Ohio. Mar 1956. 64p photos, drawings, graphs, tables. Order from OTS. $1.75. PB 121327

Creep data were compared to establish whether significant differences existed between tension and compression behavior. Room-temperature and elevated-temperature static properties of each material were obtained. Metallographic and hardness studies were used to supplement the results of creep and static tests. Test equipment and test techniques were developed which permitted creep measurements approaching 10 microinches per inch in sensitivity and ± 25 microinches accuracy. Project no. 7360. AF WADC TR 56-26, Part 1. Contract AF 33(616)-2738.

Investigation of the effects of hydrogen on the brittle failure of high-strength steels, by Edward R. Slaughter, E. Ellis Fletcher, Arthur R. Elsea and George K. Manning. Battelle Memorial Institute, Columbus, Ohio. Apr 1956. 150p drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 121357

The effect of hydrogen on the delayed, brittle failure of high-strength steel was investigated by the use of room-temperature stress-rupture tests on unnotched, cathodically charged specimens. The principal variables in these tests were stress, strength level, structure, composition, and hydrogen content. The martensite and bainite reactions were found to be unaffected by variations in hydrogen content. The diffusion of hydrogen through cathodically charged steel was investigated. Hydrogen contents of steel cathodically charged under various conditions were determined. Project no. 7351. Covers period of work from Jul 1954 to Jun 1955 under Contract AF 33(616)-2103. AF WADC TR 56-83.

Investigation of the effects of incongruous elements and the interaction effects of these elements on high temperature strength of Fe-Co-Ni-Cr alloys, by Thomas L. Robertshaw and Francis W. Richmond. Universal-Cyclops Steel Corp., Bridgeville, Pa. Apr 1956. 62p diagr, graphs, tables. Order from OTS. $1.75. PB 121379

An investigation was made of the effect of various hardening elements on the high temperature properties of vacuum melted alloys having a base composition of 60 atomic % Ni, 20 atomic % Cr, 10 atomic % Fe and 10 atomic % Co. Stress-rupture properties of these alloys at 1600°F were largely dependent on (1) the vacuum obtained during melting, (2) the fabrication methods, and (3) the total amount of hardener. It was found that, in general, a higher level of strength was more likely to occur at a given hardener level when greater variety of hardening elements were added. Project no. 7351, Task no. 73512. Covers work conducted from Dec 1, 1954 to Feb 29, 1956 under Contract AF 33(616)-2777. AF WADC TR 56-114.

Metallurgical preparation of Fe-Si-Al alloys (Sendust) for the determination of magnetic properties, by J. F. Nachman and W. J. Buehler. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1953. 24p photos, drawings, table. Order from OTS. 75 cents. PB 121164

Contains a detailed description for the metallurgical preparation of high quality cast Sendust cores. Includes details of melting, precision casting of cylinders, and a cut-off grinding technique for cutting magnetic test rings from the cast cylinders. See also NAVORD 2869 (PB 121166). NAVORD 2576.

Metallurgical study of molybdenum, by S. L. Case. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. 107p photo, graphs, tables. Order from OTS. $2.75. PB 111753

All work on this project was directly or indirectly concerned with three major problems: (1) Improvement of the room-temperature ductility of molybdenum, especially that of molybdenum weldments. (2) Measurement of high-temperature mechanical properties of molybdenum and its alloys. (3) Improvement of the high-temperature oxidation resistance of molybdenum through the development of oxidation-resistant alloys. Summary report under contract N9onr-82100, Project no. NR 039-003. Covers work from Mar 15, 1949 to Oct 15, 1954.

Preliminary investigation of laminating techniques for aluminum sheet material, by Fred Werren and B. G. Heebink. U. S. Forest Products Laboratory, Madison, Wis. Mar 1956. 27p graphs, tables. Order from OTS. 75 cents. PB 121336

This report presents the results of preliminary investigations on the mechanical properties of 36- by 40-inch laminated panels consisting of 8 piles of 0.032-inch aluminum alloy. Five different adhesive systems were used to make the panels. Short-column edgewise-compression tests and flexural tests over short and long spans were run on the laminated material. The results show that, if the adhesive system used is rigid enough, the mechanical properties of the laminate, calculated on the basis of net area or net moment of inertia of the metal, are about equal to those of the same metal in solid form. If the shear modulus of the adhesive is low, buckling may occur at low loads under compressive edge loading, and excessive shear deflections may occur in flexure. Some theoretical considerations concerning the behavior of laminated metal are presented in Appendix I. Project no. 7340. Covers period of work from 1 Jan 1954 to 1 Sep 1955 under Contract DO (33-616)-53-20, Amend. 2 (55-295). Appendix I: Some theoretical considerations concerning the behavior of laminated metals. - Appendix II. Details of fabricating test panels. AF WADC TR 56-24.

Propagation of shock waves in aluminum, by H. Dean Mallory. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 18p diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120962

The velocity of shock waves in aluminum and the associated translational motions, induced by metal-metal impact, have been determined by an electrical contact technique. The results obtained have been used to evaluate an equation of state for the metal. The concept of minimum shock velocity is used to fix the lower bound of the measurements. Task NOL Re2c-1-1-53. NAVORD 2864.

Research on minimum scatter in fatigue testing, by Frank A. McClintock. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 120024

The mean and standard deviation of the life and position of failure have been calculated for a class of distribution functions representing the strength of the differential elements comprising the specimen. OSR project no. R-355-10-13. AF OSR TR 56-3. Contract AF 18(600)-895.

Sendust powder magnetic cores, a non-strategic substitute for powdered high nickel alloys, by Edmond Adams. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1953. 19p photos, graphs, tables. Order from OTS. 50 cents. PB 121166

The powdered high permeability alloy, Sendust, has been investigated as a substitute material for powdered high nickel alloys, such as 2-81 molybdenum-permalloy now used in loading and filter coils. A negative temperature coefficient of permeability similar to that of cast Sendust was measured on powdered Sendust cores. The permeability of the powdered cores remains fairly constant over a wide range of flux density. The techniques for processing Sendust cores from the cast alloy are described along with the factors which most influence their magnetic properties. See also NAVORD 2576 (PB 121164). NAVORD 2869.

Separation of rare earths by liquid extraction, by L. F. Audrieth, E. W. Comings and G. F. Asselin.

Illinois. University, Urbana, Ill. Aug 1947. 54f diagr, graphs, tables. Order from LC. Mi $3.60, enl pr $10.80. PB 122135

The present study involved an investigation of possible solvents and the effects of rare earth concentration, anion and the presence of other rare earths on the equilibrium distribution of various rare earth salts between aqueous and solvent phases. As was found in the course of the investigation, the separation of thorium from rare earths is much more promising than separation among the rare earths themselves. Because the present methods for producing pure thorium leave much room for improvement, attention was turned in this direction and it was shown that very good separation can be achieved by the preferential extraction of thorium nitrate with n-pentanol from aqueous solutions containing ammonium thiocyanate and rare earth nitrates. U-58699. Thesis by George Asselin.

Some effects of silicon on the mechanical properties of high strength steels, by Chester H. Shih, B. L. Averbach and Morris Cohen. Massachusetts Institute of Technology. Dept. of Metallurgy. Nov 1955. 59p photos, graphs, tables. Order from OTS. $1.50. PB 121225

The effects of increasing the silicon content in 4340 and 4323 steels to 1.5 percent have been observed as a function of tempering temperatures. Although the introduction of silicon has several beneficial effects at high strength levels, undesirable impact properties may be introduced by tempering at high temperatures (temper embrittlement). Retained austenite data are presented as a function of cooling rate from the hardening temperature, and it is shown that substantial amounts of retained austenite may be developed on retarded cooling. There is also some indication that the fatigue endurance limits and the elastic limits may be related. Project no. 7351, Task no. 73515. Covers work conducted from 1 Jul 1953 to 31 Dec 1954 under Contract AF 33(616)-2012. AF WADC TN 55-87.

Tensile and impact properties of commercial titanium over the temperature range -196°C to 500°C, by L. Sama, A. J. Opinsky and L. L. Seigle. Sylvania Electric Products, Inc. Sep 1954. 45p photos, graphs, tables. Order from OTS. $1.25. PB 121086

Tensile and impact tests were made at temperatures from -196° to 500°C on commercial Ti 75A in three different conditions: (1) as received, (2) vacuum annealed at 850°C for 24 hours, and (3) vacuum annealed at 950°C for 24 hours. The main effect appeared to be that of hydrogen, which was most apparent in the impact tests. Project no. 7351. AF WADC TR 54-422. Contract AF 33(616)-422.

Tensile properties of aircraft structural metals at various rates of loading after rapid heating, by Clifford L. Dotson and J. Robert Kattus. Southern Research Institute, Birmingham, Ala. Aug 1955. 174p photos, drawing, diagrs, graphs, tables. Order from OTS. $4.50. PB 121137

The purpose of the work described in this report was to determine the effects of the following variables on the tensile properties of seven aircraft-structural sheet metals after they had been heated within 10 seconds to temperatures up to 1200°F: 1. Strain rates from 0.00005 in./in./sec. to 1.0 in./in./sec. 2. Holding times at test temperature from 10 seconds to 30 minutes. Special testing apparatus for heating and controlling the temperature of the test specimens, loading the test specimens, and recording load-strain curves was developed. Project no. 7360, Task no. 73605. Covers work conducted from Jan 1953 to Jan 1955 under Contract AF 33(616)-424. AF WADC TR 55-199, Part 1.

Thermal-shock investigation, by T. A. Hunter, L. L. Thomas, A. R. Bobrowsky. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Sep 1954. 106p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.75. PB 121109

A program of investigation has been undertaken to evaluate the resistance of various material to thermal shocking. A preliminary analysis of thermal-shock damage has been carried out on a theoretical basis. The results of this theoretical work indicate that the scope of the problem is so wide that purely analytical methods must be supplemented by experimental data. An experimental program has therefore been set up to test fourteen materials for their relative resistance to severe repeated thermal shock from the temperature range of 1600 to 2000°F. A suitable apparatus has been constructed and a standard specimen shape has been devised which give reasonable reproducibility of results. Excursions into the subjects of previous specimen history, mechanical fatigue, and thermal wiggling have also been made. Research conducted from Apr 1951 to Apr 1954 under Contract AF 33-(038)-21254. AF WADC TR 54-206.

Variability in fatigue testing: Sources and effect on notch sensitivity, by Frank A. McClintock. Massachusetts Institute of Technology. Dept. of Mechanical Engineering, Cambridge, Mass. May 1955. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 120014

Discusses local variations, position of failure, and notch sensitivity effects on fatigue testing of metals. AD no. 71738. Presented to the International Union of Theoretical and Applied Mechanics, Colloquium on Fatigue, Stockholm, May 25, 1955. AF OSR TN 55-186. Contract AF 18(600)-895.

METEOROLOGY AND CLIMATOLOGY

Atmospheric transmission in the infrared, by J. H. Taylor and H. W. Yates. U. S. Naval Research

Laboratory. Jul 1956. 19p photos, diagrs, graphs, tables. Order from OTS. 50 cents. PB 121199

Infrared atmospheric transmission from 0.5 μ to 15μ is shown as measured over three horizontal paths of 1000 feet, 3.4 statute miles, and 10.1 statute miles. The intense source—a 60-inch carbon-arc searchlight—permits a resolution throughout of about 10 wave numbers. Work is continuing in an effort to obtain data taken under a wide range of atmospheric and meteorological conditions. The data presented here represent an average relatively-clear winter day, a moderately dense fog, and a snowstorm. NRL R 4759.

Experiments with sensitive detectors of ultraviolet and infra-red radiations, by E. O. Hulburt. U. S. Naval Research Laboratory. Feb 1939. 32p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 120389

This report presents: (1) discussion of experiments with fluorescent telescope reception of ultra-violet radiation; (2) experiments with new photoelectric tube counter receivers of ultraviolet radiations; (3) experiments with photoelectric cell receivers of ultra-violet, visible and infra-red radiations. Eng. problem no. X6-25, Ser. no. 4. NRL H-1519.

Der mammato-cumulus (The mammatocumulus), by H. Osthoff. Translated by James Gough, Jr. Sep 1955. 17p photos. Order from LC. Mi $2.40, ph $3.30. PB 120161

Translated from Meteorologische Zeitschrift, 9: 401-408, 1906, under Contract AF 19(604)-1364.
1. Clouds, Cumulus - Formation - Theory - Germany 2. Contract AF 19(604)-1364.

Meteorological and solar radiation data, College, Alaska, by William S. Wilson. Alaska. University, College, Alaska. Contract AF 18(600)-40. Project no. 7312, task no. 73124. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I. Jan 1956. 84p graphs, tables. $2.25. PB 121207

The daily observations of maximum and minimum temperatures, maximum, minimum, and mean of the relative humidity with the approximate time (Alaskan Standard Time) of the occurrence of each maximum and minimum, maximum intensity of solar radiation and total radiation received on a horizontal surface and a surface slanted 45° to the south are tabulated along with the monthly averages and totals of each of these factors as obtained in connection with the project on the "Exposure of USAF Materials near College, Alaska." The temperature data for a given year are represented on a composite graph. The monthly values of all data are accumulated in separate tables. Covers work from Feb 1952 to Sep 1954. AF WADC TR 55-175, Part I.

Part II. Jan 1956. 41p graphs, tables. $1.25. PB 121185

Includes data collected from 1 Sep 1954 to 31 Aug 1955.
1. Meteorology - Observations - Alaska 2. Solar radiation - Alaska 3. AF WADC TR 55-175, Part II.

