U. S. Government

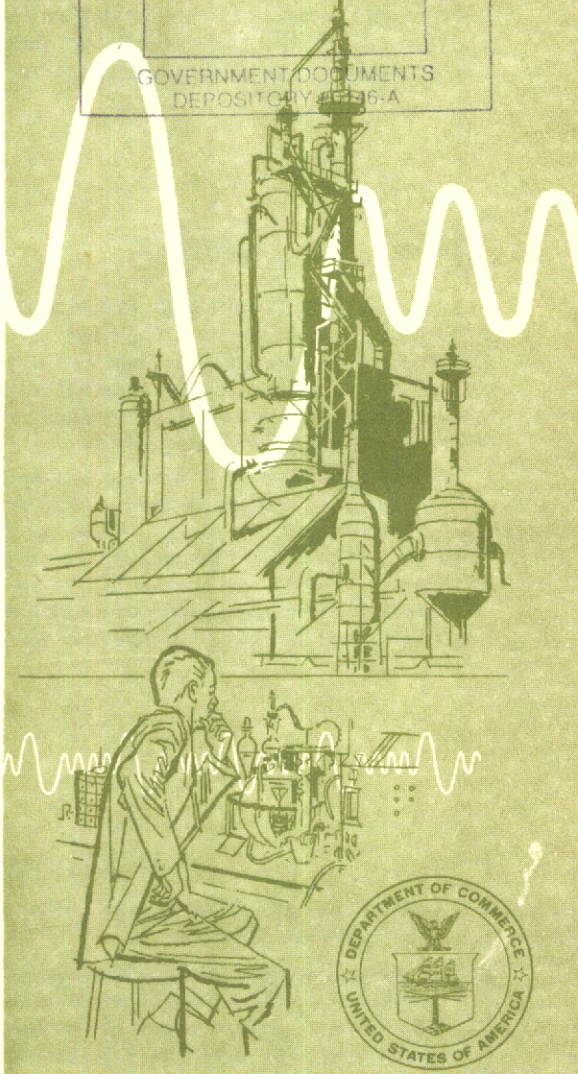
RESEARCH REPORTS

July 12, 1957
Vol. 28, No. 1

. . . A monthly listing of Government research reports available to industry . . .

[redacted]

n this issue:



U. S. DEPARTMENT OF COMMERCE
Office of Technical Services

The PB Reports . . .

announced in this publication have just been released, usually by agencies of the U. S. Government, for dissemination to the public. In most instances they result from Government or Government-sponsored research.

The Office of Technical Services is responsible, under Public Law 776, 81st Congress, for the collection and distribution of these technical reports in the interest of American science and industry.

The more important reports are reprinted for sale to the public by OTS. Many of the reports are so specialized that the demand for them does not warrant reproduction of printed copies; originals of these documents are deposited at the Library of Congress. There they may be inspected in the Annex Reading Room, or copies may be ordered from the Library in either photocopy or microfilm.

PB reports of special interest to smaller businesses are abstracted in OTS's monthly *Technical Reports Newsletter*, available from the Superintendent of Documents, Washington 25, D. C., at $1 a year domestic, $1.50 foreign.

Since 1945 thousands of business firms have used PB reports in their research programs. These reports now constitute one of the world's largest collections of non-confidential technical information, numbering over 250,000 items. OTS has published catalogs of related reports in more than 300 areas of industrial interest. For further information relative to any of its activities, you are invited to write OTS, U. S. Department of Commerce, Washington 25, D. C.

Except to the extent indicated by acknowledgment of authorship, OTS does not edit PB reports, nor does it accept responsibility for the information and conclusions contained in them. If copyrighted material appears, permission for its use should be requested from the copyright owners. Any national security restrictions that may have applied to these reports have been removed. Patents may cover the subject matter of any report, and the reader is advised to make patent searches before developing applications based on the reports.

How To Order

ALWAYS USE COMPLETE TITLE AND PB NUMBER of each report ordered. The letter "s" accompanying some PB numbers means "supplement," "t" means "translation," and "r" means a partial or complete revision. These letters should be included as part of the PB number. Prepayment is required.

TO ORDER FROM LC • Address your order to Library of Congress, Photoduplication Service, Publications Board Project, Washington 25, D. C. Make check or money order payable to Chief, Photoduplication Service, Library of Congress. State whether report is desired in microfilm or photocopy. Microfilm copies are in 35 millimeter film and require special reading equipment; if you do not have such a machine you may be able to use one at a library in your area.

TO ORDER FROM OTS • Address your order to Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. Make check or money order payable to OTS, Department of Commerce. Reports available from OTS may also be ordered through Department of Commerce field offices.

TO ORDER FROM OTHER SOURCES • When an agency other than OTS or LC is the source, use the full address included in the abstract of the report. Make check or money order payable to that agency.

U. S. GOVERNMENT RESEARCH REPORTS

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

U. S. DEPARTMENT OF COMMERCE
Sinclair Weeks, *Secretary*

Issued monthly. Annual subscription $6 ($3 additional for foreign mailing). Single copy 60 cents. Make remittance payable to Superintendent of Documents and mail either to your nearest Department of Commerce field office or to the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Address changes should be sent direct to the Superintendent of Documents.

Use of funds for printing this publication approved by the Director of the Bureau of the Budget, August 22, 1955.

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

Vol. 28, No. 1 July 12, 1957

Contents

Printed Reports Available from OTS Announced in This Issue

BIBLIOGRAPHY

Infrared, a bibliography, by Mauree W. Ayton, Thomas J. Derby, Virginia H. Boteler, and Clement R. Brown. U. S. Library of Congress. Technical Information Division. Mar 1957. 156p. Order from OTS. $3.00. PB 121998

Includes references to unclassified reports and documents and to formerly restricted reports now unclassified, issued from 1931 to 1952, which have been found in sources listed. Material on heat transfer theory and processes, as such, has been excluded. For Part I see PB 111643.

Literature survey on leaded steels, by R, C. Elliott and D. M. Koffman. U. S. Arsenal, Watertown, Mass. Jul 1955. 38p graphs, tables. Order from Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. $1.00. PB 111917

Published data indicate that considerable savings in machining costs can be achieved by utilizing leaded steels where large amounts of machining per unit volume of steel are required. In contrast to high sulphur steels, lead addition to normal steel grades does not lower ductility or toughness values. Leaded steels appear better suited for ordnance applications than high sulphur steels of comparable machinability, except for applications where service temperatures exceed 650°F and where ultra-high strengths are required. It is deemed possible through the use of published information on leaded steels together with further development studies to advantageously employ leaded steels in many ordnance applications, thus reducing production costs. WAL RPL 10/1.

Marine borers, a preliminary bibliography, by William F. Clapp and Roman Kenk. U. S. Library of Congress. Technical Information Division. Feb 1956. 358p. Order from LC. Mi $11.10 ph $54.60. PB 125921

This bibliography is based on a survey of marine-borer literature carried out by the William F. Clapp Laboratories, Inc., Duxbury, Mass. A systematic search of recent literature is being made to bring the bibliography up to date.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Ethylene diamine tetra acetic acid, its salts, properties and uses, by John J. Singer. Apr 1951. 2p. Order from OTS. 50 cents. PB 131082

Reprints from Monthly Research Report of the Office of Naval Research, Apr 1951, p. 24 - 25.

Nuclear magnetic resonance study of polyisobutylene CCl_4 solutions, by A. W. Nolle. Texas. University. Dept. of Physics, Austin, Texas. Jul 1955. 20p photo, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 124489

The nuclear magnetic resonance relaxation times of CCl_4 solutions of polyisobutylene are measured by the spin-echo method. The independent variables are the solution concentration and, in some cases, the temperature. Six polymer samples are used, with molecular weights covering the range 2×10^3 to 2×10^6. The critical concentration below which the solution is "dilute" is consistent with statistical theories of molecular radius. Contract Nonr-375 (05) NR330-034, Technical report No. 1.

Relative electron densities in substituted benzenes, by P. L. Corio and B. P. Dailey. Columbia University. Dept. of Chemistry, New York, N. Y. Jul 1956. 29p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123465

The proton magnetic resonance spectra of a number of monosubstituted benzenes have been studied in an attempt to derive values of the relative electron density from observations of the chemical shifts of the chemical shifts of the ring protons, and the effect of various functional groups on these shifts. The observed shifts are compared with data from other experimental sources, with theoretical calculations of electron densities in substituted benzenes, and with the electronic theory of orientation effects in benzene substitutions. In particular, the importance of polarization effects in aromatic substitution reactions is emphasized. AF OSR TN 55-440 Contract AF 18(600)-1152.

Plastics and Plasticizers

Adhesive for composite material used in printed circuitry, by Russell M. Houghton and Virgil G. Lorenzini. Houghton Laboratories, Inc., Olean, N. Y. Mar 1956. 83p photos, diagrs, tables. Order from Office of Technical Services, U. S. Department, of Commerce, Washington 25, D. C. Order from OTS. $2.25. PB 121960

The defined objective of this contract was to develop an improved adhesive for composite materials used in etched circuitry. Earlier research was performed under Contract DA 36-039-sc-42708. This study is limited to electrolytic or rolled copper foil and laminates produced from paper, nylon, glass and orlon by means of phenolics, melamine, epoxide, silicone, Teflon and diallyl phthalate resins.

Detailed structure of copolymers from dielectric measurements, by Richard N. Work and Yves M. Trehu. Princeton University. Plastics Laboratory, Princeton, N. J. Feb 1956. 36p graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124190

The technique discussed in this paper considers the number of chain segments that are disturbed by the rotation of a single segment. This is accomplished by determining the effective dipole-moment per polar group for each type of dipole in a polar-polar copolymer as a function of copolymer composition. It was found sufficient to take into account only the interactions between nearest-neighbor dipoles along the same chain. Dept. of the Army project 3-99-15-022. Signal Corps project 152B. Based on a thesis by Y. Trehu. PU PL TR 40B. Contract DA 36-039-sc-70154. Report 1b.

Development of aircraft windshields to resist impact with birds in flight. Part III: Impact characteristics of aircraft windshields incorporating polyvinyl butyral plastic interlayer, by Pell Kangas and George L. Pigman. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Mar 1950. 32p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 122305

Parts I to II were issued as TDR no. 62 and no. 74. 1. Windshields, Laminated glass - Impact tests. 2. Plastics, Laminated - Strength. 3. CAA TDR 105.