Upper atmosphere research report no. 1, part II: Ionization experiments in the V-2, by M. Becker, R. E. Bourdeau, T. R. Burnight and W. F. Fry. U. S. Naval Research Laboratory. Oct 1946. 24p photos, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 120730

1. Radio waves - Attenuation 2. Atmosphere, Upper - Ionization 3. V-2 (Rocket) 4. NRL R 2956.

MINERALS AND MINERAL PRODUCTS

Final report on research on crystal structures of minerals under contract N5 ori-07860, project NR 032-346, by M. J. Buerger. Massachusetts Institute of Technology. Crystallographic Laboratory, Cambridge, Mass. Mar 1955. 10p. Order from LC. Mi $1.80, ph $1.80. PB 119928

A brief summary of research on the crystal structure of $FeSb_2S_4$, $CuFe_2S_3$, Co_2S_3, $KNa_3Al_4Si_4O_{16}$, AsS, $HNaCa_2(SiO_3)_3$, and Cu_2S. Design of a new one-dimensional Fourier analogue computer is included. For technical reports 2-5 under this contract, see PB 112803-112804, 119046, 119930.

Investigation of the effect of raw material production variables on the physical and chemical properties of carbides, nitrides, and borides, by Herman Blumenthal. American Electro Metal Corporation, Yonkers, N. Y. Feb 1954. 69p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 121110

Various titanium carbides, produced commercially by as many different procedures as possible, have been purchased and are being used for this investigation. Changes of chemical composition during ball milling, hot pressing and other processing steps leading to the production of solid pieces have been followed by the same analytical techniques as well as metallographic studies. The effect of various ball milling media on the chemical composition of the milled product has been studied. It has been found that the chemical composition of TiC produced by different procedures varies as to combined and free carbon, oxygen and nitrogen content as well as metallic impurities. The amount and kind of impurities present influence maximum

density obtainable by hot pressing unbonded bars, and their ability to infiltrate. AF WADC TR 54-13. Contract AF 33(616)-89.

On the application of the polarization theory to ceramic problems, by John W. Lindenthal. Pennsylvania State College. School of Mineral Industries, State College, Pa. May 1952. 83f photos, graphs, tables. Order from LC. Mi $4.80, enl pr $15.30. PB 122136

Previous reports under this contract revealed that the freshly formed surface of silica gives rise to very unusual reactions. The high reactivity of fresh surfaces can be explained on the basis that a fresh surface still contains some of the cations. This thesis investigates the usefulness of these discoveries with respect to ceramics, especially to the surface chemistry of mixtures of sand and water or clay and water. U-22551. ONR TR 51. Contract N6onr-269, T. O. 8, NR 032-264.

PHOTOGRAPHIC AND OPTICAL GOODS

Method for producing multiple sparks at high frequencies across a single gap, by B. T. Simonds, P. E. Shafer and J. F. Moulton, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1950. 33p photos, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120922

The program to develop a multiple spark light source for shadowgraph and schlieren photography was initiated in June, 1949. By the end of the summer a multiple switch multiple spark device was completed but was not put into service due to timing and decoupling difficulties experienced in testing. Rather than design and construct a complex counting circuit that would have probably cleared up the difficulties, work was started on a single switch multiple spark device which was completed and put into service in January, 1950. A type 4C35 hydrogen thyratron is made to act as a single switch which is controlled in such a way as to discharge energy from a capacitor across a single spark gap at frequencies up to 30,000 per second. The duration of effective light is of the order of 10^{-7} second. NAVORD 1598.

Method for the determination of the optical constants of semitransparent films, by Max S. Oldham. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1949. 157p photos, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 120965

This report describes a method for the determination of the optical constants of semitransparent films. A table expressing the optical constants in terms of reflectance, transmittance, and film thickness is presented. The report has been submitted as a thesis to the Iowa State College of Agriculture and Mechanic Arts. References pp. 150-153. NOL R 1120.

Proceedings of the Conference on infrared optical materials, filters, and films held at the Engineer Research and Development Laboratories, Ft. Belvoir, Va., 10 Feb 1955. Feb 1955. 138p photos, diagrs, graphs, tables. Order from OTS. $3.50. PB 121128

Contents: Development of some infrared transmitting glasses, by G. W. Cleek and E. H. Hamilton. - Arsenic trisulfide glass and its applications, by Walter A. Fraser. - Infrared characteristics of germanium and tellurium dioxide glasses, by Henry H. Blau. - Optical characteristics and methods of temperature stabilization of selenium, tellurium, and other infrared glasses, by William F. Parsons. - Rapid and accurate measurements of refractive index and absorption coefficient in the infrared, by John J. Villa and Calvin D. Salzberg. - Optical materials for infrared instrumentation in the laboratory and in the field, by Stanley S. Ballard. - Reflection reducing coatings for the infrared, by G. Hass and A. F. Turner. - Kodak for infrared filters, by S. Duffield. - Semiconducting materials and filters for the infrared, by H. F. Priest and E. Barr. - Infrared transmitting interference filters, by C. F. Mooney and A. F. Turner. - Coatings for infrared reflecting optics, by Georg Hass. - Infrared reflectivity of evaporated metal films, by David M. Gates.

Refractive index of water as a function of temperature. Stevens Institute of Technology, Hoboken, N. J. Nov 1948. 10f graphs, table. Order from LC. Mi $1.80, enl pr $3.30. PB 122632

By the use of the Jamin interferometer and associated equipment (described in J. Opt. Soc. Am. 38:617, 1948), measurements of the thermal coefficient of the index of refraction of distilled water for sodium yellow light have been completed over the temperature range -7°C. to $+53^{\circ}$C. U 2280. Contract N6onr-247, T. O. I, NR 032-102.

PHYSICS

General

Accuracy of frequency spectra obtained by several numerical Fourier transformation methods, by Nathan L. Wener and Hobart C. Drum. U. S. Air Force. Air Research and Development Command, Wright Air Development Center. Directorate of Flight and All-Weather Testing, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1955. 64p diagrs, graphs, tables. Order from OTS. $1.75. PB 111931

Numerical Fourier transformation methods are compared with the formal Fourier integral transformation in order to evaluate the accuracy of the former when applied to harmonic analysis of aircraft dynamics. Two sets of Fourier coefficients were applied, using an electronic card-programmed calculator, to a number of analytic functions which

resemble transient inputs used in flight tests. A second transformation method investigated was the numerical evaluation of the Fourier integral on a digital differential analyzer, using linear approximation of the transient. A third approach to the problem made use of analogue computer equipment to carry out in a direct fashion the Fourier transformation. The results of these numerical transformations are compared with the formal, mathematical transformations of the selected transients. The end result is an evaluation of the numerical methods in terms of accuracy, utility and speed. Task no. 13552. AF WADC TR 54-518.

Approximate method of calculating a turbulent boundary layer in the presence of heat exchange, by M. B. Skopets. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 16p graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119957

Translated from Zhurnal Tekhnicheskoi Fiziki, Vol. 25, no. 5, pp. 864-876, 1955.
1. Atomic power - Research - Russia 2. Boundary layer, Turbulent - Heat transference - Russia 3. AERE Lib/Trans 591.

Asymptotic development of steady state electromagnetic fields, by Rudolf K. Luneberg. New York University. Washington Square College of Arts and Science. Mathematics Research Group. Jul 1949. 72p. Order from LC. Mi $4.50, ph $12.30. PB 122627

This paper develops two different forms of asymptotic series for the spatial behavior of steady state electromagnetic fields. The basic variable in each series is the wave-length so that the first few terms of each series may serve as excellent approximations to the steady state for small λ . NYU RR EM-14. ATI 66015.

Asymptotic evaluation of diffraction integrals, by Rudolf K. Luneberg. New York University. Washington Square College of Arts and Science. Mathematics Research Group. Oct 1949. 54f diagrs. Order from LC. Mi $3.60, enl pr $10.80. PB 122624

The present paper serves first as an illustration of how the theory on asymptotic expansions can be applied to physical problems. Secondly, the application itself is of interest and importance in the general study of diffraction through lenses and as such it discusses a problem now actively pursued in current research. Insofar as application to diffraction is concerned this paper gives a wave formulation of a somewhat generalized problem of diffraction through lenses and obtains a solution of the formulation in terms of integrals. ATI 69890. NYU RR EM 15.

Asymptotic solution of linear second-order hyperbolic differential equations, by Morris Kline. New York University. Washington Square College of Arts and Science. Mathematics Research Group. Dec 1952. 38f. Order from LC. Mi $3, enl pr $7.80. PB 122626

This paper presents a method of obtaining one type of asymptotic solution for the linear hyperbolic second-order partial differential equation in n-I independent variables and one time variable with coefficients independent of time. Appropriate initial and boundary conditions are specified. AD 2442. NYU RR EM-48. Contract AF 19(122)-42.

Asymptotic solution of Maxwell's equations, by Morris Kline. New York University. Washington Square College of Arts and Science. Mathematics Research Group. Nov 1950. 44p. Order from LC. Mi $3.30, ph $7.80. PB 122628

The main portion of the paper shows how it is possible, at least theoretically, to obtain the time discontinuities in the various time derivatives of E_0 and H_0 without knowing the full pulse solution itself. These discontinuities are shown to be the solutions of ordinary differential equations. Thus one obtains the coefficients of the asymptotic expansions directly without requiring the full pulse solution. Moreover, the entire theory offers a method for the asymptotic solution of some types of initial and boundary value problems. ATI 95683. NYU RR EM-24. Contract AF 19(122)-42.

Boundary layer, by L. G. Loitsianskii. May 1956. 29p. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122496

The author reviews the scope of papers on boundary layer contained in seventy references for the period from 1917 to 1948. Translation of Pogranichnyi sloi (Mechanics in the U.S.S.R. over thirty years, 1917-1947) pages 300-320. NACA TM 1400.

Collection of papers presented at the colloquium in statistical design of laboratory experiments. U.S. Naval Ordnance Laboratory, White Oak, Md. Jun 1955. 102p graphs, tables. Order from OTS. $2.75. PB 121181

Contents: An example of planning laboratory experiments, by Besse Day and Francis Del Priore. - Principles of experimental design, by Kenneth Brownlee. - The student-Fisher revolution in modern statistics, by Churchill Eisenhart. - Usable but not widely known statistical techniques, by William Kruskal. - Multivariate methods in testing of complex equipment, by Harold Hotelling. - Making decisions from experiments, by David Blackwell. NAVORD 4028.

Heat transfer and flow friction characteristics of porous solids, by G. L. Locke. Stanford University. Dept. of Mechanical Engineering, Stanford,

Calif. Jun 1950. 123f drawings, graphs, tables. Order from LC. Mi $6.30, enl pr $21.30.
PB 122138

This report summarizes the work accomplished to date on an investigation of the convective heat transfer and friction characteristics for flow through porous solids such as packed screens and beds of granular materials. A mathematical analysis is presented for the determination of the temperature of the solid and fluid as a function of time and position for two transient conditions -- heating of the solid with a distributed heat source when a cool fluid is flowing through, and cooling of the solid when the heat source is switched off. An experimental method and apparatus is described for measuring the friction factor and convective heat transfer coefficient of material such as porous solids. For the heat transfer data, conventional steady state techniques are not applicable. An appraisal of the accuracy and errors indicates that the results obtained will have an expected uncertainity of +13% in the heat transfer coefficient and +3% in the friction factor. Preliminary experiments on a straight tube test core verifies the practicality of the method for testing porous solids and also for testing any type of core which because of high effectiveness can not be tested by the usual steady state method. U 10579. SU ME TR 10. Contract N6onr-251, T. O. 6, NR 035-104.

Investigation of the effect of the rate of motion of the water current on the heat exchange coefficient on boiling in an inclined tube, by V. V. Bogdanow. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 9p diagr, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee.
PB 119989

Translated from Izvestiya Akademii Nauk, Otdelenie Tekhnicheskikh Nauk, no. 4, pp. 136-140, 1955.
1. Atomic power - Research - Russia 2. Heat exchange coefficients - Russia 3. AERE Lib/Trans 596.

Measurement of boundary-layer transition on a standard model to determine the relative disturbance level in two supersonic wind tunnels, by A. H. Lange and L. P. Gieseler. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1953. 24p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80.
PB 122027

Boundary-layer transition on a slender cone was observed at various Mach numbers between 1.9 and 4.2 in the NOL supersonic wind tunnels no. 2 and 3. From the results of this investigation the conclusion is drawn that the slender cone is a suitably sensitive standard model to indicate differences in the free stream disturbance level of supersonic wind-tunnel flows. The tests also show that flow disturbances in the subsonic part of a tunnel are propagated through the Laval nozzle in a way to affect the transition in the boundary layer of a model placed in the supersonic stream. NAVORD 2752. NOL ARR 170.

Molecular flow conductance of a pipe of elliptical cross-section, by A. H. Turnbull. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1955. 7p diagrs. Available for loan from AEC Depository Libraries. Photocopies at a fee.
PB 119312

1. Atomic power - Research - Gt. Brit. 2. Gas flow - Properties - Gt. Brit. 3. Pipe - Flow - Theory - Gt. Brit. 4. AERE GP/M 182.

On the existence of Dirac generating functions, by Peter G. Bergmann. Syracuse University, Syracuse, N. Y. Feb 1955. 3p. Order from LC. Mi $1.80, ph $1.80.
PB 120141

1. Dirac equation 2. Contract N6 onr-24806, NR 010-201 3. ONR TR 11.

On the theory of heat exchange on boiling in pipes, by L. S. Sterman. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1955. 10p. Available for loan from AEC Depository Libraries. Photocopies at a fee.
PB 119306

Translated from Zhurnal Tekhnicheskoi Fiziki, Vol. 24, no. 2, pp. 250-257, 1954.
1. Atomic power - Research - Russia 2. Heat - Transference - Theory - Russia 3. AERE Lib/Trans 579.

Scattering of sound from prolate spheroids, by R. D. Spence. Michigan State College, East Lansing, Mich. 1951. 76f diagrs, graphs, tables. Order from LC. Mi $4.50, enl pr $13.80.
PB 122913

In this work it is assumed that the incident radiation is a plane monochromatic wave. The incident and scattered radiation are expressed in terms of a velocity potential from which the pressure and particle velocity are readily calculated. The prolate spheroid is assumed to be rigid, which implies that the particle velocity vanishes at the surface. U 17075. Contract Nonr-02400, Final report.

Small, forced oscillations in an ideal, rotating liquid, by J. A. Morrison and G. W. Morgan. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Mar 1955. 76p diagrs. Order from LC. Mi $4.50, ph $12.30.
PB 119932

This paper is primarily concerned with a study of the motion of a rotating liquid which is disturbed by the introduction of forced oscillations of small amplitude. In the first part of the paper the motion set up by a weak spherical source, with centre on the axis of rotation of an initially uniformly rotating fluid, which starts to emit fluid at a given time and has subsequently an arbitrarily prescribed strength, is determined. GDAM TR 121. GDAM A-11-121/76. Contract N7onr-35801, T. O. I, NR 041-406.

Solution of Laplace's equation for regular polygon regions with a given boundary condition, by H. Ruderfer. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1951. 15p drawings, table. Order from LC. Mi $2.40, ph $3.30. PB 120923

The method of orthogonal polynomials has been used to obtain an infinite series solution of Laplace's differential equation for a regular polygonal simply-connected region and for a given symmetric boundary condition that is applicable to problems of torsional rigidity. The terms of the series are in the form of determinants. The elements of the determinants are given by means of a recursion formula. This investigation was carried out in order to determine the usefulness of orthogonal polynomial methods to the numerical solution of problems arising in ordnance research. Aeroballistics Research Report no. 14. NAVORD 1597. NOL ARR 14.

Tekhnickeskaia gazodinamika (Technical gas dynamics) Chapter 7: Flow of gas through turbine lattices, by M. E. Deich. Translated by S. Reiss. May 1956. 136p photos, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122495

This report is concerned with fluid mechanics of two-dimensional cascades, particularly turbine cascades. Methods of solving the incompressible ideal flow in cascades are presented. The causes and the order of magnitude of the two-dimensional losses at subsonic velocities are discussed. Methods are presented for estimating the flow and losses at high subsonic velocities. Transonic and supersonic flows in lattices are then analyzed. Some three-dimensional features of the flow in turbines are noted. NACA TM 1393.

Toward quadratic programming (a report to the Logistics Branch, O.N.R.), by E. W. Barankin and R. Dorfman. Columbia University. Dept. of Industrial Engineering, New York, N. Y. Jan 1955. 70p. Order from LC. Mi $3.90, ph $10.80. PB 120140

This paper presents the results obtained to date in a projected broad study of the quadratic programming problem. The problem is that of maximizing a second degree function of nonnegative variables, with these variables subject to linear inequalities. This study aims at finding a finite alogrithm for determination of a solution of such a problem. Contract Nonr-266(04).

Nuclear

Accessory equipment and procedures for use of a 1500 Curie cobalt-60 gamma-ray source, by Marvin C. Atkins. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1956. 18p photos, drawings, diagrs, tables. Order from OTS. 50 cents. PB 121378

The source is a cylinder, 1.78 in. I.D. x 2.31 in. O.D. x 13.5 in. long. It is shielded by a lead container which is mounted on a table behind a concrete block wall. A rotating-beam hoist is used to change samples. Other items of accessory equipment include specialized plugs for the container, additional sample canisters, and a cooling system. Measurements have been made of scattered radiation from the source. A standard operating procedure for use of the source has been established. This procedure has significantly reduced the probability of personnel exposure to harmful radiation. Project no. 7360. AF WADC TN 55-302.

Calorimetric determination of the half life of Cm^{242}, by W. P. Hutchinson and A. G. White. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jan 1954. 15p photos, diagr, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 54 cents plus mailing handling. PB 120137

S. O. code no. 70-674-1-77.
1. Atomic power - Research - Gt. Brit. 2. Calorimeters - Design - Gt. Brit. 3. Calorimeters - Performance - Gt. Brit. 4. Curium - Isotopes - Half lives - Gt. Brit. 5. AERE C/R 1365.

Determination of radioactivity due to fission product niobium, by A. J. Fudge. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 11p tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119972

Date of manuscript 8 Dec 1954.
1. Atomic power - Research - Gt. Brit. 2. Niobium - Determination - Gt. Brit. 3. Fission products - Chromatographic analysis - Gt. Brit. 4. AERE C/R 1502.

Fission product gases from a homogeneous power reactor, by P. C. Davidge and C. J. L. Lock. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1955. 23p graphs, tables (part fold). Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 54 cents PB 120130

S. O. code no. 91-3-2-34.
1. Atomic power - Research - Gt. Brit. 2. Reactors, Power - Fission products - Gt. Brit. 3. AERE C/M 262.

Focusing in the proton linear accelerator: II, by M. Bell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 13p graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119294

1. Atomic power - Research - Gt. Brit. 2. Protons, Accelerators - Focusing - Gt. Brit. 3. AERE T/M 128.

Non-linear effects in alternating gradient synchrotrons, by P. A. Sturrock. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1955. 41p graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119298

1. Atomic power - Research - Gt. Brit. 2. Synchrotrons - Theory - Gt. Brit. 3. AERE X/R 1771.

Preparation of plutonium amalgam and its reaction with dilute hydrochloric acid, by A. G. White. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 21p drawings, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents PB 119953

S. O. code no. 91-3-2-23. Date of manuscript Jun 1954.
1. Atomic power - Research - Gt. Brit. 2. Amalgam, Plutonium - Preparation - Gt. Brit. 3. AERE C/R 1468.

Random errors and misalignments in the A/G proton linear accelerator, by N. M. King. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 28p drawing, diagrs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119293

1. Atomic power - Research - Gt. Brit. 2. Accelerators, Linear - Errors - Gt. Brit. 3. Protons - Accelerators - Gt. Brit. 4. AERE T/M 126.

Study of DC discharges in neon-argon gas mixtures, by C. L. Coates and L. Goldstein. Illinois. University. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Dec 1955. 117p photos, diagrs, graphs. Order from LC. Mi $6, ph $18.30. PB 120275

The procedure which was used for this investigation consisted of the determination and correlation of the intensity of the neon and argon spectral lines with respect to the electron density, the electron collision frequency determined by microwave techniques, and the neon metastable density of the discharge plasma. It was believed that such a procedure would not only show how the aforementioned quantities were related but also would show which excitation processes were important insofar as the visible light was concerned. AF CRC TN 56-154. Contract AF 19(604)-524, Technical report no. 8.

Techniques for using fissionable deposits in neutron measurements, by A. Brodsky, L. W. Fagg and T. D. Hanscome. U. S. Naval Research Laboratory. Jun 1956. 14p diagrs, tables. Order from OTS. 50 cents. PB 121124

Techniques have been developed for the measurement of time integrated fluxes of neutrons using fissionable deposits faced against nuclear plates. These techniques are applicable to the measurement of fast neutron doses greater than 10^{10} neutrons/cm^2. The methods of calculating fission fragment absorption, and of electrodeposition of the fissionable elements used are also generally applicable for work with fission counters and for other purposes. In addition, the procedure for electrodeposition appears favorable as a method for radiometric assay of type 5f rare earth elements. NRL R 4746.

Trajectories in the accelerating and drift spaces of a proton injector, by N. M. King, L. C. W. Hobbis, and E. R. Harrison. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1955. 21p graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119970

1. Atomic power - Research - Gt. Brit. 2. Trajectories, Particle - Mathematical analysis - Gt. Brit. 3. AERE GP/R 1748.

Two group analysis of Z.E.T.R. experiments, by F. W. Fenning, C. C. Horton and J. D. McCullen. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1955. 23p graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 63 cents. PB 120131

S. O. code no. 91-3-2-32.
1. Atomic power - Research - Gt. Brit. 2. Plutonium - Tests - Gt. Brit. 3. AERE R/R 1225.

PHYSIOLOGY

Annotated bibliography on human factors in engineering design, compiled by Merle Lawrence and John W. MacMillan. U. S. Bureau of Medicine and Surgery. Research Division. Aviation Branch. Feb 1946. 217f diagrs, tables. Order from LC. Mi $9.60, enl pr $34.80. PB 122823

An attempt has been made to present such information as could be found concerning human factors in the operation of military equipment. This information is intended as background material for those who are interested in the design and development of equipment. Project X-651 (Av-340-a). U 68727.

Impact acceleration of the human head using protective headgear. Progress report, by Herman P. Roth, Charles F. Lombard, Arthur G. Gross,

Aaron Z. Klain and Smith W. Ames. University of Southern California. Dept. of Aviation Medicine, Los Angeles, Calif. Mar 1949. 42f graphs, tables. Order from LC. Mi $3.30, enl pr $9.30.
PB 122132

The immediate purpose of this preliminary series of tests was to determine the physical characteristics of tolerable impacts below the concussion level and to find out what correlation there might be between instrumental measurements obtained during impact blows and the subjective sensations of persons wearing various protective headgear. Among the general purposes of this program is development of means and procedures for testing protective headgear which will enable correlation of test results with experimental evidence on the physiological effects of impact blows applied to the head. In addition, it is desired to measure ability of headgear to modify the impact forces in such a way as to minimize the likelihood of either fracture of the skull or concussion of the brain. U 5005. Contract N6ori-77, T. O. 1, NR 161-014.

PSYCHOLOGY

Relation of certain thinking factors to training criteria in the U. S. Coast Guard Academy, by J. P. Guilford, N. W. Kettner and P. R. Christensen. University of Southern California. Psychological Laboratory, Los Angeles, Calif. May 1955. 19p tables. Order from LC. Mi $2.40, ph $3.30.
PB 122641

This study is part of a comprehensive investigation of abilities that are considered important in the success of high-level personnel. The purpose of the present investigation is threefold: (a) to verify some of the factors found in previous studies; (b) to gain further information about some of the newer tests; and (c) to relate some of these tests to training criteria furnished by the U. S. Coast Guard Academy. Studies of aptitudes of high-level personnel. Reports from the Psychological Laboratory, no. 13.

Some conditions affecting quality, consistency, and predictability of performance in solving complex problems, by Robert M. W. Travers, Joseph E. Marron and Andrew J. Post. 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. Sep 1955. 86p map, graphs, tables. Order from OTS. $2.25. PB 121071

This research report deals with differences among Air Force personnel in their ability to solve the complex administrative problems that confront those in positions of leadership. The difficulties inherent in studying administrative behavior as it occurs on the job have made it necessary to study samples of such behavior in artificial situations developed in the laboratory. AF PTRC TN 55-27.

Tracking with intermittently illuminated displays, by John W. Senders. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1955. 12p drawing, graphs, tables. Order from OTS. 50 cents. PB 121377

Subjects performed a tracking test involving the simultaneous control of two indicators by the use of two controls. Their view of the indicators was periodically and simultaneously obscured. The data indicate that performance varies as a direct function both of frequency and relative length of the "on" portion of the cycle. Project no. 7182, Task no. 71510. AF WADC TR 55-378. Contract AF 18-(600)-50.

Variables affecting the accuracy of collision judgments on radar-type displays, by John E. Mangelsdorf. Ohio State University. Laboratory of Aviation Psychology, and Ohio State University. Dept. of Electrical Engineering, Columbus, Ohio. Dec 1955. 59p drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 121376

The present study investigated judgments of collision courses with particular emphasis on the study of the variability of judgments as affected by the distance-to-go, the velocity, and the angle of intersection of two simulated radar targets. The psychophysical method of adjustment was employed by four subjects who made a total of 4480 judgments. Constant, average, and variable errors were calculated for each problem and were pooled for the four subjects. The resulting functions were markedly regular, and the constant and average error functions were nearly identical. A' mathematical model was developed to relate variable error and the three experimental variables of speed, distance, and angle. Both general and applied aspects of the mathematical model are discussed. Project no. 5-(7-7192). AF WADC TR 55-462. Contract AF 33-(616)-43.

RUBBER AND RUBBER PRODUCTS

Development of rubber diaphragms for arming device XH-5A, by W. C. McCall. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 51p photos, drawing, graphs, tables (part fold). Order from LC. Mi $3.60, ph $9.30. PB 122067

Task NOL-Re6b-324-1.
1. Diaphragms, Rubber - Design 2. NAVORD 1770.

Proceedings of the Joint Army-Navy-Air Force Conference on Elastomer Research and Development, Jan 11-12, 1956. ONR Symposium report ACR-4. Order separate parts described below from OTS, giving PB number of each part ordered.

Vol. 1. Jun 1956. 152p diagr, graphs, tables. $2.50. PB 121360

Contents: Opening address, by L. D. Coates. - Department of Defense policy statement, by C. C. Furnas. - Chairman's introduction to the agenda, by J. H. Faull, Jr. - Department of the Army rubber program, by J. Fred Oesterling. - Navy elastomer program--summary statement, by J. H. Faull, Jr. - Air Force elastomer program statement, by E. R. Bartholomew. - National Science Foundation elastomer program, by Paul S. Greer. - Introduction, by William Postelnek. - Materials Advisory Board conference on high-temperature elastomers (invited comment), by Charles C. Price. - Studies at the Bureau of Standards on elastomers for high-temperature service (invited comment), by Leo A. Wall. - Synthesis of an all-trans diene polymer and preparation of diels-alder polymers (invited comment), by William J. Bailey. - Applicability of glass research to elastomers for high-temperature service, by A. B. Bestul. - Additional comments on elastomers for high-temperature service. - Introduction, by J. C. Montermoso. - Stress relaxation studies of the viscoelastic properties of polymers, by Arthur V. Tobolsky. - Missile engineer looks at arctic rubbers, by James R. Miles, Sr. - Study of the effect of gamma radiation on rubber compounds and polymers, by J. W. Born. - AEC studies of radiation effect on elastomers (invited comment), by B. Manowitz. - Outdoor weathering of neoprene-coated nylon (invited comment), by R. S. Griffin, N. Catton, and F. E. Ruppert. - Development of hose for the probe-drogue system of inflight refueling, by Philip A. House. - Elastomer program of the Bureau of Ships, by T. A. Werkenthin. - Program statement of the Office of Naval Research, by J. H. Faull, Jr. - Naval Research Laboratory program statement, by Ralph C. Taylor. - Elastomer program of the Bureau of Aeronautics, by Paul R. Stone. - Bureau of Supplies and Accounts program statement on elastomer research and development, by T. J. Seery.