Development of plastic expanded pellet-type core material for sandwich construction, by Arthur Derr Golladay. Golladay Aeronautical Laboratory, Cumberland, Md. Dec 1953. 40p photos, tables. Order from LC. Mi $3.00, ph $6.30. PB 125144

This program has been concerned with the development of core materials making use of commercially available resins, not with the development of basic materials. However, some resin investigation has been necessary, but only enough to produce pellets and core compositions suitable for demonstration of the pellet type core material. Expanded plastic pellets of a wide range of sizes have been developed and produced on a laboratory basis by methods closely identical with mass production techniques. AF WADC TR 53-327. Contract AF 33(600)-19090. AD 24746.

Elevated temperature resistant silicone structural adhesives for metals, by Frank J. Riel, Jr., and M. Bruce Smith. Narmco, Inc., San Diego, Calif. Mar 1957. 41p. diagr, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.25. PB 131024

During the period covered by this report, two possible methods of approach to the synthesis of a new silicon containing polymer suitable for a high temperature adhesive were investigated. The first type of materials investigated, polymers made from poly-hydroxy compounds and halosilanes, proved to be too susceptible to hydrolysis to be useful as ashesives. The second line of approach involved the synthesis of polysiloxane and polysilane resins containing tolyl groups, followed by oxidation of the tolyl groups to polar carboxyphenyl groups. A number of such resins were prepared, identified, and evaluated. Evaluation of the carboxyphenyl polysiloxanes showed them to be better high temperature resistant laminating resins than high temperature resistant metal-to-metal adhesives when compared with conventional commercially available silicones. AD 118153. Project 3343, Task 73496. Covers work from May 1955 - Oct 1956 under Contract AF 33(616)-3007, Supplemental agreement 1 (56-1616). AF WADC TR 56-533.

Investigation of the vacuum-forming process for plastics fabrication (U), by Harrison Gross and Warren L. Price. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Aug 1956. 14p drawing, graphs, table. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington, D. C. 50 cents. PB 121954

Report details work accomplished to compare technical operational data for efficient vacuum forming of various thermoplastic materials. Tables and graphs are included showing the vacuum-forming properties of various materials and the conditions required for their most effective employment. Experimental work started 11 Aug 1954, completed 6 Jan 1955. Project 4-91-06-002. CC CRL R488.

Oxidative degradation of polyethylene, by Harold C. Beachell and Spero P. Nemphos. Delaware. University, Newark, Del. Sep 1956. 24p graphs tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington, D.C. 75 cents. PB 121682

The degradation of polyethylene has been studied in molecular oxygen between 150° - 250°C in ozone-enriched O_2 between 20° and 109°C. and in fuming HNO_3 between 25° and 83°C. The solid, liquid, and vapor products have been analyzed by means of their infrared spectra. The kinetics of the oxidation were determined by measurements of oxygen absorption at both constant pressure and constant volume and by the spectroscopic increase in carbonyl-band absorption. The Elovich equation for chemisorption was applied successfully to the kinetic data. The

reaction appears to be a typical free radical reaction with a hydroperoxide intermediate. The oxidation with ozone is comparable to that with oxygen; ozone affects only the initiation reaction. The oxidation with nitric acid, which has an activation energy of 35.6 koal/mole, proceeds by a different mechanism. AD 97304. Project 7340, Task no. 70312. AF WADC TR 55-420.

Stress relaxation and dynamic properties of ethylene polymers, by E. T. Oskin and B. Maxwell. Princeton University. Plastics Laboratory, Princeton, N. J. Jan 1957. 39p. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.00. PB 121924

The physical properties of a regular grade polyethylene and a linear (highly crystalline) polyethylene have been studied by means of standard tests, stress relaxation tests and a dynamic mechanical test. The results of these tests are given and conclusions drawn. The dynamic testing method is shown to be a valuable aid in analyzing the performance of a plastic material. PU PL TR 44A.

Paints, Varnishes and Lacquers

Estimation of the quadratic cost function of a paint factory, by Charles C. Holt and Franco Modigliani. Carnegie Institute of Technology. Graduate School of Industrial Administration. Oct 1955. 11p graphs. Order from LC. Mi $2.40, ph $3.30. PB 125029S

Appendix II to ONR research memorandum no. 30 (PB 125029). Project: Planning and control of industrial operations. 1. Paint industry - Administration - Theory. 2. Cost of production - Estimates. 3. Industry - Organization, control, etc. 4. Contract N onr-76001, NR 047001. 5. ONR RM 30, Appendix 2.

Heat resitant paints for rocket launchers, by T. Rice. U. S. Arsenal, Rock Island, Ill. Sep 1956. 12p photos, table. Order from Office of Technical Services, Dept. of Commerce, Washington 25, D.C. 50 cents. PB 121736

This report describes tests of four heat resisting paints in which a blast flame is used instead of a high temperature furnace to supply the heat. Results indicate that zinc pigmented dibutyltitanate paint will withstand the heat of a blast flame somewhat better than the best of the aluminum pigmented silicone paints which have been previously tested. Ord. proj. TB 4-771F, Report no. 6. D. A. proj. 593-14-007. RIAL R56-2659.

Preparation of protective coatings by electrophoretic methods, by Allen C. Werner, James J. Shyne, Harold N. Barr and Bernard Triffleman. Vitro Corporation of America. Vitro Laboratories, West Orange, N. J. Apr 1957. 53p photos, diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce Washington 25, D.C. $1.50. PB 131062

An investigation was conducted of the preparation of oxidation-resistant coatings for molybdenum by electrophoretic methods. Multilayer coatings of 80% nickel-20% chromium and nickel-bonded chromium carbide provided good static air-oxidation resistance. Inclusion of a 50% dense nickel-chromium layer resulted in satisfactory ballistic impact resistance. Erosion was fair. All the test panels failed under severe thermal shock. AD 118224. Project no. 7351, Task no. 73512. Covers work conducted from Jul 1955 to Jul 1956 under Contract AF 33(616)-3118. AF WADC TR 56-521.

Progress in the study of anti-fouling compositions for the protection of flying boat hull bottoms, by Allen L. Alexander and Peter King. U. S. Naval Research Laboratory. Nov 1941. 109p photos, tables (part fold). Order from LC. Mi $5.70, ph $16.80. PB 122577

1. Paints, Anti-fouling - Tests. 2. Seaplanes - Hulls - Paints. 3. Plastics, Acrylic - Properties. 4. NRL P-1815.

Inorganic Chemicals

Experimental study of butt-joined ADP crystal plates, by B. J. Faraday and D. J. G. Gregan. U. S. Naval Research Laboratory. Apr 1957. 28p diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce Washington 25, D. C. 75 cents. PB 121878

Bonded crystals employing several types of adhesives were investigated from the standpoint of solvent resistance, mechanical dissipation and strength, electromechanical coupling, dielectric properties, and thermal behavior. The results of these tests as well as a consideration of severe limitations brought about by the properties of ADP, eliminated all types of bonding agents except the epoxide resins. The tests also indicated that the bond thickness should be kept at a minimum and that the bond should be located away from the position of the antinode of stress and strain. NRL R 4916.

Investigation of the molecular structure of biphosphine, by Eugene R. Nixon. Pennsylvania. University. Dept. of Chemistry, Philadelphia, Pa. Dec 1955. 32p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124805

1. Phosphine - Derivatives - Spectrographic analysis. 2. Contract Nonr-294(00), NR 052-257, Final report.

Kinetics of the thermal decomposition of hydrogen peroxide vapor, by Paul A. Giguere and I. D. Liu. Laval University. Dept. of Chemistry, Quebec, Canada. Jul 1956. 28p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124854

The kinetics of the thermal decomposition of hydrogen peroxide vapor were studied by the static method at low pressures (0.2 to 20mm. Hg.) over the temperature range 300° - 600°C. and in specially treated glass vessels. Packing the reaction vessel with glass rods and adding various gases (including nitric oxide and propylene) produced no appreciable effect on the gas-phase reaction. The rate of decomposition of deuterium peroxide was indistinguishable from that of hydrogen peroxide under comparable conditions. A mechanism is proposed for the homogeneous reaction in which chains play no significant role. AF OSR TN 56-397. Contract AF 18 (600)-492. AD 96055. Chem 40-6.

Quarterly periodic status report of the Hydrogen Peroxide Laboratories under Contract N5 ori-07819, NR 092-008, by R. L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories. Jun 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 122156

The work on kinetics has been directed to a determination of the effects of heat and mass transfer on the kinetics of the decomposition step. This has necessitated an experimental determination of the thermal conductivity of calcium oxide (k_2) and the gas pressure drop constant (K). DIC 6552.

Solid state luminescence theory and oscillator strengths in KCl:Tl, by R. S. Knox and D. L. Dexter. Rochester. University. Institute of Optics, Rochester, N.Y. Jun 1956. 35p diagr, graph, tables. Order from LC. Mi $3.00, ph $6.30. PB 124265

This report discusses the free thallous ion, comparison of predicted and experimental oscillator strengths in the solid, and thallous ion wave functions and the existing theory of solid state luminescence. It is concluded that: (1) the simplified theory of luminescent center as so far worked out is insufficient to produce in a straightforward way any unequivocal configuration coordinate curve for the excited states of a center, and (2) the Seitz-Williams model for KCl:Tl should not be considered decisively confirmed, because (a) the quantitative calculations appear largely to be in fortuitous agreement with experiment, certainly insofar as they depend on the simplified energy calculations, (b) several important features of the center are left unexplained, and (c) it does not, in our straightforward application, predict the oscillator strengths of the principal KCl:Tl absorption lines. AF OSR TN 56-405. Contract AF 18(600)-688, NR 355-20-7. AD96213.

Determination of perchlorates in submarine storage battery electrolyte, by Edward J. Peebles. U. S. Naval Research Laboratory. Mar 1943. 11p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122679

1. Perchlorates - Determination. 2. Submarines - Batteries - Chemical analysis. 3. Electrolytic cells - Chlorine production. 4. NRL P 2021.