Vol. 2. Jan 1956. 314p photos, drawings, diagrs, graphs, tables. $5.50. PB 121361

Contents: Development of organic polymers for high temperature applications, by R. N. Evans. - Development of inorganic polymers for high temperature applications, by Malcolm J. Rogers, Jr.- Investigation of elastomer compounds for diester lubricant application, by Eric G. Schwarz. - Effect of diester lubricants on nitrile rubbers, by R. M. Harper and J. H. Bowen, Jr. - Properties of fluorocarbon filled silicone compositions in the temperature range -35°F to +500°F, by F. L. Downs. - Chemical resistant elastomers for service at temperature extremes, by J. C. Montermoso and C. B. Griffis. - Evaluation of stress decay of elastomers at low temperatures, by J. Z. Lichtman, G. Adler, and M. Hanok. - Accelerated and outdoor weathering of rubber, by Robert Zeitlin. - Weathering of Ordnance Corps rubber end items, by E. J. Kvet, Jr. and J. E. Gaughan. - Infrared spectrophotometric evaluation of ozone-induced chemical changes in antiozonants for elastomeric compounds, by I. J. Stanley, B. B. Sims, A. D. Delman, and A. R. Allison. - Oxygen permeability of elastomers and composite structures, by I. Silver, H. Anderson, and H. E. Mathews, Jr. - Shelf life of neoprene coated nylon fabrics, by Robert Briganti. - Polyurethane rubber for coating and flexible foam applications, by Wah B. Lew. - Dilaminar elastomeric films, by Fred Léonard and Myron G. DeFries. - New method for determining the dynamic mechanical properties of rubber, by R. E. Morris, R. R. James, and C. W. Guyton. - Curatives for improved aging resistance of rubber vulcanizates, by Z. T. Ossefort. - Radioisotope studies on the water extractability and migration of plasticizers in elastomer materials, by B. L. Gilbert and J. L. Kalinsky. - Stress relaxation vs sealability of gasket materials, by S. A. Eller. - Linings for bulk fuel storage tanks, by Jack E. Cowling.

Synthetic rubbers from carbon-fluorine compounds, by Frank A. Bovey. Minnesota Mining and Manufacturing Co., St. Paul, Minn. Apr 1956. 67p graphs, tables. Order from OTS. $1.75. PB 121351

The object of the research described in this report is the preparation and evaluation of fluorine-containing elastomers with very wide useful temperature ranges and resistance to a wide variety of solvents, hydraulic fluids, lubricants, and other liquids. Further study has been given to homopolymers and copolymers of fluorinated dienes. Copolymers of 1,1,2-trifluorobutadiene with 1,1-dihydroperfluorobutyl acrylate (FBA) have been prepared. Further study of plasticizers for poly-FBA has disclosed one non-fluorinated material (butyl carbitol formal) which is effective. A new type of alkoxyalkyl acrylate has been developed which is more favorable economically than those previously studied but equally good in properties. Project no. 7340. Covers period of work from May 15, 1954 to Apr 15, 1955 under Contract AF 33(038)-515. For Parts 1-3 see PB 116221-116223. AF WADC TR 52-197, Part 5.

STRUCTURAL ENGINEERING

Behavior of structural elements under impulsive loads. Massachusetts Institute of Technology. Dept. of Civil and Sanitary Engineering. Contract W19-016-eng-3215. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, by Audun Ofjord, Joseph Penzien, Robert L. Sumwalt, Jr., William M. Wells, Jr., Harry A. Williams and Robert J. Hansen. Apr 1950. 129p photos, drawings, graphs (part fold), tables. Mi $6.30, ph $19.80. PB 122855

This report presents a description of the experimental techniques, the results, and the conclusions from a series of laboratory investigations on the behavior or reinforced concrete beams and oneway slabs and all steel beams subjected to static or impulsive loads, and the preliminary study of the behavior of plain and reinforced concrete shear walls under the action of static loads. It has been determined that reinforced concrete beams and all steel beams will absorb a somewhat larger amount of energy when loaded impulsively than when loaded statically to the same total deflection in the plastic range. The results from the static and impulsive tests on slabs are of a very preliminary nature. Preliminary results on the sidesway loading of a shear wall indicate that the problem is very complex. It has been found, however, that initial cracking in both unreinforced and reinforced panels can be predicted by use of elementary theory with the moment of inertia of the transformed but uncracked section.

Part II, by Gerard D. Galletly, Fujio Matsuda and Audun Ofjord. Nov 1950. 246p photos, drawings, diagrs, graphs (part fold), tables. Mi $11.10, ph $37.80. PB 122853

This report presents a description of the experimental techniques, the results, and the conclusions from a series of laboratory investigations on rail steel versus structural grade steel as reinforcing for concrete beams, and the shearing strength of bolts, and shear failures of reinforced concrete beams under static and dynamic loading conditions. Supplementary data on oneway slabs under dynamic loading and on concrete shear walls under the action of static loads is also presented.

Part III, by Gerard D. Galletly, Audun Ofjord, N. Grant Hosking. Jul 1951. 344p photos, drawings, diagrs, graphs, tables. Mi $11.10, ph $52.85. PB 122854

This volume discusses the behavior of prestressed concrete beams, properties of rectangular steel beams, and the behavior of two-way reinforced concrete slabs. These were studied under dynamic as well as static loading conditions. The study of behavior of one-way reinforced slabs has continued, and further tests of shear walls and shear failure in reinforced concrete beams under static loading are reported.

Effect of imperfections on the stresses in a circular cylindrical shell under hydrostatic pressure, by Sol R. Bodner and William Berks. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, Brooklyn, N. Y. Dec 1952. 36f drawing, graphs. Order from LC. Mi $3, enl pr $7.80. PB 122631

An investigation of the effect on the stresses of initial deviations from the circular cylindrical shape is presented here. An eighth order linear differential equation for the radial deflection is derived which takes into account initial inaccuracies of the circular cross section. This equation is solved for the case of an external hydrostatic pressure with the aid of a set of deflection functions corresponding to simple supports. Bending moments and stresses are obtained for the case where only the component of the initial deviations corresponding to the buckled configuration is considered. Charts are presented giving allowable values of the eccentricity amplitude based upon a circumferential stress yield criterion and an octahedral shear stress yield criterion. AD 2341. PIB AL 210. Contract N6 onr-26303, NR 064-167.

Nondestructive method for detecting the incipient buckling pressures of thin-walled shells, by J. C. New. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1951. 50p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120926

1. Shells, Thin-walled - Buckling 2. Pressure, Buckling - Tests 3. Non-destructive tests 4. NOL R 1154.

Stress concentration around circular inserts in cylindrical shells, by Manford B. Tate. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1951. 18p photos, drawing, diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120925

Task NOL FR 1-51.
1. Shells, Thin-walled - Cylindrical 2. Inserts, Circular 3. NAVORD 1560.

Stress concentration around circular inserts in spherical shells, by Manford B. Tate. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1951. 16p photos, drawings, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 120924

The theoretical analysis given in this report shows that stress concentrations up to 54 per cent in excess of the maximum stress computed from conventional shell theory occur around disk inserts in thin-walled spherical casings of naval mines or in the hemispherical ends of pressure vessels. As found previously for cylindrical shells, it is indicated that a more favorable stress condition exists in the spherical casing when disk inserts are less rigid than those used in current practice. NAVORD 1561.

TEXTILES AND TEXTILE PRODUCTS

Development of chemically resistant, high-temperature protective fabric, by A. S. Kidwell. Connecticut Hard Rubber Co., New Haven, Conn. Jan 1956. 88p photos, diagrs, graphs, tables. Order from OTS. $2.25. PB 121212

A coated fabric comprising a thin coating of aluminum-pigmented polychlorotrifluoroethylene on glass fabric backed with a low-density silicone rubber sponge, and having an overall thickness of 0.070 inch, was developed for use in protective clothing for personnel in danger of being exposed briefly to a chemical fire at temperatures up to 1000°F. The fabric shows excellent resistance to fuming nitric acid and other oxidizers and fuels, is flexible and useful over a temperature range of -80°F to +390°F. AF WADC TR 55-324. Contract AF 33(616)-2544.

Development of dacron parachute materials, by Hamilton J. Bickford, Thomas L. Rusk, Jr., and Donald K. Kuehl. Cheney Bros., New York, N. Y. Feb 1956. 52p tables. Order from OTS. $1.50. PB 121187

The application of parachutes to high speed vehicles and missiles has made the requirements for such parachutes more rigorous. Among the properties of the fabrics used in parachutes which become more critical under specialized severe conditions of use are resistance to high temperatures and more severe opening shocks than previously designed for. Dacron was selected as the material to be tried for this application because of its relatively better resistance to high temperature degradation than nylon. Project no. 7320. Covers work from Jun 1954 to Nov 1955 under Contract AF 33(616)-2562. AF WADC TR 55-432.

Investigation of selected chemically altered cotton materials, by Earlana L. Hamilton. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1956. 26p graph, tables. Order from OTS. 75 cents. PB 121215

Acetylated and cyanoethylated cotton have been evaluated. Preliminary tests showed that acetylated cotton provided different degrees of fungus resistance as the amount of alteration varied. Work was initiated to find the level of alteration by acetylation which gave adequate resistance to fungi, yet retained the desired physical properties. In addition to the chemical alteration of cotton by acetylation, there is the reaction of acrylonitrile with cellulosic fibers to produce a partially cyanoethylated cotton material. The degree of chemical alteration by cyanoethylation is measured by the percent nitrogen content of the cellulose fibers after modification. Preliminary testing of cyanoethylated cotton in a 3.6 ounce weight fabric with a 3.6% nitrogen content showed that satisfactory fungus resistance could be obtained by cyanoethylation. Project no. 7312, Task no. 73124. Appendix I. Test methods. - Appendix II. Analytical methods. AF WADC TR 55-508.

Study of the effects of fabric geometry variables on air permeability, by William O. Perry. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1955. 63p photos, diagr, graphs, tables. Order from OTS. $1.75. PB 121211

A series of specially designed nylon parachute fabrics was selected to represent extremes in cloth construction and to demonstrate fundamentals of fabric geometry. By means of a somewhat unusual test arrangment it was possible to indicate the relationship of fabric geometry to air permeability at several pressure differentials. Through the process of establishing the ratio of total fabric area to interstice area, data were obtained on yarn widths as they lie in the cloth. These data were obtained on a variety of twist constructions and will provide a knowledge and background of design data for present application and future studies in this area. Project no. 7320, Task no. 73201. Covers work conducted from Mar 1953 to Feb 1954. AF WADC TR 54-574.

Teflon, test of. First interim report on Project T-1077, by T. I. Gunning. U. S. Marine Corps Equipment Board. Apr 1955. 46p. Order from OTS. $1.25. PB 121286

Appendix B is NRL report 6170: Technique of applying thin films of teflon to metals, by V. G. FitzSimmons.
1. Teflon - Lubricating properties 2. Teflon - Tests 3. Films, Teflon - Preparation.

Water repellent thread for military items, by Edward B. Frederick and Walter Zagieboylo. U. S. Army. Quartermaster Research and Development Command. Textile, Clothing and Footwear Division, Quartermaster Research and Development Center, Natick, Mass. Jun 1955. 25p graphs, tables. Order from OTS. 75 cents. PB 121114

Studies were conducted to determine whether cotton sewing thread could be successfully treated for water repellency on a production basis and then sewed in normal scale production of garments. This treatment was applied to thread used in laboratory studies, under pilot-plant conditions, in production trials by industry, and evaluated in the laboratory and in a field evaluation of garments sewed with this thread. Project reference: 7-92-06-005. QMC TSR 87.

TRANSPORTATION EQUIPMENT

Aeronautics

Instruments

CAA VHF omnirange, by H. C. Hurley, S. R. Anderson and H. F. Keary. U. S. Civil Aeronautics Administration. Technical Development and

Evaluation Center, Indianapolis, Ind. Jun 1950. 68p photos, diagrs, graphs, tables. Order from LC, Mi $3.90, ph $10.80. PB 122834

This report describes the development of a VHF omnirange system operating in the frequency band of 112 to 118 Mc. The range furnishes magnetic bearing information with respect to the range station and provides definite track guidance between the station and any point within its service area. The accuracy of the system in operation including the receiver plus ground equipment is approximately $\pm 1.5^{\circ}$. The ground equipment has been in continuous operation for more than three years. CAA TDR 113.

Time correlator for problems in aerodynamics, by George Tolmie Skinner. U. S. National Advisory Committee for Aeronautics. Jun 1956. 32p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122519

An instrument of fairly simple design for measuring time correlation functions of two stationary random electrical signals is discussed. It is intended primarily for use in problems connected with aerodynamically produced acoustic fields but has suitable properties for application to a rather wide range of aerodynamic problems involving turbulent fields. NACA TN 3682.

Engines and Propellers

Aircraft fire extinguishment. U. S. Civil Aeronautics Administration. Technical Development Evaluation Center, Indianapolis, Ind. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Study of factors influencing extinguishing system design, by Charles M. Middlesworth. Oct 1952. 21p diagrs, graphs, tables. Mi $2.70, ph $4.80. PB 122835

An initial attempt was made to compare a number of aircraft fire extinguishing agents under full-scale test conditions and using standard aircraft fire extinguishing equipment. It was found, however, that the influence of different physical properties of the agents prohibited an absolute comparison. Consequently, a study of factors which influence the aircraft fire extinguishing problem was made. This consisted of preliminary studies of requirements, of variables affecting requirements, and of extinguishing system design factors. CAA TDR 184.

Part II: Effect of air flow on extinguishing requirements of a jet power-plant fire zone, by Charles A. Hughes. Jun 1953. 10p photos, diagrs, graphs. Mi $1.80, ph $1.80. PB 122836

The work described in this report was conducted to determine the effect of various conditions of air flow, to evaluate new methods of fire extinguishment, and to evaluate newly developed extinguishing agents. CAA TDR 205.

Part III: Instrument for evaluating extinguishing systems, by James D. New and Charles M. Middlesworth. Jun 1953. 15p photos, diagrs, graphs, tables. Mi $2.40, ph $3.30. PB 122837

A gas analyzer for evaluating aircraft fire-extinguishing systems was calibrated for use with carbon dioxide, methyl bromide, and bromochloromethane. Extensive application of the analyzer in evaluating the carbon dioxide system of the XB-45 power plant proved it to be of practical value. Operation of the instrument in flight proved satisfactory. CAA TDR 206.

Analysis and comparison with theory of flow-field measurements near a lifting rotor in the Langley full-scale tunnel, by Harry H. Heyson. U. S. National Advisory Committee for Aeronautics. Apr 1956. 162p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122525

1. Rotors - Flow measurement 2. Helicopters - Rotors - Wind tunnel tests 3. NACA TN 3691.

Determination of means to safeguard aircraft from powerplant fires in flight. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Order separate parts described below from LC, giving PB number of each part ordered.

Part III, by H. L. Hansberry. Apr 1944. 37p photos, diagrs, graphs, tables. Mi $3, ph $6.30. PB 122838

A full scale, operating Waco YKS-37 engine-fuselage-wing combination was fire tested in a controlled air blast to simulate actual flight conditions. Quantities of gasoline and oil were ignited at locations throughout the powerplant installation where fire might occur as a result of failures of the engine or the fuel or oil systems. Four separate investigations were conducted concerning (1) fire extinguishment, (2) fire detection, (3) effect of fire on materials, and (4) sources of ignition. Ignition tests were conducted to determine the possibility of spontaneous ignition of gasoline, lubricating oil, and diesel fuel oil. The tests showed that ignition sparks, the carburetor air heating system, and cracks or openings in the exhaust system can be ignition sources. CAA TDR 38.

Part V: Lockheed Constitution (Navy XR60-1), by Lyle E. Tarbell. Apr 1953. 45p photos, diagrs, graphs, tables. Mi $3.30, ph $7.80. PB 122839

A full-scale operating XR60-1 Navy Constitution combination of a power plant, nacelle, and wing was subjected to fire tests under simulated flight conditions. Five separate investigations were conducted concerning: (1) fire detection, (2) fire extinguishment, (3) crew procedure, (4) materials and design, and (5) ignition sources. The tests showed many ways in which the original system could be improved and also showed that the use of newly developed detectors could result in better and simpler detecting systems. For Parts 1-2, 4 see PB 99660-99661, 118914. CAA TDR 198.

Investigation of the effect of impact damage on fatigue strength of jet-engine compressor rotor blades, by Albert Kaufman and Andre J. Meyer, Jr. U. S. National Advisory Committee for Aeronautics. Jun 1956. 25p photos, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122498

1. Compressors - Blades - Fatigue 2. Compressors - Blades - Damage 3. NACA TN 3275.

Method of selecting rocket thrust for experimental supersonic airplanes, by Robert W. Byrne. U. S. National Advisory Committee for Aeronautics. Aug 1946. 12p graphs, table. Order from LC. MI $2.40, ph $3.30. PB 122540

1. Rocket motors - Thrust 2. Airplanes, Supersonic - Power plants 3. NACA RB L6G22.

Some linear dynamics of two-spool turbo-jet engines, by David Novik. U. S. National Advisory Committee for Aeronautics. Jun 1956. 35p drawing, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122497

Transfer functions, descriptive of the responses of inner- and outer-spool speed to changes in turbine-inlet temperature and exhaust-nozzle area, were derived analytically and corroborated experimentally. NACA TN 3274.

Stall propagation in axial-flow compressors, by Alan H. Stenning, Anthony R. Kriebel and Stephen R. Montgomery. Massachusetts Institute of Technology, Cambridge, Mass. Jun 1956. 83p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122517

A theory for the prediction of the stall propagation velocity in axial-flow compressors has been developed and compared with experiments on a stationary circular cascade and a single-stage compressor. The theory, which is valid for small perturbations in velocity about a mean flow condition with finite pressure rise across the cascade, includes the effects of finite blade chord and boundary-layer response to changes in angle of attack. NACA TN 3580.

Ebene plattengitter bei überschallgeschwindigkeit (Flat plate cascades at supersonic speed), by Rashad M. El Badrawy. Translated by J. Vanier. May 1956. 133p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122494

A brief review of exact two-dimensional supersonic flow theory and Ackeret's linearized theory are first presented. The lift and drag coefficients of a cascade of flat plates are calculated exactly and compared to those obtained using the linearized theory. The forces on the cascade are determined for unsteady inlet flow. The flat plate cascade theory is extended to compute the efficiency of a supersonic propeller with friction and finite blade thickness. Translated from Mitteilungen aus dem Institut für Aerodynamik, Eidgenössische Technische Hochschule, Zürich, no. 19, 1952. NACA TM 1369.

Flight test investigation of the sonic boom, by Marshall E. Mullens. U. S. Air Force, Air Research and Development Command. Flight Test Center, Edwards Air Force Base, Calif. May 1956. 40p graphs. Order from OTS. $1. PB 121312

Flight tests were conducted to measure the pressure field surrounding an F-100 in level supersonic flight. Data was obtained at Mach 1.05 at two altitudes, 25,000 and 35,000 feet, to the right of and below the shock generating aircraft. Intensity of pressure jump and rate of decay with distance closely follow theory. Airplane fly-bys at high Mach numbers can impose high loads and therefore should be approached with caution. The audibility of the sonic boom as a function of altitude and Mach number was investigated. It was determined that the audibility at ground level is dependent upon the existing wind and temperature gradients and is difficult to predict. See also PB 111735. AF FTC TN 56-20.

High speed flight information for pilots. Revised. U. S. Office of Naval Research. Special Devices Center, Port Washington, N. Y. and Jackson & Moreland. Mar 1955. 247p drawings, diagrs, graphs, tables. Order from OTS. $6.25. PB 121331

This is a handbook of general information concerning high-speed flight. The first part contains information relating directly to the performance and limitations of aircraft designed for high-speed flight. The second part contains information relating to the performance and limitations of the human body under conditions associated with high-speed and high-altitude flight. Includes Suppl. no. 1, May 1954. NAVEXOS P-960.

Statistic stability and axial force measurements on cone cylinders, by H. Chaplin and F. J. DeMeritte. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1953. 185p photo, drawings, graphs (part fold), tables. Order from LC. Mi $8.40, ph $28.80. PB 122039

This systematic investigation was undertaken to determine the validity of the hypersonic similarity law, which states that the pressure ratios at stations of equal percent length for related slender bodies in hypersonic flow will be equal if the values of the hypersonic similarity parameters are equal. NAVORD 2882. NOL ARR 178.

Marine Transportation

Application of oceanography to subsurface warfare, by John T. Tate. U. S. National Defense Research Committee. 1946. 141f photos, maps (part fold), diagrs, graphs. Order from LC. Mi $7.20, enl pr $24.30. PB 122183

This volume deals with the physical properties of the medium in which subsurface warfare is waged. It is much more than an account of the oceanographic research sponsored by the Division. It is a text in which the science of physical oceanography is presented with special reference to the significant applications of that science to naval operations. Reprinted March 1951. U-68729. NDRC Div 6.

Design of vessels for underwater ordnance, by Charles J. Rodriguez. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1955. 35p graphs. Order from LC. Mi $3, ph $6.30. PB 120814

The more important theories and concepts involved in the analysis and design of vessels subjected to external pressure are reviewed and discussed. Using the analysis of one investigator as a foundation, an equation is formulated which is subsequently employed in the construction of charts for practical design. The charts will yield an optimum design with a safety factor of unity since they incorporate a parameter for out-of-roundness, a fabrication anomaly heretofore accounted for by the application of factors to classical perfect-shell theory. Ranges of design parameters and operating depths that will find primary usage in the field of underwater ordnance are covered. A typical design example of a pressure hull for an undersea weapon is presented in conclusion. Task no. NOL-NM-5-1-55. NAVORD 3900.

Recoil forces between turret and hatch opening, by H. B. Maris. U. S. Naval Research Laboratory. Aug 1939. 10p photo, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 120391

1. Gun turrets 2. Deck openings - Stresses 3. NRL H 1551.

Shockwave parameters in fresh water for pressures up to 95 kilobars, by H. G. Snay and J. H. Rosenbaum. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1952. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120961

The propagation velocity of a shock front in fresh water, and the particle velocity, sound velocity, specific volume and temperature immediately behind the front, are calculated from PVT data not heretofore considered. These data, due chiefly to Bridgman, extend up to 36,500 kg/cm^2 for water and up to 50,000 kg/cm^2 for ice VII. Extrapolations are made up to 100,000 kg/cm^2 for both ice VII and the supercooled liquid. In the calculation of the shockwave parameters, both supercooling of the liquid and instantaneous equilibrium along the water-ice VII phase line are considered. NAVORD 2383.

Studies on labyrinthula, by Stanley W. Watson and Erling J. Ordal. Washington. University. Dept. of Oceanography, Seattle, Wash. Jan 1951. 38f photos. Order from LC. Mi $3, enl pr $7.80. PB 122184

This paper is a report of the isolation of Labyrinthula in pure culture and an investigation of the organism with special emphasis on the morphology, life cycle and nutritional requirements. U-16378. Contract N8 onr-520, T. O. III, NR 083-012, Technical report no. 3. WU OR 51-1.

Supplementary report on deck stresses surrounding a turret opening, by H. B. Maris. U. S. Naval Research Laboratory. Mar 1939. 8p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 120390

Supplements H-1442 and H-1493 (PB 120386). 1. Gun turrets - Design 2. Deck openings - Stresses 3. NRL H 1524.

Tests on photo-elastic investigation of turret openings in deck structure, by H. B. Maris. U. S. Naval Research Laboratory. Nov 1938. 16p photos, drawings, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120386

The object of the investigation was to determine the stress pattern in a celluloid model of a battleship deck surrounding a turret opening with barbette rigidly attached to the deck near the center, to determine the most effective means of making the barbette support the deck, and to determine the effect of a free barbette closely fitting into a turret opening on the stress pattern of the deck. Supplement to Report no. H-1442. NRL H-1493.

Turret gun girder stresses, by H. B. Maris. U. S. Naval Research Laboratory. Nov 1939. 7p photo. Order from LC. Mi $1.80, ph $1.80. PB 120393

1. Gun turrets 2. Deck openings - Stresses 3. NRL H 1570.

Underwater sounds and the orientation of marine animals, a preliminary survey, by D. R. Griffin. Cornell University. Dept. of Zoology, Ithaca, N. Y. Oct 1950. 35f diagrs, graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 122182

This report discusses 1) the apparent bottom echo from a fish call; 2) a survey of previously available information on the sensitivity of hearing in fish; 3) the relationship between hearing and sound production; 4) preliminary experimental studies of hearing in the sea robin. Bibliography is included. U-13574. Contract N6onr-264, T. O. 9.

MISCELLANEOUS

Analysis of selected foreign-trade zones in Germany and Sweden: Their nature, their significance in the regional relationships of their associated seaports, and their role in the international trade of their host countries, by Richard S. Thoman. Chicago. University. Dept. of Geography, Chicago, Ill. Aug 1955. 11p. Order from LC. Mi $2.40, ph $3.30. PB 122550

1. Foreign trade zones 2. Contract N6ori-02046, Final report.

Report of NRL progress. U. S. Naval Research Laboratory. Aug 1956. 59p. Order from OTS. $1.25. Also available on annual subscription rate of $10.00 a year in U. S. A., foreign subscription rate $13.00 a year. PB 121448

Contents: Articles: Fire extinguisher for use at polar temperatures, by J. K. Musick and J. A. Grand. - A tropospheric scatter propagation experiment, by D. L. Ringwalt, H. J. Passerini, and D. L. Randall. - Magnetic optical studies of semiconductors in the infrared. I: Cyclotron resonance, by E. Burstein, G. S. Picus, and H. A. Gebbie. - Scientific program: Problems accepted. - Problem notes: Astronomy and astrophysics: Investigation of atmospheric attenuation and the physical state of the low solar chromosphere, using radio telescope which operates at short millimeter wavelengths-. . . . Thermal and nonthermal radio stars observed at intermediate frequencies and the mapping of selected regions of the Milky Way. - Chemistry: The use of hydrophobic rings for the measurement of interfacial tensions--the relation between the interfacial tensions of fuels and their water-tolerance characteristics. - Mathematics: Application of the principle of virtual displacements to the analysis of longitudinal oscillations. . . . Conditions under which the equations of motion for Reiner-Rivlin fluids will not admit weak discontinuities. - Mechanics: Stiffness and lightness as criteria for the design of shock-and vibration-resistant electronic equipment for shipboard use. . . . Changes in the thermoelectric power of a strain-gage metal (copper) after being plastically deformed at liquid nitrogen temperatures. . . . Properties of bolts under shock loading. - Metallurgy and ceramics: The electrical resistivity of silver-palladium alloys. . . . Compressional creep of tin single crystals. . . . Effects of alloying elements on graphitization. . . . Studies of the tear properties of project steels with loads perpendicular and parallel to the direction of rolling and at temperatures of 0°F and 78°F. . . . Corrosion products in ferrous systems. - Nuclear and atomic physics: Operation of NRL-1 carbon steel loop at the Materials Test Reactor. - Optics: Preliminary study on the correlation of atmospheric transmission with back-scattering. - Radio: Characteristics of an NRL-designed conical monopole type of antenna. . . . Rate measurement of marine chronometers, Gimbal mounted chronometer watches, and non-Gimbal navigating watches under controlled climatic conditions, Part V. The interval-record and chronograph methods of rate measurement. . . . Noise generation in high-power gas discharges. . . . A starting current analysis of monotrons with a cylindrical TM_{01n} resonator. . . . Scanning properties of solid dielectric bifocal lenses. - Solid state physics: Luminescent centers in sulfide phosphors. - Published reports. - Papers by NRL staff members. - Patents.