Development of schematic analytical procedures for synthetic lubricants and their additives, by Francis S. Bonomo. Denver. University. Denver Research Institute, Denver, Colo. Apr 1957. 56p diagr, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.50. PB 131063

Methods for the separation, identification, and determination of certain components of synthetic greases and synthetic lubricants are presented and discussed. Included in these components are such base-oils as dibasic acid esters, silicate esters, disiloxanes, and silicone oils, and selenide and phenol type antioxidants. Analytical chromatographic procedures employing column partition, paper partition, and adsorption techniques for the separation and identification of different groups of components are presented and discussed. Qualitative and quantitative procedures for the detection and determination of selenium-containing antioxidants are presented. Attempts to detect phenol-type antioxidants by volatilization were unsuccessful. AD 118215. Project no. 3044, Task no. 73314. Covers period of work from Nov 1955 to Nov 1956 under Contract AF 33(616)-3336. For Part 1 see PB 111856; Part 2 not available. AF WADC TR54-464, Part 3.

Hydrogen contamination in titanium and titanium alloys. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Project 7351, Task 73510. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 2. Comparison of various methods for hydrogen analysis, by John W. Seeger and Jack A. Winstead. Oct 1956. 94p photos, drawings, diagrs, graphs, (part fold) tables. $2.50

Descriptions of various analytical methods for hydrogen determination in titanium and its alloys are presented, with information on operating procedures and costs.

A suggested experiment for a single sheet disputed between two laboratories is given as a model by which appropriate experiments can be devised to incorporate the sources for disagreement found in this investigation. AF WADC TR 54-616 Part 2. Covers work from Jan 1955 - May 1956. AD 110412.

Part 3: Strain aging hydrogen embrittlement in alpha-beta titanium alloys, by H. M. Burte. Oct. 1956. 51p photos, drawing, graphs, tables. $1.50. PB 121786

It is well recognized that hydrogen contamination in alpha-beta titanium alloys can lead to sudden, brittle fracture during the use of these materials. The strain aging embrittlement which causes such fracture has been investigated. Metallographic examination of many hydrogen contaminated alpha-beta alloys shows no evidence for a third phase either before or after fracture. In at least one alloy, however, a third phase was visible after fracture. Both alloy composition and microstructure affect susceptibility to strain aging embrittlement. Increasing test temperature seems to decrease the tendency towards embrittlement, but increases the rate at which embrittlement can occur. A mechanism for strain aging embrittlement is proposed. Other types of embrittlement which may be caused by hydrogen are mentioned. AF WADC TR 54-616 Pt. 3 Covers work from July 1954 - Oct 1955. AD 110439.

Microscopic and X-ray study of barium titanate ceramics, by W. R. Cook, Jr. Brush Laboratories Co., Cleveland, O. Jul 1955. 44p photos, diagrs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. $1.25. PB 121342

Techniques are demonstrated for identifying Ba_2TiO_4, Ba Ti_3O_7, and hexagonal $BaTiO_3$ in tetragonal Ba Ti O_3 ceramic. Forsbergh's solution of the square net domain pattern is confirmed. Based upon interpretation of the domain patterns, several conditions are suggested to be necessary for the attainment of maximum electromechanical coupling. Technical report no. 7 under Contract no. Nonr-1055(00).

Study of direct methods of crystal structure determination. Final report covering the period of Jul 1, 1954 to Sep 1, 1956, under Contract AF 18(600)-1168, by Leonid V. Azaroff. Armour Research Foundation, Chicago, Ill. Aug 1956. 75p photos, diagrs, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 125166

The study of direct methods of crystal structure determination has been carried out with the aid of a single crystal of fairfieldite. This particular crystal was chosen because its structural composition was such that it could not adversely influence this investigation. The first method tested, the Hauptman-Karle statistical method, was found to be limited in its applicability to structures which could alternatively be solved by simpler methods. Methods employing inequalities were found to be limited to structures consisting of a small number of similar atoms. The vector shift methods emerged from this investigation as the only ones promising universal applicability. There are several difficulties which presently limit their utilization. These limitations, as well as the detailed evaluations of all the methods, are described in this report. Suggestions for extending the usefulness of vector shift methods are also given. ARF Proj A632, Final report. Project no. R355-40-18. AD 110342.

Miscellaneous Chemicals

Chemical thermodynamics of materials at high temperatures. Technical report no. 16: Thermodynamics of the liquid solutions in the triad Cu-Ag-Au: I. The Cu-Ag system, by Russell K. Edwards and James H. Downing. Illinois Institute of Technology. Dept. of Chemistry, Chicago, Ill. Jun 1955. 22p diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 123998

The thermodynamics of the liquid CuAg system have been investigated as part of a general study in the Cu-Ag-Au triad to consider the energetic relationships and chemical bonding among these elements. The study was conducted by the method of determination of the partial pressures over the liquid solutions as a function of composition and temperature. Partial pressures were measured by the molecular effusion technique and were related to the vapor pressures of the pure liquids similarly measured, and activities were calculated. The related thermodynamic properties for the mean temperature 1428°K. are reported, based on the temperature and composition dependencies of the activity data. Paper presented at the 126th meeting of the American Chemical Society, New York, Sep 1954. Contract Nonr-1406, T.O. II, Project 358-070, Technical report 16.

Electronic levels of complex molecules, by Ian G. Ross. Florida State University. Dept. of Chemistry, Tallahassee, Fla. Jun 1955. 134p graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 124173

Covers research during the period 1 Jan 1953 - 31 Dec 1954 under Contract Nonr-988-03, NR019-134. Contents: - 1. On the absorption law for samples of non-uniform concentration with special reference to the spectroscopy of irradiated glasses by Ian G. Ross. (Figures are in J. Optical Soc. Am. 44, 40, 1954). 2. Luminescence spectroscopy of molecules and the photo-synthetic system, by R. S. Becker and Michael Kasha. (Presented

at the Conference on Luminescence at Pacific Grove, 29 Mar - 1 Apr 1954). 3. Lowest triplet levels of the polyacenes, by S. P. McGlynn, M. R. Padhye and Michael Kasha. 4. Role of hydrogen bonding in the n * blue-shift phenomenon, by Graham J. Brealey and Michael Kasha. 5. Lowest triplet state of anthracene, by M. R. Padhye, S. P. McGlynn and Michael Kasha. 6. On the misassignment of the multiplicity forbidden transition in pyridine, by Graham J. Brealey. 7. Luminescence spectroscopy of porphyrin-like molecules including the chlorophylls, by R. S. Becker and Michael Kasha.

Fundamental studies on the adhesion of organic materials to metal substrates, by R. L. Patrick and W. A. Vaughan. Quantum, Inc., Mount Carmel, Conn. Dec 1956. 121p photos, drawings, graphs, diagrs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $3.25. PB 121982

Model systems have been prepared in order to study the phenomenon of adhesion. This report is in four sections. Section I is a general discussion of adhesion and surfaces. Section II concerns monomolecular layers and the development and use of ellipsometry as a useful tool in considering adhesive systems. Section III discusses the development of an ultracentrifugal technique for rupture-stress testing of single interface samples. Section IV correlates the results of polymerization at the monolayer. Section V reviews cybotaxis. Section VI is a critical bibliography of pertinent adhesion literature and allied subjects. AD 118054. Project 7340, Task 70337. Contract AF 33(616)-2465. AF WADC TR 56-663.

Heats of adsorption of water vapor on bovine serum albumin, by R. A. Beebe and C. H. Amberg. Amherst College. Dept. of Chemistry, Amherst, Mass. May 1955. 25p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123990

Heats of adsorption of water vapor on bovine serum albumin were measured calorimetrically at 20°C and are presented together with the isotherms. The heat curves are discussed and critically compared with calculated values from the literature. Possible mechanisms for the absorption process are considered, with special regard to the high initial heats and the appearance of a maximum in the heat-coverage curve near the B. E. T. value for a complete monolayer. ONR TR 7. Contract N8 onr-66902, NR 358-151.

ELECTRICAL MACHINERY

Electronics

AIEE transaction paper on the effects of nuclear radiation on electronic components and systems, by J. Robert Milliron. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1957. 9p. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. 50 cents. PB 131051

The usual causes and effects of reactor radiation on electronic components and systems are briefly reviewed. It was observed that damage resulting from nuclear radiation is a function of type and energy of the radiation, as well as other environmental factors, such as temperature, humidity, stress, and rate of irradiation. AD 118202. Project 4155, Task 41700. AF WADC TN 57-120.

Angular dependence of the characteristic energy loss of electrons passing through metal foils, by Richard A. Ferrell. Maryland. University. Physics Dept., College Park, Md. Sep 1955. 37p diagrs, graph, table. Order from LC. Mi $3.00, ph $6.30. PB 123964

This work shows that the experimental angular dependance of 24 volt characteristic energy loss in gold is consistent with a simple Bohm-Pines approch, provided that a correction is made for finite energy resolution. General criteria are presented which can in principle select in any given case between the alternative mechanisms of collective excitation or one-electron excitation. UM TR 21. Contract Nonr-594(00), NR 017-610.

Automatic radar equipment used in conjunction with a Mark 37 director, Mark 1, Model 2 computer and a Mark 4 radar system, by Allen H. Schooley. U. S. Naval Research Laboratory. Nov 1942. 48p photos, fold diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120682

Report on tests of the Bell Laboratories and Arma Corporation. Unclassified 15 Dec 1953. 1. Radar - Tests. 2. NRL R 1955.

Causes for frequency instability in the type 1605 resonant cavities, by H. L. Wuerffel and L. Schlesinger. U. S. Naval Research Laboratory. Jun 1946. 18p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120724

1. Cavities, Resonant - Tests. 2. Frequency

stabilization - Measuring equipment 3. NRL R 2834.

Comparative consideration of performance characteristics of existing ultra-high frequency radio receivers, by S. H. Liebson. U. S. Naval Research Laboratory. Nov 1941. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 120677

Unclassified 15 Dec 1953.
1. Radio receivers (UHF) - Performance 2. Radio receivers (UHF) - Sensitivity 3. NRL R 1807.

Comparative operational tests of radar systems Mark 33, SO-7M, using various surface and aircraft targets, by Kenneth D. Miller, Jr. U.S. Naval Research Laboratory. Jun 1945. 42p photos, map, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122652

Unclassified 15 Dec 1953.
1. Radar - Tests 2. Radar - Tracking 3. Radar - Targets, Moving 4. NRL R 2569.