SELECTED LIST OF ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

Reproduction in whole or part of any report listed herein is encouraged by the U. S. Atomic Energy Commission, subject to the approval of authors or originating sites. General inquiries from the industrial press about AEC-developed information should be directed to the Industrial Information Branch, Atomic Energy Commission, Washington 25, D. C.

Biology and Medicine

Semiannual report to the Atomic Energy Commission, by Leon O. Jacobson. Argonne Cancer Research Hospital, Chicago, Ill. Mar 1956. Contract AT-(11-1)-69. 82p. Order from OTS. 50 cents. ACRH-5

Quantitative biological methods for studying radiation effects in mammals, by John B. Storer and Wright H. Langham. Los Alamos Scientific Lab., N. Mex. (1954?). Contract W-7405-eng-36. 43p. Order from LC. Mi $3.30, ph $7.80. AECU-3099

Genetic resistance to x-irradiation in mice, by Harold D. Swanson, C. A. Leone, and J. A. Weir. Kansas. Univ., Lawrence. (1955). Contract AT-(11-1)-304. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3130

Progress report. Part I. (Isotope encephalometry). Part II. Progress and plans in the development of a scanning scintillation coincidence isotope-encephalometer, by Lyle A. French and Ralph L. Suechting. Minnesota. Univ., Minneapolis. Univ. Hospital. Dec 1955. Contract AT(11-1)-285. 42p. Order from LC. Mi $3.30, ph $7.80. AECU-3132

Effects of x-irradiation on the plasmas of chickens as revealed by serological analysis. Part I. Whole plasma comparisons; Part II. Alteration of proteins of the liver; (A preliminary report); Part III. Autoantibody formation, (A preliminary report), by Charles A. Leone. Kansas. Univ., Lawrence. (1955). Contract AT(11-1)-304. 41p. Order from LC. Mi $3.30, ph $7.80. AECU-3133

Some effects of irradiation on the immunochemical and physicochemical identity of serum proteins of rats, by Frank Dolyak. Kansas. Univ., Lawrence. (1955). Contract AT(11-1)-304. 60p. Order from LC. Mi $3.60, ph $9.30. AECU-3134

Proposal for further studies on lung hazards from inhalation of insoluble radioactive particulate matter. Summary report for year of July 15, 1953 to July 14, 1954, by Herman Cember. Pittsburgh. Univ. Graduate School of Public Health. (1955). Contract AT(30-1)-912. 9p. Order from LC. Mi $1.80, ph $1.80. AECU-3135

A comparative study of Hanford and Utah range sheep, by L. K. Bustad, S. Marks, N. L. Dockum, D. R. Kalkwarf, and H. A. Kornberg. Hanford Atomic Products Operation, Richland, Wash. Nov 1953. Contract W-31-109-eng-52. 44p. Order from LC. Mi $3.30, ph $7.80. HW-30119

Biology research—annual report for 1954. Biology Section, Radiological Sciences Dept. Jan 3, 1955. Changed from Official use only Nov 9, 1955. Hanford Atomic Products Operation, Richland, Wash. 188p. Contract W-31-109-eng-52. Order from LC. Mi $8.40, ph $28.80. HW-35917

Chemistry and Chemical Engineering

Analytical information report for the period November 1—December 15, 1944. Madison Square Area, Manhattan District, New York. Jan 1945. Decl. Dec 1955. 28p. Order from LC. Mi $2.70, ph $4.80. A-1064

Preparation of certain polyhalogenated compounds. Monthly technical report covering period April 1, 1944 to May 1, 1944, by E. T. McBee. Purdue Univ., Lafayette, Ind. May 1944. Decl. Dec 1955. Contract W-7405-eng-74. 40p. Order from LC. Mi $3, ph $6.30. A-1507

Recovery of R (uranium) from solutions containing fluoride ion by extraction with dibutyl "carbitol." Investigation of $Al(NO_3)_3$ as salting out agent, by Charles A. Kraus. Brown Univ., Providence. Jul 1945. Decl. Jan 1956. Contract W-7405-eng-73. 18p. Order from LC. Mi $2.40, ph $3.30. A-2316

Purdue pilot plant studies on the recovery of uranium from synthetic /3 -gunk, by R. E. Hatton, E. T. McBee, R. N. Shreve, T. S. Taylor, A. A. Alberts, D. W. Pearce, R. Mezey, G. M. Rothrock, P. E. Weimer, and Z. D. Welch. Purdue Univ., Lafayette, Ind. (194?). Decl. Jan 1956. 87p. Order from LC. Mi $5.40, ph $15.30. A-2715

Analytical information report. Madison Square Area, Manhattan District, New York. Nov 1945. Decl. Jan 1956. 15p. Order from LC. Mi $2.40, ph $3.30. A-2911

Chemical research—general chemistry. Report for period of February 1 to March 10, 1944, by F. H. Spedding and H. A. Wilhelm. Chicago. Univ. Metallurgical Lab. Apr 1944. Decl. with deletions Dec 1955. 22p. Order from LC. Mi $2.70, ph $4.80. AECD-3827

Uranium peroxide. Part III. Discussion of the solubility of (uranium) peroxide in sulphate solutions based on the (uranyl) sulphate association hypothesis, by P. F. Grieger and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. May 1945. Decl. Dec 1955. Contract W-7401-eng-23. 21p. Order from LC. Mi $2.70, ph $4.80. AECD-3957

Summary of surface decontamination experience at Oak Ridge National Laboratory, by F. N. Browder. Oak Ridge National Lab., Tenn. Nov 1943 through July 1948. Decl. with deletions Jan 1956. Contract W-7405-eng-26. 38p. Order from LC. Mi $3, ph $6.30. AECD-3998

Quarterly progress report to the United States Atomic Energy Commission for April, May, and June 1954. National Bureau of Standards, Washington, D. C. Decl. Jan 1956. 74p. Order from LC. Mi $4.50, ph $12.30. AECD-4031

Quarterly progress report for July, August and September 1953. National Bureau of Standards, Washington, D. C. Jan 1954. Decl. Jan 1956. 52p. Order from LC. Mi $3.30, ph $7.80. AECD-4040

Radiometric analysis of thick samples, by Sergio deBenedetti. Monsanto Chemical Co. Dayton Labs., Ohio. Mar 1944. Decl. Jan 1956. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-4100

The coprecipitation of thorium and uranium peroxides, by Roy Oringer, R. W. Woodard, and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. May 1946. Decl. Feb 1956. Contract W-7401-eng-23. 37p. Order from LC. Mi $3, ph $6.30. AECD-4102

Factors affecting the precipitation of uranium peroxide, by D. W. Mogg and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Jul 1946. Decl. Feb 1956. Contract W-7401-eng-23. 42p. Order from LC. Mi $3.30, ph $7.80. AECD-4103

High temperature chlorination of salvage residues recovery of (uranium) from trap washes, by R. W. Veatch, Jr. and A. J. Miller. Tennessee Eastman Corp., Oak Ridge, Tenn. Mar 1946. Decl. Jan 1956. Contract W-7401-eng-23. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-4111

Progress report for the month of October 1946, by E. J. Center, H. R. Nelson, H. A. Pray, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Oct 1946. Decl. Jan 1956. Contract W-38-094-eng-27. 22p. Order from LC. Mi $2.70, ph $4.80. AECD-4126

Literature survey of treatments for monazite sands by M. Williqman and E. E. Slowter. Battelle Memorial Inst., Columbus, Ohio. Nov 1947. Decl. Jan 1956. Contract AT-30-1-gen-202. 41p. Order from LC. Mi $3, ph $6.30. AECD-4127

Progress report for the month of January 1947, by E. J. Center, H. R. Nelson, H. A. Pray, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Jan 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 25p. Order from LC. Mi $2.70, ph $4.80. AECD-4138

Progress report for the month of September 1947, by A. E. Bearse, E. J. Center, I. Igelsrud, A. C. Richardson, and J. D. Sullivan. Battelle Memorial Inst., Columbus, Ohio. Sep 1947. Decl. Feb 1956. Contract W-38-049-eng-27. 18p. Order from LC. Mi $2.40, ph $3.30. AECD-4140

A discussion of the distribution of tubanyl (uranyl) salts between organic solvents and aqueous solutions, by R. L. Tichenor and John R. Van Wazer. Tennessee Eastman Corp., Oak Ridge, Tenn. Jan 1945. Decl. Feb 1956. Contract W-7401-eng-23. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-4152

The determination of total non-U cations in UF_4 by penta-ether extraction, by H. Yellin and E. E. Sinclair. Tennessee Eastman Corp., Oak Ridge, Tenn. Mar 1946. Decl. Feb 1956. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-4155

Electrodecontamination of stainless steel, by M. R. Bennett. Oak Ridge National Lab., Tenn. Nov 1954. Decl. with deletions Dec 1955. Contract W-7405-eng-26. 29p. Order from LC. Mi $3.60, ph $9.30. AECD-4169

Separation of tuballoy from metallic tantalum, by E. L. Wagner, L. O. Gilpatrick, and R. F. Raeuchle. Tennessee Eastman Corp., Oak Ridge, Tenn. Dec 1944. Decl. Feb 1956. 6p. Order from LC. Mi $1.80, ph $1.80. AECD-4176

Recovery of tuballoy from standardized salvage residues from beta, by V. P. Calkins and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Decl. Feb 1956. Contract W-7401-eng-23. 9p. Order from LC. Mi $1.80, ph $1.80. AECD-4184

Conversion of uranium hexafluoride to uranium trioxide, by K. B. Brown and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1946. Decl. Feb 1956. Contract W-7401-eng-23. 29p. Order from LC. Mi $2.70, ph $4.80. AECD-4188

Colorimetric determination of titanium in the presence of T (U). Part I. (.1% to 5%), by DeWayne A. Lee, J. A. Widmer, and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1945. Decl. Feb 1956. Contract W-7401-eng-23. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-4202

Development of equipment for the purification of mercury by distillation, by J. E. Lee, Jr. and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. May 1945. Decl. Feb 1956. Contract W-7401-eng-23. 48p. Order from LC. Mi $3.30, ph $7.80. AECD-4204

Qualitative observations of the characteristics of TCl_5 (UCl_5) decomposition, by Gilbert Gavlin, J. V. Hubbard, and G. H. Clewett. Tennessee Eastman Corp., Oak Ridge, Tenn. Apr 1945. Decl. Feb 1956. Contract W-7401-eng-23. 6p. Order from LC. Mi $1.80, ph $1.80. AECD-4206

The decomposition of solid barium nitrate by gamma rays (thesis), by Lawrence E. LaMar. New Mexico. Univ., Albuquerque. 1955. Contract W-7405-eng-36. 48p. Order from LC. Mi $3.30, ph $7.80. AECU-3047

Equipment and preliminary results for the leaching of UO_2 in a basic carbonate circuit. Technical report no. VIII, by Ray L. Pearson, Theron L. Mackay, Milton E. Wadsworth, and W. Martin Fassell, Jr. Utah. Univ., Salt Lake City. Inst. for the Study of Rate Processes. May 1955. Contract AT(49-1)-633. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3051

Studies on the anodic polarization of zirconium. I. The formation field from both high-potential and low-potential measurements. II. Porosity of very thin anodic oxide films. III. Thicknesses of very thin air-formed oxide films. IV. A low-potential current-voltage regulator, by George B. Adams, Jr., Mario Maraghini, Tien-Shuey Lee, and Pierre Van Rysselberghe. Oregon. Univ., Eugene. Jul 1955. Contract AT(45-1)-535. 35p. Order from LC. Mi $3, ph $6.30. AECU-3058

Occurrence of technetium in nature. Final report for the period November 1, 1954 to August 31, 1955, by Edward Anders (Alperovitch). Illinois. Univ., Urbana. Sep 1955. Contract AT(11-1)-67. 20p. Order from LC. Mi $2.70, ph $4.80. AECU-3131

Investigation of organic reagents as collectors for the flotation of uranium minerals. Progress report no. 1, by J. N. Butler and R. J. Morris. Mackay School of Mines. University of Nevada, Reno, Nevada. Jul 1954. Contract AT(49-1)-624. 20p. Order from OTS. 20 cents. AECU-3137

Reaction of graphite with sodium, by G. L. Montet. Argonne National Lab., Lemont, Ill. Jun 1952. Decl. Jan 1956. Contract W-31-109-eng-38. 3p. Order from LC. Mi $1.80, ph $1.80. AECU-3142

Chemical and radiochemical studies of tellurium in fluoride volatility studies, by J. Fischer and R. K. Steunenberg. Argonne National Lab., Lemont, Ill. Jun 1956. Contract W-31-109-eng-38. 19p. Order from OTS. 30 cents. ANL-5593

Quarterly report for the period December 15, 1948 to March 15, 1949. Section I. Recovery of uranium from shales, by A. E. Bearse and others. Battelle Memorial Institute, Columbus, Ohio. Mar 1949. Decl. Mar 1956. Contract AT-30-1-gen-202. 118p. Order from OTS. 60 cents. BMI-JDS-175

LMFR-9 static corrosion behavior of materials in bismuth and uranium-bismuth solution at 550°C, by J. E. Atherton, O. F. Kammerer, C. J. Klamut, and J. Sadofsky. Brookhaven National Lab., Upton, N. Y. Aug 1954. 8p. Order from OTS. 15 cents. BNL-395(T-76)

Gamma ray initiated polymerization of n-vinylpyrollidone, by D. Ballantine, A. Glines, and B. Manowitz. Brookhaven National Lab. (1955?). 15p. Order from LC. Mi $2.40, ph $3.30. BNL-2275

Chemical research—extraction and properties of U^{233}. Report for period ending December 15, 1944. Chicago. Univ. Metallurgical Lab. Jan 1945. Decl. Dec 1955. Contract W-7401-eng-37. 36p. Order from LC. Mi $3, ph $6.30. CC-2636(Includes Suppl.)