Comparison of jamming effectiveness of 200 megacycles of types AN/APT-1 and AN/APQ-2 airborne radar jammers, by W. F. Main and E. M. Lonsdale. U. S. Naval Research Laboratory. Apr 1945. 17p photo, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123358

Unclassified 15 Dec 1953.
1. Jamming transmitters, Airborne - Tests 2. Radar - Jamming equipment - Tests 3. NRL R 2502.

Comparison of performance of an CRD-2 DAU and FH 4 radio direction finders, by Earl H. Flath, Jr., and Willard C. Meilander. U. S. Naval Research Laboratory. Dec 1946. 51p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 123338

Unclassified 15 Dec 1953.
1. Goniometers 2. Radio direction finders - Evaluation 3. NRL R 2949.

Cone of silence tests at Knoxville, Tennessee, by D. M. Stuart. U. S. Civil Aeronautic Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1938. 10p graphs. Order from LC. Mi $1.80, ph $1.80. PB 123555

Reprinted 1940. Formerly Report no. 8, Safety and Planning Division, Bureau of Air Commerce.
1. Radio range - Tests 2. Recorders, Automatic - Use 3. Radio - Signals - Strength 4. CAA TDR 8.

Corrosion and fouling of sonar equipment, Part I, by J. W. Fitzgerald, M. S. Davis and B. G. Hurdle. U. S. Naval Research Laboratory. Mar 1947. 39p photos, drawing, diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 123395

1. Sonar - Communication equipment - Corrosion 2. Sonar - Communication equipment - Fouling 3. Corrosion - Prevention 4. Corrosion - Theory 5. Coatings, Corrosion resistant - Acoustic effects 6. Fouling - Prevention 7. Fouling - Acoustic effects 8. NRL S 2477

Development of "R" sweep for SC-1, 2, 3 and SK radar indicators, by E. E. Herman and R. E. Davis. U. S. Naval Research Laboratory. Aug 1946. 18p photos, diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 120766

1. Radar - Indicators - Tests 2. Radar - Range finders- Research 3. NRL R 2811

Diffraction by an aperture, II, by J. B. Keller, R. M. Lewis and B. D. Seckler. New York University. Institute of Mathematical Science. Division of Electromagnetic Research, New York, N. Y. Aug 1956. 42p diagrs, graph. Order from LC. Mi $3.30, ph $7.80. PB 125112

The field diffracted by an aperture of any shape is evaluated asymptotically for small wavelengths on the basis of several approximate diffraction theories. These are the Kirchhoff method, the two customary modifications of it, and W. Braunbek's new modification of this method. In each case a double integral over the aperture is evaluated asymptotically, and contributions from interior stationary points, edge stationary points, and corners of the edge are obtained. AD 98791. Part I issued as Research report EM-92. AF CRC TN 56-592. NYU RR EM-96.

Evaluation of model FSD frequency shift equipment for Naval use, by Malcolm F. Hodges. U. S. Naval Research Laboratory. Aug 1946. 67p photos, diagr, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 123337

1. Radio frequencies - Modulation 2. NRL R 2938. Unclassified 15 Dec 1953.

Experimental investigation of a dielectric-loaded corner-reflector antenna, by J. Y. Wong and E. V. Jull. National Research Council of Canada. Radio and Electrical Division. Nov 1955. 13p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122619

This report presents the results of an experimental investigation performed on a dielectric-loaded corner-reflector antenna. The structure consists of a 90-degree wedge-shaped cylindrical section of dielectric material located at the apex of a conventional corner-reflector. Curves are included to show the effect of the dielectric on the impedance and radiation characteristics of the antenna. In

addition to the experimental results, Kraus's calculations of input resistance have been extended to include the general case of a dipole antenna of arbitrary length. NRCC 3833. NRCC ERA 296.

Field and T-F emission, by Winthrop W. Dolan and Walter P. Dyke. Linfield College, McMinnville, Oregon. Jan 1957. 110p photos, diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $2.75. PB 131000

Field emission of electrons from metals has been investigated with respect to basic properties, control and stabilization of emission current, extension of useful life, and possible application to electronic devices. The stability of the cold cathode under steady applied fields has received special emphasis, and stable life has been extended in favorable cases to more than 1000 hours at currents in the range of ten to one hundred microamperes through control of environmental factors. Applications have progressed as far as the design and preliminary test of several devices utilizing the unique properties of field emission, including a rectifier, a transducer, and a voltage regulator. Collateral techniques such as emitter fabrication, electron microscopy, and vacuum practices have been refined and reduced to standard procedures. AD 118134. Project 4156, Task 41706. Summarizes research from 12 Oct 1952-11 Sep 1956 under Contract AF 33(616)-3247. AF WADC TR 56-578.

Final report on heat-storage cooling of electronic equipment, by J. Kaye, R. M. Fand, W. G. Nance and R. J. Nickerson. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Research Laboratory of Heat Transfer in Electronics, Cambridge, Mass. Feb 1957. 108p photos, drawings, diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $2.75. PB 121980

The feasibility of using non-expendable latent-heat sinks for protection of electronic equipment on high speed aircraft during cruise-dash-cruise flight conditions was investigated. Several hundred chemical compounds were considered for possible use as non-expendable heat sinks. Of these, a list of thirty possible compounds having the best combination of properties for the intended application was prepared. A study was also made of the methods of application of heat storage chemicals in various types of heat sinks. Advantages and disadvantages of each method was studied, considering transient heat flow in the heat storage substances. Typical pieces of electronic equipment were subjected to ambient temperature increases from $50^{\circ}F$ to $400^{\circ}F$ in a twenty minute period. The tests indicated that heat storage materials of the type considered would not adequately protect electronic equipment under the conditions stated. AD 97255. Project 6146, Task 61201. Contract AF 33(616)-2358. AF WADC TR 56-473.

Frequency translation by modulation of transit-time devices, by Raymond C. Cumming. Stanford University. Applied Electronics Laboratory, Standford, Calif. Aug 1955. 133p photos, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $ 21.30. PB 122990

For the purposes of this work a transit-time device is defined as a device in which each cycle of the carrier initiates a disturbance that propagates from the input terminal to the output terminal with a transit time τ. The transit time of a particular disturbance is determined by conditions which exist at the input terminal at the time the disturbance is initiated. The klystron and the traveling-wave tube are microwave electronic examples of such a transit-time device. A general spectrum analysis for combined transit-time modulation (TTM) and amplitude modulation (AM) is given. A corresponding analysis for combined phase modulation (PM) and amplitude modulation (AM) is presented, and the similarities and differences in the results of the two analyses are pointed out. SU AEL TR 39. AD70736. Contract N6 onr-25132, NR 373-362. Contract AF 33(600)-16080.

Heat treatment of cathode ray tube shields, by I. R. Kramer and L. M. Punsky. U. S. Naval Research Laboratory. Nov 1944. 24p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120755

1. Vacuum tubes, Cathode ray - Shields - Tests 2. Shielding, Electromagnetic - Tests 3. NRL M 2404.

Investigation of reduced voltage starting of motor generator set PU-219/TPS-10D, by Richard E. Bartow. U. S. Air Force. Air Research and Development Command, Rome Air Development Center, Griffiss Air Force Base, Rome, N.Y. Jul 1956. 31p diagr, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124857

1. PU-219TPS-10D (Motor generator set) 2. Generators, Engine driven - Starting 3. AF RADC TN 56-196. Project: SI( )E-2

Investigation of means to reduce or overcome effects of static, by P. M. Haffcke. U. S. Naval Research Laboratory. Oct 1935. 22p diagr, graph. Order from LC. Mi $2.70, ph $4.80.

1. Radio - Static 2. Radio receivers - Noise 3. Radio interference - Research 4. NRL R 1201.

Life test and application of low noise, S-band, traveling wave tube, by A. G. Hogg, M. Magid and F. R. Arams. Radio Corporation of America. Tube Division, Harrison, N. J. Oct 1955.

79p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 125155

1. Tubes, Traveling-wave - Design 2. Tubes, Traveling-wave - Life tests 3. Contract AF 19 (604)-1140, Final report 4. AF CRC TR 56-162.

Life tests on type 864 triodes, by C. H. Williams and J. T. Fetsch. U. S. Naval Research Laboratory. May 1935. 36p photo, fold graphs. Order from LC. Mi $3.00, ph $9.30. PB 122793

1. Vacuum tubes, Triode - Life expectancy
2. Vacuum tubes, Triode - Tests 3. NRL R 1157.

Mangin mirror, by R. C. Gunter, Jr., F. S. Holt, and C. F. Winter. U.S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Apr 1955. 38p photos, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 125236

A microwave antenna was designed on the principle of the Mangin Mirror optical system, a system that comprises a spherical reflector with an in-contact spherical corrector plate. Theoretical investigations were made by optical techniques. The overall aberration characteristics indicated that such a system is superior to either the paraboliod or the spherical reflector. AF CRC TR 54-111.

Measurement of characteristic impedance and attenuation of twisted pair transmission lines, by R. A. Gordon. U. S. Naval Research Laboratory. Aug 1935. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 122654

1. Radio transmission lines - Impedance - Measurements 2. Radio transmission lines - Attenuation - Measurements 3. NRL R 1187.

NEL reliability design handbook. Revised. U. S. Navy Electronics Laboratory, San Diego, Calif. Nov 1955. 282p photos, drawings, diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $3.00. PB 121839

This handbook is intended as a source of information on ways of achieving greater simplicity, economy, and reliability in electronics equipment developed for the Navy, and as a medium through which information on new materials, processes, and techniques, as well as design aids and reliability concepts can be disseminated. It is intended as a method of coordinating preferred circuits, construction techniques, design procedures, and application design data. The basic book will be enlarged and kept up to date by means of loose-leaf insertion sheets. In addition to NEL originated material, it will contain current reliability and standardization data from the Bureau of Ships, other government organizations, and contractors. Contains MIL-E-16400 (SHIPS) 15 Mar 1955: Military specification, electronic equipment, Naval ship and shore.

Nonmetallic ferromagnetic materials. Part VIII: Loss studies in ferrites, by Nathan Schwartz and Aaron P. Greifer. General Electric Company. Electronics Division, Syracuse, N. Y. Dec 1956. 36p graphs, table. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $1.00. PB 131052

The work presented in this report covers the investigation of losses and loss mechanisms at small signal levels for various ferrites. An evaluation of samples of known processing history is given, and initial results of a pressure, pellet-size study are indicated. The results of the study of the effects of humidity on apparent losses at low signal levels are also given. AD 110617. Project no. 4155, Task no. 41640. Covers work performed from Apr 1, 1943 to Oct 31, 1955 under Contract AF 33(616)-2009. AF WADC TR 56-274, Part 8.

Optimum design of common emitter transistor audio amplifiers, by L. M. Vallese. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Sep 1955. 26p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 123970

An analytical procedure of design of common emitter transistor audio amplifiers is given. The conditions of optimum design for maximum power output are derived for resistance-capacitance and transformer coupled amplifiers, taking into consideration the limitations of the collector characteristics. Finally the distortion due to nonlinearity of the collector characteristic is computed. PIB 366. PIB R-434-55. Contract Nonr-839(05) NR 375-216.

Production and standardization of electromagnetic waves within shielded rooms, by K. O. Hornberg. U. S. Naval Research Laboratory. May 1945. 33p drawing, diagrs, graphs. Order from LC. Mi $3.00, ph $6.30. PB 123381

1. Waves, Electromagnetic - Measurement
2. NRL R 2536

Pulse "Phantom" target for use with radar and IFF equipment by F. C. Isley and J. E. Stankey. U.S. Naval Research Laboratory. Oct 1942. 14p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120681

1. Radar - Targets - Design 2. Radar, IFF - Targets - Design 3. NRL R 1943

Quarterly progress report no. 14, May 1, 1956 - Aug 1, 1956 under Contract AF 18 (600)-497. Duke University. Dept. of Physics. Microwave Laboratory. 1956. 37p drawing, tables. Order from LC. Mi $3.00, ph $6.30. PB 123417

AD 87515. (Technical report 1). Project R-357-10-6. Contents: Papers published. - Abstracts of current projects. - Technical reports: Spectra of some symmetric -top molecules in the one to four millimeter wave region, by Charles A. Burrus and Walter Gordy. - Millimeter wave spectrum, by Gunnar Erlandsson. -Millimeter wave spectrum of formaldehyde, by Gunnar Erlandsson. AF OSR TN 56-202.

Radar mapping of the Chicago-New York airway, by R. C. Bordon and E. C. Williams. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1950. 11p photos, maps, tables. Order from LC. Mi $2.40, ph $3.30. PB 122301

1. Airways - Mapping - Radar 2. Mapping, Aerial 3. CAA TDR 66

Reflection of an acoustic stepwave from an elastic cylinder, by Richard Skalak and Morton B. Friedman. Columbia University. Dept. of Civil Engineering and Engineering Mechanics, New York, N. Y. Jun 1955. 27p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 124099

An elastic cylinder, circular in section and infinite in length, is considered in an infinite acoustic fluid. The object of this paper is the determination of the reflected and diffracted pressure fields at large distances due to a plane step wave of pressure impinging on the cylinder and moving in a direction normal to the axis of the cylinder. A formal solution is obtained for the general case of an elastic cylinder, but numerical results are computed only for rigid, fixed and rigid, floating cylinders. Two different methods are used to achieve results in different ranges of the time which are of interest. A short time approximation is developed by the use of a double integral transform method. A mode approach and a single integral transform are used for later times. The results show that the reflected pulse decays quickly, within a time on the order of the transit time of the original wave across the cylinder. CU-1-55 ONR-266(27)-CE. Technical report no. 1 under Contract Nonr-266(27), NR 385-411.

Research services employing gold-bonding techniques, by John Levinson. Transistor Products, Inc., Waltham, Mass. 1955. 155p photos, diagrs, graphs (part fold). Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $3.00. PB 121742

Characteristics of some 700 transistors made by the techniques developed are given. A separate section deals with frequency of alpha cut-off. It is shown that with the present geometry of the bonds, cut-off frequencies of the order of 100 kc/sec are to be expected. Suggestions are made as to how the characteristics might be improved. Project 56-640-521. For previous reports see PB 111669 and 113297. AF CRC TR 55-174.

Results of engineering tests of model AN/ARC-13 (XN-1), serial #1, UHF communications transmitter and receiver, by V. O. Smallwood and R. C. Miedke. U. S. Naval Research Laboratory. Sep 1946. 73p graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 122766

1. Radio transmitters (UHF) - Tests 2. Radio receivers (UHF) - Tests 3. NRL R 2966

Retest of preliminary model of class IV radio receiving equipment, consisting of one RAG-1 receiving equipment, one RAH-1 receiving equipment and one type CHS-23067 control unit, by J. H. Gough, S. A. Greenleaf and George A. Lyle. U. S. Naval Research Laboratory. Jul 1935. 63p tables. Order from LC. Mi $3.90, ph $10.80. PB 122668

1. Radio receivers - Tests 2. NRL R 1178

Scattering by a small conducting prolate spheroid, by Raymond Justice. Ohio State University. Dept. of Electrical Engineering. Antenna Laboratory, Columbus, O. Aug 1956. 83p. Order from LC. Mi $4.80, ph $13.80. PB 124716

Among the problems in diffraction theory for which a rigorous solution is being sought one is that of finding the scattered field when a plane wave is incident upon a spheroid. Several methods of obtaining solutions to such problems have been proposed in recent years. The purpose of this paper is to examine two of the proposed methods and to use them to obtain third-order approximations to the field scattered by a perfectly conducting prolate spheroid illuminated by a plane electromagnetic wave. AF CRC TN 56-750. AD 98804. Report 678-2. Contract AF 19(604)-1725.

Secondary electron current from a pulsed electron accelerator, by A. E. Evans, Jr., D. V. Breitenbecher, D. W. Cady and L. L. Antes. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1956. 20p photos, diagrs, graphs. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. 50 cents. PB 121757

A 2 Mev electrostatic accelerator with a .06 microsecond pulsed electron source was found to produce radiation afterpulses occurring as late as 150

microseconds after cessation of the source pulse. The rate of afterpulsing was roughly proportional to the pressure in the acceleration and drift tube for pressures up to 5 x 10^{-5}mm of mercury and rose more steeply at higher pressures. The decay curve of the delayed radiation was independent of the target material and the type of detector used to study it. The energy spectrum was continuous, with an average energy less than that of the bremsstrahlung pulse. The cause of the effect has been determined to be ionization in the drift tube by the primary electron beam. The mechanism for formation of the afterpulses and the instrumentation for their study are discussed. AD 110486. Project 7630, Task 70835. AF WADC TR 56-463.

Simple method of calculating electrostatic capacity, by C. J. Bouwkamp. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Jun 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 124868

The purpose of this note is to draw attention to a simple application of the general theory of images by means of which it is easy to determine the electrostatic capacity of certain conducting surfaces with respect to infinity. UC IER Series 60, Issue no. 138. Contract N7 onr-29529, Report no. 12.

Some new high-frequency equivalent circuits for junction transistors, by R. M. Scarlett. Stanford University. Electronics Research Labora- Stanford, Calif. Mar 1956. 94p diagrs, graphs, tables. Order from LC Mi $5.40, ph $15.30. PB 125569

This report is concerned principally with the characterization of junction transistor triodes at high frequencies by means of small-signal equivalent circuits and associated four-pole parameters. Contract N6 onr 251(07), NR 373-360.

Synthesis of Chebyshev impedance matching networks, filters, and interstages, by George L. Matthaei. Calif. University. Div. of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Jun 1955. 64p diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 124870

Work of R.M. Fano on the theoretical limitations of broadband impedance matching it utilized to give a straight-forward procedure for synthesis of optimum, lossless, Chebyshev, wideband impedance matching networks for various classes of loads. Procedures are described and examples are presented for low-pass, high-pass, and band-pass matching network design for use with specified loads so as to meet prescribed band-width and reflection coefficient magnitude specifications. The design procedure is greatly simplified by the use of tablated reflection coefficient polynomials each of which is a function of frequency p and a design parameter. The application of this procedure to Chebyshev filter and vacuum-tube amplifier interstage design is also discussed. UC IER Series 60, Issue no. 139.

Television research and the study of man, by Ken Thomas. U. S. Office of Naval Research. Training Devices Center. Port Washington, L. I. N. Y. Oct 1956. 46p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125179

Appendix A-C: Photos and diagrams. - Appendix D, Part 1. Use of television by the biological research organization. - Part 2. Televising with the microscope. - Part 3. Color television of microcirculation. - Part 4. Preliminary report on biological applications. This is a report on the four-year television project of the U.S. Naval Training Device Center and the National Institutes of Health, with summaries of other research activities in instructional medical television. NAVEXOS P-1552.

Test of frequency control device, by L. C. Young. U. S. Naval Research Laboratory. Mar 1934. 22p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120639

1. Radio frequencies - Control equipment - Tests 2. NRL R 1039.

Test of models RAA and RAB receiving equipments, Warren B. Burgess. U. S. Naval Research Laboratory. Mar 1934. 41p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120636

1. Radio receivers - Tests 2. NRL R 1030

Test of the re-submitted preliminary model LD-1, combined heterodyne frequency meter and crystal controlled calibrator, range 100-5000 kcs for A. C. operation, by R. B. Owens. U. S. Naval Research Laboratory. Mar 1934. 9p tables. Order from LC. Mi $1.80, ph $1.80. PB 120640

1. Meters, Frequency - Tests 2. Calibrators - Tests 3. NRL R 1041

Tests of reflecting material as a radar counter measure, by L. V. Blake. U.S. Naval Research Laboratory. Mar 1943. 18p photos, tables. Order from LC. Mi $4.50, ph $12.30. PB 120685

1. Radar - Countermeasures - Tests 2. Radar - Signals - Reflection 3. NRL R 2022

Time-domain compensation for closed-loop systems by a delay line method, by Yu-Chi Ho. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jan 1955. 36p photos, diagrs, graphs, tables.