Fractionation of fission products and heavy elements by volatilization methods, by N. D. Erway and O. C. Simpson. Argonne National Lab., Lemont, Ill. Aug 1946. Decl. Feb 1956. Contract W-31-109-eng-38. 45p. Order from LC. Mi $3.30, ph $7.80. CC-3625

Some physical properties of UO_2SO_4—D_2O solutions, by R. Van Winkle. Oak Ridge National Lab., Tenn. Jan 1952. Decl. Jan 1956. Contract W-7405-eng-26. 22p. Order from LC. Mi $2.70, ph $4.80. CF-52-1-124

Recombiner loop detonation, by D. M. Eissenberg. Dec 1954. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-54-12-78

The distribution of plutonium tracer between metals and their molten halides. VIII. Distribution of plutonium tracer in the cerium-cerium bromide system, by B. J. Fontana. California. Univ., Berkeley. Radiation Lab. Jun 1944. Decl. Jan 1956. 5p. Order from LC. Mi $1.80, ph $1.80. CK-1803

Analysis of potassium and sodium solutions. Problem assignment no. CX3-4. Development of radiochemical analytical procedures for plutonium, by G. L. Johnson, D. E. Koshland, Jr., and C. W. Smith. Clinton Labs., Oak Ridge, Tenn. Jun 1945. Decl. Nov 1955. Contract W-7405-eng-39. 9p. Order from LC. Mi $1.80, ph $1.80. CN-2043

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Principles and processes for removing nitrogen oxides from gases, by M. S. Peters. Illinois. Univ., Urbana. Engineering Experiment Station. Aug 1955. Contract AT(11-1)-276. 93p. Order from LC. Mi $5.40, ph $15.30. COO-1015

Thermochemical measurements of purex process solutions, by G. A. Burney. E. I. du Pont de Nemours & Co. Savannah River Lab. May 1956. Contract AT(07-2)-1. 14p. Order from OTS. 30 cents. DP-158

The preparation of aluminum nitrate from hydrated aluminum oxides, by M. K. Harmon. Hanford Works, Richland, Wash. Oct 1949. Decl. Mar 1956. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-14604

The flocculation of uranium compounds with calcium nitrate, by W. G. Hudson. Hanford Works, Richland, Wash. Oct 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-14708

An infrared absorption method for TBP after extraction from an aqueous phase, by R. H. Moore and D. W. Brite. Hanford Works, Richland, Wash. Sep 1951. Decl. Jan 1956. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. HW-22090

Removal of hydrogen fluoride from an air stream by adsorption in a Dorex charcoal filter, by K. M. Harmon. Hanford Works, Richland, Wash. May 1952. Decl. Feb 1956. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-24495

Capacity of marble chips to absorb HF gas from an air stream, by K. M. Harmon. Hanford Works, Richland, Wash. Sep 1952. Decl. Feb 1956. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-25771

Backmixing in pulse columns II, experimental values and effect of several variables, by W. H. Swift and L. L. Burger. Hanford Atomic Products Operation, Richland, Wash. Aug 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. HW-29010

Natural tritium as a tracer for underground water movement—a feasibility report, by H. G. Rieck. Hanford Atomic Products Operation, Richland, Wash. Nov 1953. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. HW-30262

Uranium determination by the isotope dilution technique. Part II, by Paul Goris and F. H. Tingey. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Apr 1956. Contract AT(10-1)-205. 11p. Order from LC. Mi $2.40, ph $3.30. IDO-14366

Quarterly summary research report in chemistry for April, May and June 1952. Ames Lab., Ames, Iowa. Sep 1952. Decl. Jan 1956. Contract W-7405-eng-82. 31p. Order from LC. Mi $2.70, ph $4.80. ISC-285

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The electrolytic separation of hydrogen isotopes by migration through a palladium membrane, by O. N. Salmon. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1956. Contract W-31-109-eng-52. 27p. Order from OTS. 35 cents. KAPL-1272

The preparation and reduction of divinylacetylene, by D. L. Williams and A. R. Ronzio. Los Alamos Scientific Lab., N. Mex. Aug 1949. Decl. Apr 1956. Contract W-7405-eng-36. 16p. Order from LC. Mi $2.40, ph $3.30. LA-742

Recovery of uranium values from by-product scrap materials, by Louis Spiegler. Du Pont de Nemours (E. I.) & Co. Jackson Lab., Wilmington, Del. Jan 1944. Decl. Jan 1956. Contract W-7412-eng-151. 65p. Order from LC. Mi $3.90, ph $10.80. M-854

Radiometric research, by James H. Pannell, Emilia M. Rubino, and Elizabeth W. Warren. Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy. Aug 1947. Decl. Apr 1956. 25p. Order from LC. Mi $2.70, ph $4.80. MITG-A29

Electrolytic precipitation of uranium from aqueous solutions, by Eugene Joseph Michal. Dept. of Metallurgy. Massachusetts Inst. of Tech., Cambridge, Mass. Sep 1947. Decl. Apr 1956. 53p. Order from OTS. 40 cents. MITG-A35

Radioactivity measurements at continuous countercurrent leaching test, by James H. Pannell, Emilia M. Rubino, Wilfred Freyberger, and Donald W. Haney. Mineral Engineering Laboratory, Massachusetts Inst. of Tech., Watertown, Mass. Mar 1949. Decl. Apr 1956. Contract W-7405-eng-85. 31p. Order from OTS. 30 cents. MITG-A63

Further studies on the double-precipitation process, by John J. Brumner. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. Aug 1949. Decl. Apr 1956. Contract W-7405-eng-85. 15p. Order from LC. Mi $2.40, ph $3.30. MITG-A74

Corrosion tests in sulfuric acid—ferric sulfate leaching of siliceous ores, by Norman N. Schiff. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. Oct 1949. Decl. Apr 1956. Contract W-7405-eng-85. 35p. Order from LC. Mi $1.80, ph $1.80. MITG-A80

Diffusion of synthetic and natural polyphosphates, by B. J. Katchman and H. E. Smith. Mound Lab., Miamisburg, Ohio. Jun 1955. Contract AT-33-1-gen-53. 9p. Order from LC. Mi $1.80, ph $1.80. MLM-1052

Phosphorus as a substitute for mercury in a power cycle, by John J. Grebe. Clinton Labs., Oak Ridge, Tenn. Jul 1947. Decl. Dec 1955. Contract W-35-058-eng-71. 23p. Order from LC. Mi $2.70, ph $4.80. MonP-344

Organic in-pile loop NAA-18, by S. Nakazato and R. H. J. Gercke. Atomics International. A Division of North American Aviation, Inc., Canoga Park, Calif. Jul 1956. Contract AT-11-1-gen-8. 37p. Order from OTS. 30 cents. NAA-SR-1592

Compatibility of sodium and various materials of interest in reactor construction, by F. E. Bowman. North American Aviation, Inc., Downey, Calif. Jan 1953. Decl. Jun 1956. 4p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-557

A report on the filtration of pitchblende digest slurry on an Oliver continuous vacuum rotary precoat filter, by Walter G. Weber. Mallinckrodt Chemical Works, St. Louis. n.d. Decl. Nov 1955. 6p. Order from LC. Mi $1.80, ph $1.80. NYO-1323

The dissociation pressure and the nature of uranium hydride and the preparation of transition metal hydrides, Part I: Paper 1. Density of partially dehydrogenated samples of UH_3, by Edward J. Goon; Paper 2. A review of the statistical mechanical approach to metal—hydrogen systems, by George G. Libowitz; Paper 3. References to the preparation of hydrides from organometallic compounds, by Thomas R. P. Gibb, Jr. Tufts Coll., Medford, Mass. Nov 1954. Contract AT(30-1)-355. 16p. Order from LC. Mi $2.40, ph $3.30. NYO-3918

Revised green salt (UF_4) milling, mixing and packing operation, by James C. Graham, Jr. Mallinckrodt Chemical Works, St. Louis. Dec 1944. Decl. Jan 1956. Contract W-7405-eng-29. 5p. Order from LC. Mi $1.80, ph $1.80. NYO-5067

Factors affecting the mechanism of graphitization and the heterogeneous gas reactions of graphites. Quarterly progress report for October 1, 1954 to December 31, 1954. Part I. Carbonization and graphitization, by D. B. Murphy and W. V. Kotlensky. Part II. Heterogeneous gas reactions of carbons. A. Changes in internal structure of a spectroscopic graphite upon gasification with carbon dioxide, by Emile Raats. Pennsylvania. Univ., University Park. Mineral Industries Experiment Station. Feb 1955. Contract AT(30-1)-1710. 38p. Order from LC. Mi $3, ph $6.30. NYO-6681

Elution of uranium sorbed on anion exchange resins from low-grade ore leach liquors, by J. T. Roberts and I. R. Higgins. Oak Ridge National Lab., Tenn. Dec 1952. Decl. Feb 1956. Contract W-7405-eng-26. 11p. Order from LC. Mi $1.80, ph $1.80. ORNL-1418

Progress report on uranium extraction with organo-nitrogen compounds, by D. J. Crouse, K. B. Brown, W. D. Arnold, J. G. Moore, and R. S. Lowrie. Oak Ridge National Lab., Oak Ridge, Tenn. May 1956. Contract W-7405-eng-26. 63p. Order from OTS. 45 cents. ORNL-2099

The performance contactors for liquid-liquid extraction. Progress report no. 3 (preliminary). The application of statistical procedures to a study of the flooding capacity of a pulse column. Part I. The behavior of the system trichloroethylene-water, by Frederick Philips Pike, Joseph R. Nelli, Eugene E. Erickson, and Donald S. Arnold. Part II. Statistical design and analysis, by George E. P. Box and J. Stuart Hunter. North Carolina State Coll., Raleigh. Feb 1954. Contract AT(30-1)-1320. 89p. Order from LC. Mi $3.30, ph $7.80. ORO-140

The performance of contactors for liquid-liquid extraction. Progress report no. 4. The flooding capacity of a pulse column on the benzene-water system, by Frederick Philips Pike, Eugene E. Erickson, Joseph R. Nelli, and J. Stuart Hunter. North Carolina State Coll., Raleigh. Apr 1954. Contract AT(40-1)-1320. 41p. Order from LC. Mi $3, ph $6.30. ORO-141

Electromotive force measurements of cell reactions in fused salt solvents. Annual report, by Douglas G. Hill and Arthur S. Gillespie, Jr. Duke Univ., Durham, N. C. Sep 1954. Contract AT(40-1)-1526. 12p. Order from LC. Mi $2.40, ph $3.30. ORO-146

A study of the oxidation of TCl_4 by dry air. Special report—chemistry group, by John Booher and Abel De Haan, Jr. California. Univ., Berkeley. Radiation Lab. Nov 1942. Decl. Sep 1955. Contract W-7405-eng-48. 20p. Order from LC. Mi $2.40, ph $3.30. RL-4.6.6

Precipitation reactions of organic acids with electrolytic cell effluent, by M. D. Kamen and M. B. Allen. California. Univ., Berkeley. Radiation Lab. Nov 1943. Decl. Sep 1955. Contract W-7405-eng-48. 9p. Order from LC. Mi $1.80, ph $1.80. RL-4.6.227

Preparation of tuballoy (uranium) hexachloride. II, by H. G. Reiber. California. Univ., Berkeley. Radiation Lab. Dec 1943. Decl. Sep 1955. Contract W-7405-eng-48. 7p. Order from LC. Mi $1.80, ph $1.80. RL-4.6.233

Rate of sublimation. History of $TCl_4(UCl_4)$ charges of varying geometry, by Manfred Mueller and Iva Streeter. California. Univ., Berkeley. Radiation Lab. Jun 1944. Decl. Sep 1955. Contract W-7405-eng-48. 22p. Order from LC. Mi $2.70, ph $4.80. RL-4.6.267

Reduction equilibria of TCl_4 and TBr_4, by David Altman. California. Univ., Berkeley. Radiation Lab. Aug 1944. Decl. Sep 1955. Contract W-7405-eng-48. 16p. Order from LC. Mi $2.40, ph $3.30. RL-4.6.276

Graphite tests, by Clarence H. Dibble. California. Univ., Berkeley. Radiation Lab. Jul 1944. Decl. Jun 1954. 12p. Order from LC. Mi $2.40, ph $3.30. RL-12.6.17

Uranium production process designs for leached zone plants. Volume XI. Nitric acid digestion process, by D. F. Clements, W. B. Williams, R. F. McCullough, and E. E. Wrege. International Minerals and Chemical Corp., Chicago. Sep 1953. Decl. Oct 1955. Contract AT(49-1)-545. 84p. Order from LC. Mi $5.70, ph $16.80. RMO-2022