Order from LC. Mi $3.00, ph $6.30.
PB 123218

This report presents a new approach to the synthesis and analysis of closed-loop systems in the time domain. In general, it investigates the effect of the discrete filter in compensating for feedback systems, and its resultant transient response. The basis of this method is analyzed in terms of servo and network theory. Several methods are presented for calculating the closed-loop response of the compensated system. A specific example is designed according to the procedure and its transient response calculated. MIT RLE TR 288.

Waveguide rotating joint for X-bl band, by Cornell H. Mayer. U. S. Naval Research Laboratory. Jul 1945. 8p photo, diagr. Order from LC. Mi $1.80, ph $1.80. PB 122787

Unclassified 15 Dec 1953. 1. Wave guides - Joints 2. Radar - Bands X 3. NRL R 2593

Generators, Motors, Transmission

Cascade backward-wave amplifier with drift tube or third helix transducer, by Howard R. Jory. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Dec 1955. 44p drawing, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80.
PB 122893

This paper deals with a composite form of the backward-wave amplifier in which energy is transferred from a circuit wave to an electron beam by one helix and reconverted again to a circuit wave by a second, isolated helix. In between the input and output helices, there can in general be a "transducer " used to make any changes in the beam modulation which may be desired. Theoretical analyses and experimental results are given for the two cases of a drift-tube transducer and a helical transducer. UC IER Series 60, Issue no. 153. Contract AF 33(616)-495.

Experimental two-helix backward wave mixer, by Glenn A. Gray. California. University, Berkeley, Calif. Mar 1957. 24p drawing, diagrs, graphs. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. 75 cents. PB 131022

This report describes the results of an experimental study of a backward-wave mixer tube utilizing a backward-wave oscillator. Two questions are considered: First, can low conversion loss be obtained by using a high-impedance output gap and sufficient start-oscillation separation between circuits; second, can a low noise mixer be obtained by using a properly designed low noise gun. AD 118187. Project 4156, Task 41570. For previous study see PB 123917. AD WADC TR 56-612. Contract AF33 (616)-3278.

Vibration, shock and salt spray tests of 5, 10, and 25 watt Diehl and 5 watt Blake low inertia A-C servo motor, by H. M. Ikerd. U. S. Naval Research Laboratory. Aug 1946. 11p photos. Order from LC. Mi $2.40, ph $3.30.
PB 123339

Unclassified 15 Dec 1953. 1. Motors, Servo - Tests 2. NRL R-2590

FOOD AND KINDRED PRODUCTS

Flavor changes induced by radiation sterilization. Final report under Contract DA19-129-QM-387 for the period 19 May 1955-30 June 1956, by Fred E. Littman and A.P. Brady. Stanford Research Institute, Menlo Park, Calif. Aug 1956. 65p photo, drawings, diagr, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $1.75. PB 121925

The results of the investigation described in this report indicate that a study of the action of individual free radicals on aqueous solutions of food components is capable of providing much detailed information concerningthe mechanism by which off-flavors are formed. It seems likely that only when these mechanisms are known will it be possible to take effective steps to prevent the formation of these flavor changes. Project 7-84-01-002. S-526, Report no. 8 (Final). SRI Proj. SU-1386.

Logistic and economic feasibility study on radiation sterilization of foods, by R. J. Beeley, J. C. Dillion, R. J. Mikell, C. O. Reiser and E. C. Turner. North American Aviation, Los Angeles, Calif. Sep 1956. 125p drawings (part fold), diagrs, graphs, tables. Order from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D.C. $3.25. PB 121961

The purpose of the study was to survey all of the known radiation sources of sufficient size to be of interest in large-scale radiation processing, to determine the most economic radiation source for this purpose. The sources considered in this study are the following: 1. Spent reactor fuel elements. 2. Fission-product gases from a fluid fuel reactor 3. Separated fission-product cesium - 137 4. Reactor coolant sodium - 24 5. Neutron-activated indium - 116 6. Charged-particle accelerators 7. X-rays. Final report under Contract DA 19-129-QM-491 for the period 28 Jun 1955-28 Aug 1956. Project 7-84-01-002. S-543-Rpt #6.

FUELS AND LUBRICANTS

Cool flame phenomenon in the combustion of acetylene, by W. W. Robertson and F. A. Matsen. Texas. University. Dept. of Chemistry, Austin, Tex. Jun 1956. 6p graphs. Order from LC. Mi $1.80, ph $1.80. PB 124845

Ignition limits are determined on adding small concentrations of oxygen to heated acetylene in a flow system. A "cool flame" is observed when the reactor contains fresh carbon. AF OSR TN 56-299. Technical note 28. AD 90011. Contract 18(600)-430

Effects of nuclear radiation on military specification greases, by William L. R. Rice. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1956. 29p tables. Order from OTS. 75 cents. PB 121914

A portion of the Air Force effort toward the development of nuclear radiation resistant lubricants is devoted to an evaluation of the effects of gamma radiation on available specification and non-specification greases. Data are presented on the effects of gamma radiation on forty-seven greases. Many of the greases tested appear to be satisfactory for use after exposure to about 1×10^8 roentgens, the screening dosage used for these studies. AD 110644. Project 1252, Task 73023. Covers work from Jan 1955 - Aug 1956. AF WADC TR 56-430, Part I.

Evaluation of dry-film lubricant coatings, by William C. Hart and Bernard Rubin. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Sep 1954. 29p photo, graphs, tables. Order from OTS. 75 cents. PB 121922

The endurance and load-carrying capacity of commercial and experimental dry-friction reducing films have been investigated at low surface rubbing speeds in the Falex Lubricant Tester. This investigation indicates that the most successful types of dry film lubricants have excellent extreme pressure properties and good anti-wear properties for plain bearing applications at low speeds. Baked resin-bonded films have endurance life superior to air-drying spray and dip coatings. The endurance life and load-carrying ability of dry film lubricants is dependent upon the resin-bonding agent and pretreatment of the metal surface prior to application of the film. AF WADC TR 53-466, Part I.

Heat capacities of synthetic engine oils and lubricants, by Hyman Marcus. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Apr 1957. 14p photos, graphs, Order from OTS. 50 cents. PB 131038

A modified adiabatic type calorimeter, previously designed, built and calibrated (Rev. Sci. Instr 27, p 948, 1956), was used in the measurement of the heat capacities. The variation of the heat capacity as a funcition of temperature was determined for eleven synthetic fluids conforming to Military Specification MIL -L -7808 and the data are presented graphically. The expressions for the heat capacity were derived from a least squares statistical analysis of the time-temperature data and an attempt was made to develop a heat capacity envelope of all the data obtained and calculate a median curve. No comparison or analysis was made of each set of individual data nor were any of the data identified with individual products measured. Project no. 7360, Task no. 73603. Covers period of work from Jan 1955 to July 1956. AD 118225. AF WADC TR 57-38.

High temperature antioxicants for synthetic base oils. Part VII: Evaluation of anti-oxidants in synthetic fluids, by James W. Cole, Jr. Virginia. University. Cobb Chemical Laboratory, Charlottesville, Va. Jan 1957. 83p graphs, tables. Order from OTS. $2.25. PB 121990

The object of this work is the evaluation of selected additives as antioxidants and oxidation inhibitors for non-petroleum base lubricating and hydraulic fluids in the range 400° to 700°F. The emphasis in this report is on the further examination of selected amines in methyl phenyl silicones, chlorophenyl silicones, and a tetrakis-n-dodecyl silane in the presence of aluminum, silver, copper, stainless steel and titanium. Some studies with selected additives in a pentaerythritol ester and in bis-(1-methyl cyclohexylmethyl) sebacate in the range 400°-500°F showed the same general oxidative phenomena as previously described with five chlorophenyl phosphate fluids in the range 600°-700°F. No additive was found which inhibited oxidation in the presence of metals. AD 110728. Project 7331, Task 73313. Covers work from Oct 1955 - Oct 1956. For Parts 1-5 see PB 121077-121081; Part 6 will not be released. Appendix A. Tables of oxidation data. Appendix B. -Code numbers, formulas and sources of supply of additives and fluids. Contract AF WADC TR 53-293, Part VII.

High temperature evaluation of antioxidants in diester base fluids, by Howard D. C. Hill. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1957. 20p tables. Order from OTS. 50 cents. PB 121991

This study was initiated to evaluate various organo-selenium, organo-sulfur, and organo-nitrogen additives as oxidation inhibitors in diester base fluids. Samples of these materials were submitted to oven storage at 350°F for a period of eight (8) days after which evaporation losses, change in viscosity, and sludge content were determined. A temperature of 350°F was selected as representing the upper temperature limit of a -100° to 350°F grease requirement for which the additives were evaluated. AD 110664. Project 3044, Task 73314. Covers work from Feb-Apr 1955. AF WADC TR 55-385.

Ignition and combustion research, by Abbott A. Putnam., Gail M. Clough, William R. Dennis and others. Battelle Memorial Institute, Columbus, Ohio. Dec 1956. 98p photos, drawings, graphs, tables. Order from OTS. $2.50. PB 121892

Contents: Part I. Review of previously published work. Sec. 1. Burning characteristics of fuel mists, by J. L. Harp and J. M. Pilcher. - Sec. 2. Aerodynamic conditions affecting blow-off of burners, by A. A. Putnam. - Sec. 3. Studies of the nature and suppression of acoustical oscillations in burners, by A. A. Putnam. - Sec. 4. The effect of imposed physical influences on the combustion process, by A. A. Putnam. - Sec. 5. Ignition processes, by A. E. Weller. - Sec. 6. A study of transverse modes of oscillation in an acoustically closed combustion system, by Gail M. Clough. - Sec. 7. The effect of grid generated turbulence on flame propagation, by M. J. Kenworthy. - Sec. 8. High temperature kinetics of the hydrogen-bromine reaction, by Arthur Levy and J. F. Foster. AD 110681. Project 5-(3-3012), Task 70334. For earlier reports see PB 121442 and 121794. Contract AF 33(038)-12656. AF WADC TN 56-206.

Physical and chemical laboratory evaluation of experimental silicate base high temperature hydraulic fluids. Part IV: MLO 8200, by H.M. Schiefer and R. J. Benzing. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1957. 22p graphs, tables. Order from OTS. 75 cents. PB 131042

A physical and chemical evaluation has been conducted on an experimental high temperature hydraulic fluid, MLO 8200, which has a disiloxane base fluid. It was evaluated against the requirements of Specification MIL-H-8446 (USAF) and for higher temperature applications to 550°F. It passes all the requirements of MIL-H-8446 with the exception of rubber swell. Some additional tests were performed on this fluid which indicated that, as for other silicate fluids tested, the hydrolytic stability at 400°F seems to be one of the major deficiencies of this type of fluid. AD 118123. Project 7331, Task 73313. Covers work from Sep 1954-Aug 1956. AF WADC TR 55-89, Part 4.

Sonic shear method for determination of shear breakdown on hydraulic fluids and lubricating oils, by A. J. Gironda, Earl B. Essing, and Bernard Rubin. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1955. 24p photos, graphs, tables. Order from OTS. 75 cents. PB 131012

A procedure has been devised which, within short test periods, will evaluate the shear stability of hydraulic fluids and lubricating oils containing polymeric materials. This procedure utilizes the Raytheon, 10KC, magnetostrictive oscillator model DF-101. The test fluids are subjected to sonic vibration for a specified length of time, after which viscosity measurements are taken in order to determine the extent of molecular decomposition. Data of typical shear-time relationship of several hydraulic fluids are presented. AD 73857. Project 7331, Task 73313. AF WADC TN 55-62.

Study of ultra high temperatures. Technical note no. 2: Hydrogen cyanide-fluorine-oxygen flame, its combustion products, flame temperatures and burning velocities, by Charles S. Stokes. Temple University. Research Institute, Philadelphia, Pa. Nov 1956. 31p diagr, graphs, tables. Order from OTS. $1.00. PB 121928

Hydrogen cyanide, fluorine and oxygen are available in quantity and a flame of these constituents produces a temperature of approximately 4000°K. Hydrogen cyanide and a fluorine-oxygen mixture of 1:1 molar ratio has been successfully premixed in all concentrations. Burning velocities have been measured an compared to the hydrogen cyanide oxygen flame. Project no. 7-7968. AD 110-323. Contract AF 18(600)-1475, Technical note no. 2. AF OSR TN 56-508.

INSTRUMENTS

Deceleration probe for measuring stagnation pressure and velocity of a particle-laden gas stream, by Jules L. Dussourd and Ascher H. Shapiro. Massachusetts Institute of Technology. Department of Mechanical Engineering. Gas Turbine Laboratory. May 1955. 36p photo, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124068

1. Probes - Design 2. Aerosols - Particle size - Measuring equipment - Design 3. Aerosols - Particle size - Filtration 4. Gas flow - Measuring equipment 5. Gas pressure - Measuring equipment 6. Particles - Velocity - Measuring equipment 7. Contract N5 ori -07878. Aerothermopressor project. DIC-5-6985. Based on a thesis submitted by Jules L. Dussourd.

Elements of instrumentation: III. Magnetic field transducers, by K. S. Lion and D. A. Berkowitz. Massachusetts Institute of Technology. Laboratory for Applied Biophysics and Instrumentation Laboratory, Cambridge, Mass. Mar 1956. 75p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 125906

For Parts 1-2 see PB 121296 and 123905. 1. Instruments, Electric - Design 2. Transducers, Inductance - Design 3. Transducers, Magnetic 4. Coils-Magnetic field 5. Resonance, Magnetic - Absorption 6. Resonance, Nuclear - Measurement 7. Contract N5 ori 07882, NR 011-705 8. MIT LAB TR 4

Expander-compressor method of air cooling, by R. S. McDonald. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Dec 1954. 21p diagrs. Order from OTS. 75 cents. PB 121926

A method of air cooling is proposed whereby the temperature of air is reduced by expanding it adiabatically through an expansion turbine. Air thus cooled can be introduced into the conditional space as conditioning air, or, if the air is maintained in a closed system, it may be used in an intercooler to cool conditioning air. Various cycle systems are presented and briefly investigated. CAL HG-591-S-2.

Gage for measuring the thickness of paint or any insulating material which overlies a non-magnetic metal, by J. E. Dinger. U. S. Naval Research Laboratory. May 1943. 17p photo, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120624

1. Gages, Thickness - Performance 2. Instruments, Measuring - Coatings - Thickness 3. Coatings, Insulating - Thickness - Measuring equipment 4. NRL O 2057

Hidden oscillations in sampled-data control systems, by E. I. Jury. California. University. Electronics Research Laboratory. Division of Electrical Engineering, Berkeley, Calif. Dec 1955. 20p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122230

Oscillations between sampling instants in the response of sampled-data control systems imposed certain limitations on the z-transform method and other methods available for synthesis of such systems. It is shown that these oscillations appear in the response because of certain forms of the open loop transfer function G(s). Theorems relating to initial and final values of the response in the form of modified z-transform has been presented. Two examples have been discussed in which such oscillations occur and the modified z-transform method has been applied in their analysis. UC IER Series 60, Issue no. 155. AF OSR TN 56-24. Contract AF 18(600)-1521.

Precision instruments for calibrating radiometers at 4.3 millimeters wavelength, by Arthur I. Reynard. U. S. Naval Research Laboratory. May 1957. 15p photos, drawing diagrs. Order from OTS. 50 cents. PB 121947

With the advent of the 4.3-mm wavelength radiometer, it became necessary to develop precision instruments for calibrating the radiometer. The major components consist of a hot load, discharge tube, waveguide switch, and precision attenuator. These instruments have performed well in laboratory applications and in routine use. It is believed that they represent a step forward in precision instrumentation at millimeter wavelengths. NRL R 4927.

Study of the utilization of a solar furnace for high temperature research on solids. Final summary report under Contract AF 18(600)-1499, by Thomas E. Tietz and Nevin K. Hiester. Stanford Research Institute, Menlo Park, Calif. Sep 1956. 10p. Order from OTS. 50 cents. PB 121930

The general objective of the project was to study the application of solar furnaces for research on solids at elevated temperatures. Thoretical and experimental studies, design study and cost estimates have been reported in detail in five technical reports, which are summarized in this final report. AD 115011. Report 9. For Technical reports I and II see PB 122883 and 124331. Contract AF 18(600)-1499. AF OSR TR 56-56. SRI Proj CU-1410.

Ultrasonic flaw plotting equipment, a new concept for industrial inspection, by Ross W. Buchanan and Carlton H. Hastings. U. S. Arsenal, Watertown, Mass. Jul 1955. 45p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 125645

A thorough evaluation of an equipment for ultrasonic inspection of materials has been accomplished. The equipment utilizes novel design features in ultrasonics and electronics to present usable information for material soundness evaluation by an inspector. WAL R 143/28. Dept. of the Army project no. 593-08-022. Office of Ordnance research project no. TB4- 210.

Variable temperature chambers, by M.C. Andrews, A. S. Chodakowski and E. K. Weise. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. May 1956. 9p drawings. Order from LC. Mi $1.80, ph $1.80. PB 122965

The construction of two different temperature chambers, which were built for measurements of Hall effects and magnetic susceptibilities on semiconducting materials, is described. The temperature range covered was from lower than -190°C up to

200°C. ILU EES TN5. AF OSR TN56-206. OSR project 52-670A-85. AD 87520. Contract AF 33 (038)-12644.

MACHINERY

On the theory of replacement of machinery with random failure time, by George H. Weiss. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Mar 1956. 25p graphs. Order from OTS. 75 cents. PB 121424

Dept. of the Army project no. 5B030-6002. Ordnance research and development project no. TB3-0007. This paper analyzes the effect of recurrent replacements on the expected time-to-failure of individual components or groups of components. Specifically the recurrent replacements will be of two types; strictly periodic replacement and random replacements. The latter type of replacement is most applicable in the servicing of aircraft where parts cannot be replaced in mid-flight, or in general, whenever the work cycle of a given device is variable, and the device cannot be replaced in mid-cycle. APG BRL M982.

Performance of 110-millmeter-bore M-1 tool steel ball bearings at high speeds, loads, and temperatures, by William J. Anderson. U. S. National Advisory Committee for Aeronautics. Jan 1957. 38p photos, diagrs, graphs, tables. Order from National Advisory Committe for Aeronautics, 1512 "H" Street, N. W., Washington 25, D.C., as TN 3892. PB 124435

Eleven bearings lubricated with a synthetic of the diester type were run at speeds to 14,000 rpm and bearing temperatures to 678°F. Eight bearings failed in fatigue indicating that the fatigue life of M-1 bearings might be much shorter than the life (based on catalog ratings) of SAE 52100 bearings lubricated with mineral oil. Iron-silicon bronze and silver-plated iron-silicon bronze cages showed negligible wear, but the silver plate showed some tendency to blister and peel. Cast inconel coated with nickel oxide was not a satisfactory cage material at these temperatures and speeds. NACA TN 3892.

Survey on vibration and shock isolation, by J. A. Macinante. Australia. Commonwealth Scientific and Industrial Research Organization. National Standards Laboratory, Sydney, Australia. 1955. 44p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122886

The published information on the theory and practice of vibration and shock isolation is critically surveyed, and the important results and conclusions are presented. Although the prime object is to offer guidance in the solution of particular vibration problems which occur in engineering works and laboratories, the survey might serve also to stimulate further investigation. A general procedure is suggested for the design of vibration-isolating mountings, the properties of the available isolating materials are discussed, and particular cases dealt with include engines, machinery, machine tools, instruments, vehicle-borne equipment, and structures. AUS CSIR NSL TP 7

MEDICAL RESEARCH AND PRACTICE

Bacteriologic diagnosis of acute diarrheal diseases, by Albert V. Hardy, Nathan J. Schneider and Ronald B. Mitchell. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. May 1956. 16p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124538

This practical laboratory guide for the isolation of Shigella and Salmonella from feces is designed for technicians with limited professional training in microbiology. Introductory sections summarize the etiology of acute diarrheal diseases and present the general characteristics of Shigella and Salmonella. The technical instructions cover the collection and /or submission of specimens, microscopic examination, inoculation of media, picking colonies, screening reactions on triple sugar agar and other media, and presumptive serologic and biochemical tests. A reasonable division of work between small field or hospital laboratories and larger central or reference laboratories is indicated. Details of the technic of sensitivity testing, with emphasis on rapid test procedures, are given. AF SAM R 56-36.