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Evaluation of one-product plants, by J. B. Adams and Roger Bart. International Minerals and Chemical Corp., Chicago. Feb 1955. Decl. Oct 1955. Contract AT(49-1)-545. 22p. Order from LC. Mi $2.40, ph $3.30. RMO-2040

Chemical diffusion rates in alpha and beta zirconium-tin solutions, by R. Resnick and R. Balluffi. Sylvania Electric Products Inc. Atomic Energy Div., Bayside, N. Y. Aug 1953. Decl. Nov 1955. Contract AT-30-1-gen-366. 15p. Order from LC. Mi $2.40, ph $3.30. SEP-118

Raw Materials Development Laboratory handbook of analytical methods. Compiled and edited by Michael A. DeSesa. Raw Materials Development Lab. National Lead Company, Inc., Winchester, Mass. Mar 1956. 117p. Order from OTS. 60 cents. TID-7002

The system pentaether—uranyl nitrate—nitric acid—water, by C. N. Stover, Jr. and H. W. Crandall. California. Univ., Berkeley. Radiation Lab. Apr 1950. Decl. Nov 1955. Contract W-7405-eng-48. 34p. Order from LC. Mi $3, ph $6.30. UCRL-649

Concerning K mixing in Bohr-Mottelson states of spheroidal nuclei, by John O. Rasmussen. California. Univ., Berkeley. Radiation Lab. Sep 1955. Contract W-7405-eng-48. 6p. Order from LC. Mi $1.80, ph $1.80. UCRL-3149

Separation of the lanthanides by ion exchange with alpha-hydroxy isobutyric acid, by G. R. Choppin and R. J. Silva. California. Univ., Berkeley. Radiation Lab. Jan 1956. Contract W-7405-eng-48. 6p. Order from LC. Mi $1.80, ph $1.80. UCRL-3265

Metabolism of thioctic acid in algae, by Hans Grisebach, R. C. Fuller, and M. Clavin. California. Univ., Berkeley. Radiation Lab. Apr 1956. Contract W-7405-eng-48. 20p. Order from LC. Mi $2.40, ph $3.30. UCRL-3360

Intermediates in the photosynthetic cycle, by James A. Bassham, S. Alan Barker, M. Calvin, and Ursula C. Quarck. California. Univ., Berkeley. Radiation Lab. Apr 1956. Contract W-7405-eng-48. 5p. Order from LC. Mi $1.80, ph $1.80. UCRL-3396

The effect of dissolved gases on the bubble point of water, by Paul Cohen and Kenneth Vogel. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Feb 1950. Decl. Aug 1954. Contract AT-11-1-gen-14. 8p. Order from LC. Mi $1.80, ph $1.80. WAPD-RM-7

Exchange of uranium between U^{+4} and UO_2^{+2} in dilute acid solution, by R. W. Woodard, D. A. Lee, J. S. Drury, and G. H. Clewett. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Oct 1947. Decl. Feb 1956. 8p. Order from LC. Mi $1.80, ph $1.80. Y-30

The separation of uranium isotopes by chemical exchange. Progress report for the month of September 1948, by R. W. Woodard. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Oct 1948. Decl. Jan 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. Y-257

Drum dryer and calcining furnace for the preparation of UO_3 from uranyl nitrate solutions, by G. H. Smith, John F. Lakner, and John S. Reece. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Feb 1949. Decl. Feb 1956. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. Y-351

Engineering

Natural convection flow inside small tubes, by R. G. Kennison. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1953. Decl. Feb 1956. Contract W-31-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. AECD-4227

Field evaluation of industrial xeroradiography, by Grover M. Taylor and Gerold H. Tenney. Los Alamos Scientific Lab. (1954?). Contract W-7405-eng-36. 31p. Order from LC. Mi $3, ph $6.30. AECU-3011

Media for air cleaning and air-assay purposes. Final summary report for period ending December 31, 1954. Little (Arthur D.) Inc., Cambridge, Mass. Oct 1955. Contract AT(30-1)-1013. 48p. Order from LC. Mi $4.80, ph $13.80. AECU-3119

Characteristics of various check and angle stop valves in an eight-inch water line. Technical report no. 5, by Allan T. Gifford, Ronald E. Nece, and Richard E. DuBois. Hydrodynamics Lab. Massachusetts Inst. of Tech., Cambridge, Mass. Aug 1953. Contract AT(30-3)-76. 111p. Order from OTS. 60 cents. AECU-3180

Effect of zinc ion on corrosion of 2S aluminum, type 347, and SAE-1020 steel in static water at 500 F, by C. Wohlberg. Argonne National Lab., Lemont, Ill. May 1956. Contract W-31-109-eng-38. 36p. Order from OTS. 40 cents. ANL-5399

Aqueous homogeneous reactors for producing central station power, by R. B. Briggs. Oak Ridge National Lab., Tenn. Nov 1955. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.40, ph $3.30. CF-55-11-35

Study of effect of sudden heating or cooling on HRT main heat exchangers and possible protective measures, by Roy C. Robertson. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-55-11-42

Test of HRT cell. Preliminary report, by J. N. Robinson. Oak Ridge National Lab., Tenn. Nov 1955. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-55-11-62

Study of HRT-CP waste evaporator, entrainment separator, condenser and related piping, by W. L. Carter, P. S. Lindsey, and G. W. Gray. Oak Ridge National Lab., Tenn. Nov 1955. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-55-11-143

A Hanford Works vacuum system, by N. T. Hildreth. Hanford Atomic Products Operation, Richland, Wash. May 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 49p. Order from LC. Mi $3.30, ph $7.80. HW-28211

Structural evaluation of underground waste storage tanks, by Edgar F. Smith. Hanford Atomic Products Operation, Richland, Wash. Jun 1955. Contract W-31-109-eng-52. 35p. Order from OTS. 30 cents. HW-37519

Turbulent free convection heat transfer rates in a horizontal pipe, by J. P. Fraser and D. J. Oakley. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1956. Contract W-31-109-eng-52. 51p. Order from LC. Mi $3.30, ph $7.80. KAPL-1494

Cooling systems for LPR, by D. L. Hetrick. North American Aviation, Inc., Downey, Calif. May 1951. Decl. Apr 1956. 3p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-138

The performance of contractors for liquid-liquid extraction. Progress report no. 7. Pressure-drop behavior for single-phase flow through a perforated-plate assembly, by William Thomas Lewish and Frederick Phillips Pike. North Carolina State Coll., Raleigh. May 1954. Contract AT(40-1)-1320. 184p. Order from LC. Mi $9.30, ph $31.80. ORO-142

The determination, application, and limitations of circuit reliability equations, by R. O. Frantik. Sandia Corp., Albuquerque, N. Mex. Apr 1954. 43p. Order from LC. Mi $3.30, ph $7.80. SC-3288(TR)

Results of Bettis test facility hydrogen degasification test. BTF special test no. 4, by C. S. Caldwell. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. n.d. Contracts AT-11-1-gen-14 and NObs-56404. 11p. Order from LC. Mi $2.40, ph $3.30. WAPD-CP-1030

Symposium on solar furnaces, their design and application, by W. B. Haynes and H. J. Snyder. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Oct 1955. 18p. Order from LC. Mi $2.40, ph $3.30. WAPD-FE-1101

Average surface heat transfer coefficients for a crossed plate array, by J. R. Parrette and R. E. Grimble. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Oct 1955. 15p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-138

Geology and Mineralogy

Corrosion in a nitric acid concentrator, by Fred H. Meyer, Jr. National Lead Co. of Ohio, Cincinnati. n.d. Decl. Jan 1956. 11p. Order from LC. Mi $2.40, ph $3.30. AECD-3735

An investigation of scaling of zirconium at elevated temperatures. Quarterly status report no. 9 for June 2, 1955 to September 2, 1955, by H. M. Green, H. E. Tuchschmid, and W. M. Baldwin, Jr. Case Inst. of Tech., Cleveland. Sep 1955. Contract AT(11-1)-258. 9p. Order from LC. Mi $1.80, ph $1.80. AECU-3075

Heavy aggregate investigation, by R. E. Brown. Hanford Works, Richland, Wash. Dec 1952. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. HW-26574

An investigation of the mineralogy, petrography and paleobotany of uranium-bearing shales and lignites. Scope A—shales. Fourth annual report for the period of April 1, 1954 to March 31, 1955, by E. O. Strahl, E. N. Silverman, R. L. O'Neil, H. D. Duey, J. C. Griffiths, H. D. Wright, and T. F. Bates. College of Mineral Industries. Pennsylvania State Univ., University Park, Pa. Mar 1955. Contract AT(30-1)-1202. 79p. Order from OTS. 50 cents. NYO-6068

Preliminary report on uranium deposits in the Wind River Basin, Wyoming, by Eugene W. Grutt, Jr., Jonathan P. Hadfield, Jr., and Edward W. Smith. Denver Exploration Branch. Division of Raw Materials, Denver, Colo. Oct 1954. 55p. Order from OTS. 40 cents. RME-1056

Carnotite deposits near Edgemont, South Dakota, by K. E. Baker, L. E. Smith, and I. Rapaport. Colorado Raw Materials Office, AEC. Issued Feb 1952. 17p. Order from LC. Mi $2.40, ph $3.30. RMO-881

Lost Creek (Wamsutter) schroeckingerite deposit, Sweetwater County, Wyoming, by D. G. Wyant. Geological Survey. n.d. 13p. Order from LC. Mi $2.40, ph $3.30. TEM-10B

Reconnaissance examination for uranium at six mines and properties in Idaho and Montana, by J. S. Vhay. Geological Survey. n.d. 19p. Order from LC. Mi $2.40, ph $3.30. TEM-30A

A preliminary report on radioactive fluorite deposits, Thomas Range, Juab County, Utah, by M. H. Staatz and H. L. Bauer, Jr. Geological Survey. n.d. 7p. Order from LC. Mi $2.40, ph $3.30. TEM-167A

A reconnaissance for uranium in carbonaceous rocks in Southwestern Colorado and parts of New Mexico, by Elmer H. Baltz, Jr. Geological Survey, Washington, D. C. Feb 1955. 52p. Order from OTS. 35 cents. TEM-915

Health and Safety

Monitoring of certain personnel for internal plutonium contamination, by W. H. Langham, A. Murray, III., A. M. Perley, and R. W. Mattison. Los Alamos Scientific Lab., N. Mex. Aug 1945. Changed from Official use only with deletions Dec 1955. Contract W-7405-eng-36. 25p. Order from LC. Mi $2.70, ph $4.80. AECD-4075

Measurement and control of radioactive particulate contamination. Summary report, by Theodore F. Hatch. Industrial Hygiene Foundation of America, Inc., Pittsburgh. n.d. Decl. with deletions Jan 1956. 22p. Order from LC. Mi $2.70, ph $4.80. AECD-4096

Percutaneous absorption of tritium oxide, by C. W. DeLong. Hanford Works, Richland, Wash. Jul 1951. Decl. with deletions Dec 1955. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. AECD-4207

Studies on the experimental pathology and biochemistry of the pulmonary granulomatosis of beryllium workers. Section II. Consolidated progress report, by G. W. H. Schepers. Apr 25, 1955. 39p. Supplement: A review of the physical chemistry of beryllium, by Lester D. Scheel. Trudeau Foundation, Saranac Lake, N. Y. May 1955. Contracts AT(30-1)-1733 and AT(30-1)-1398. 57p. Order from LC. Mi $5.40, ph $15.30. AECU-3140

Penetration of the gut wall by intestinal bacteria after x-irradiation. Progress report for June 1, 1955 to January 31, 1956, by M. H. Hatch. Brown Univ., Providence. 9p. Contract AT(30-1)-1815. Order from LC. Mi $1.80, ph $1.80. AECU-3169

Radiation safety guide, by J. R. Novak. Argonne National Lab., Lemont, Ill. Jun 1956. Contract W-31-109-eng-38. 67p. Order from OTS. 75 cents. ANL-5574

Dispersal patterns and effects of fluorine vent gases, by H. L. Burkhardt, H. L. Caterson, R. A. Manning, and B. Kalmon. Goodyear Atomic Corp., Portsmouth, Ohio. Jun 1956. Contract AT(33-2)-1. 11p. Order from OTS. 15 cents. GAT-185

Quarterly progress report for period ending March 31, 1950, by Stafford L. Warren. California. Univ., Los Angeles. Atomic Energy Project. Apr 1950. Decl. Jan 1956. Contract AT-04-1-gen-12. 66p. Order from LC. Mi $3.90, ph $10.80. UCLA-64(Pt. II)

The discrimination of calcium and strontium by the kidney, by N. S. MacDonald, P. Noyes, and P. C. Lorick. California. Univ., Los Angeles. Atomic Energy Project. May 1956. Contract AT-04-1-gen-12. 23p. Order from LC. Mi $2.40, ph $3.30. UCLA-369

Late effects of total body roentgen irradiation. II. The influence of fractionated and single radiation doses on the incidence of tumors, nephrosclerosis and adrenal vacuolation in Wistar rats during various periods of post-irradiation survival, by Bladwin G. Lamson, Raymond A. Meek and Leslie R. Bennett. Univ. of Calif., West Los Angeles, Calif. Jun 1956. Contract AT-04-1-gen-12. 75p. Order from OTS. 45 cents. UCLA-370

The metabolism of polonium^{210} administered by intratracheal injection to the rat, by Robert G. Thomas and J. N. Stannard. Rochester, N. Y. Univ. Atomic Energy Project. Feb 1956. Contract W-7401-eng-49. 38p. Order from LC. Mi $3, ph $6.30. UR-430

A method for the safe firing of magnesium powder to produce large area flash burns, by R. E. Roth, H. W. Bales, and H. E. Pearse. Rochester, N. Y. Univ. Atomic Energy Project. Apr 1956. Contract W-7401-eng-49. 15p. Order from LC. Mi $2.40, ph $3.30. UR-435

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