Blood volume and cardiac output determinations using radioisotopes, by Robert E. Zipf, Joe M. Webber, G. Richard Grove and Terence F. McGuire. Miami Valley Hospital. Dept. of Research, Dayton, O. and U. S. Air Force. Air Research and Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Nov 1956. 35p graph, tables. Order from OTS. $1.00. PB 121984

This report includes the methodolgy of performing the blood volume and cardiac output with intravenous radioiodinated human serum albumin (RISA). The results and accuracy of both tests are submitted. AD 118056. Project 7160, Task 71812. Covers work from 10 Nov 1954 through 31 Dec 1955 under Contract AF 33 (616)-2756. Section I of this report has been published under the title "The application of the gravimetric technique to the simultaneous determination of plasma volume using radioiodinated human serum albumin and red cell mass using sodium radiochromate" in the American Journal of Clinical Pathology, 26: 87-494, May 1956. AF WADC TR 56-574.

Effect of reduced food intake on the hyperlipoproteinemia of local radiation injury, by Norman Weiner, Lawrence J. Milch and Gordon E. Shults. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. May 1956. 4p tables. Order from LC. Mi $1.80, ph $1.80. PB 124535

The possible effect of voluntary food reduction on the hyperlipidemia and weight loss produced in rabbits after acute local radiation injury was investi gated. Pair-fed controls did not develop significantly elevated plasma lipid and lipoprotein levels and did not lose weight, as did their injured mates. AF SAM R 56-18.

Influence of total body X-irradiation and immunization on intracellular digestion by peritoneal phagocytes, by David M. Donaldson, Stanley Marcus, Ko Ko Gyi and Eugene H. Perkins. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Mar 1956. 12p photo, tables. Order from LC. Mi $2.40, ph $3.30. PB 124536

In vitro tests carried out in the presence of serum from immunized and immunized, irradiated rabbits revealed that the beneficial effect of immunization and the detrimental effect of irradiation on phagocyte digestion are due to alterations in the phagocytic cell. AF SAM R 56-8.

Measurement of intrapleural pressure at different points in the chest of the dog, by Leon Farhi, A. B. Otis and D. F. Proctor. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1956. 8p photo, drawing, graph, table. Order from LC. Mi $1.80, ph $1.80. PB 124531

The results of this study showed that intrapleural pressures measured directly at various points between the third and eighth interspaces did not vary by more than 1 cm. of water. With a small pneumothorax, measurable pressure changes were produced at all points on the same side of the chest, and, to a lesser extent, on the opposite side. It can be concluded that intrapleural pressure measurements from a single point give an estimate that is sufficiently accurate for most studies concerned with the mechanics of breathing. AF SAM R56-27.

Response of the pituitary-thyroid system of the guinea pig to low environmental temperature, by C. E. Stevens, S. A. D'Angelo, K. E. Paschkis, A. Cantatow and F. William Sunderman. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1956. 12p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124533

Adult female guinea pigs were exposed to lowered environmental temperatures for 1 to 11 weeks. Histologic activation of the thyroid and increased blood TSH were found after one week. Longer exposure produced an increase in TSH in the pituitary, accompanied by increased numbers of hypertrophied basophils containing increased amounts of glycoprotein granules. Oxygen consumption increased; this response was largely abolished by thyroidectomy. The rate of release of thyroidal radioiodine was increased, although the serum PBI and the 24-hour radioiodine uptake by the thyroid were not altered. These data indicate that heat production in the cold-exposed guinea pig is maintained primarily by activation of the pituitary-thyroid system, with augmentation of secretion of thyrotrophic and thyroid hormones. AF SAM R 55-21.

Some mechanical factors influencing intrapulmonary distribution of respired gas, by Colin B. McKerrow, Arthur B. Otis, Richard Bartlett and Bruce Armstrong. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1956. 34p photos, diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 124539

A theoretical analysis of a simple analog of a pulmonary pathway consisting of a compliance and resistance in series is presented. The behavior of a system consisting of two such pathways connected in parallel is predicted theoretically and illustrated by experiments with a mechanical model. It is shown that unless two such pathways have similar mechanical properties they will not only have differing tidal volumes but will also ventilate out of phase with each other to some degree. A few experiments with human subjects are also described. It is suggested that uneven pulmonary ventilation may have its basis in local differences in the mechanical properties of the lungs. AF SAM R 55-117.

METALS AND METAL PRODUCTS

Creep behavior of magnesium alloys, by G. W. Pearsall and C. S. Roberts. Dow Chemical Company, Midland, Mich. Dec 1956. 34p photos, graphs, tables. Order from OTS. $1.00. PB 121977

An orientation relationship was established between precipitate and matrix in a Mg-0.7 Ce alloy. The general creep behavior of Mg-Al and Mg-Th alloys were studied. The major effect of aluminum appeared to be intragranular strengthening while thorium, in the form of a Mg-Th precipitate, hindered grain boundary migration. The effects of prestrain, preferred orientation and creep test interruption on creep behavior were also studied. The case of tertiary creep in sublimed magnesium was investigated, using metallography and specific volume measurements. At 400°F, tertiary creep could be attributed either to cracking or inter-

granular cavitation, depending on strain rate. Tertiary creep was not observed at room temperature. A possible explanation for these observations is discussed. AD 11072. Project 7351, Task 70608. Contract AF 33(616)-2511. AF WADC TR 56-456.

Design properties of high strength steels in the presence of stress concentrations. Part I: Dependence of tension and notch-tension properties of high-strength steels on a number of factors, by B. B. Muvdi, G. Sachs and E. P. Klier. Syracuse. University, Sycracuse, N. Y. Dec 1956. 66p diagr, graphs, tables. Order from OTS. $1.75. PB 121847

This report presents the results of tension and notch-tension tests performed on hot rolled sections from commercial, electric furnace heats of 4340, V-Mod. 4330, 98B40, Tricent (Inco), Super Hy-Tuf, Hy-Tuf and Super TM-2 steels. Tension tests were conducted on 0.28 in. dia. specimens. An exception was a single test completed on a smooth 0.9 in. dia. 4340 steel specimen in order to examine the effect of of section size on the tension properties of this steel. Notch-tension tests were performed on 0.3, 0.5 and 0.9 in. dia. specimens that were heat treated to strength levels ranging between 180,000 and 300,000 psi approximately. These specimens were provided with notches leading to stress-concentration factors, K, or 3, 5 and 10. In both instances (tension and notch-tension tests) longitudinal and transverse specimens were examined. Information from the literature pertaining to the effects of as-processed section size is considered and evaluated. The notch strength decreased with increase in stress concentration, specimen diameter and as-processed section size. It also decreased as the specimen orientation was changed from longitudinal to transverse. AD 110637. Project 7360, Task 73605. Covers work from 1 Sep 1955 - 31 Aug 1956 under Contract AF 33(616)-2362, Supplemental agreement 4(56-445). AF WADC TR 56-395 Part 1.

Development of friction-seal materials for high temperature-high speed operation, by Peter F. Mataich. Horizons, Inc., Cleveland, O. Feb 1957. 24p photos, drawing, diagr, graph, table. Order from OTS. 75 cents. PB 121944

A study was made in an attempt to find materials suitable for use as friction seals under conditions of high temperature and high rubbing speeds. A special test rig for screening the materials under simulated operating conditions was designed and constructed. It was found that the group of materials evaluated in the present program showed excessive wear under the severe operating conditions required. This excessive wear was attributed to the excessive temperatures reached at the mating surfaces when the lubricating oil film broke down, and it is suggested that this condition could be remedied by incorporating a suitable solid lubricant in the seal material itself. AD 118047. Project 7351, Task 73512. Research started Jul 1, 1955; completed Jul 31, 1956. Contract AF 33(616)-3134. AF WADC TR 56-579.

Effect of strain rate and temperature on the plastic deformation of high purity aluminum, by T. A. Trozera, O. D. Sherby and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Dec 1955. 22p graphs (1 fold). Order from LC. Mi $2.70, ph $4.80. PB 124813

1. Aluminum - Plastic deformation - Effect of temperature 2. Aluminum - Plastic deformation - Effect of strain rate 3. Contract N7 onr-295, T.O. II, NR 031-048, Technical rept. 44 4. UC IER Series 22, Issue 44

Evaluation of approaches to the study of the physical nature of metallic surfaces, by M. K. Testerman. Arkansas. University. Department of Chemistry, Fayetteville, Ark. Feb 1957. 71p drawings, diagrs, graphs, tables. Order from OTS. $2.00. PB 121971

Various approaches to determine the roughness of a metallic surface are examined. A direct approach is considered the most feasible in studying the actual rather than the effective topography. The proposed instrument makes use of the de Broglie matter waves and thus accomplishes a theoretical resolution of 0.75A. Fifty-kv helium ions bombard the specimen at a small angle. The reflected ions are magnified through an ion microscope which detects a signal proportional to the quantity of the impinging ions. The surface of the metal is scanned and the detected signal, after being amplified, is recorded as a function of scanning. By comparing the results with a standard pattern of roughness, absolute measurements of surface fluctuations to the desired order of magnitude are made possible. AD 118106. Project 7340, Task 70337. Contract AT 33(616)-2865. AF WADC TR 56-233.

Evaluation of bend testing of titanium sheet, by W. P. Achbach and E. G. Bodine. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Apr 1957. 27p photos, diagrs. Order from OTS. 75 cents. PB 121626

The report contains an account of the literature on bend testing as well as an extensive bibliography. A description is given of the types of jigs, specimens, and testing techniques presently used in performing bend tests. The significance of bend-test data is discussed and a uniform test procedure is recommended for use in the Department of Defense titanium sheet-rolling program. BMI TML R 68.

Fatigue of ductile metals at ranges of stress extended to compression, by J. L. Merritt, R. J. Mosborg and W. H. Munse. Illinois. University. Dept. of Civil Engineering, Urbana, Ill. Jul 1955. 111p photos, drawing, diagrs, graphs, tables.

Order from LC. Mi $6.00, ph $18.30.
PB 124668

The object of the study reported herein was to extend the results of fatigue tests into the field of compression fatigue. A comprehensive axial fatigue test program involving ranges of stress varying from pure compression to tensile stresses approaching the static ultimate strength was undertaken. The material selected for study was a fully killed, annealed, structural grade steel. An unnotched axial load specimen with a theoretical stress concentration factor of 2.0 was studied. Contract N6 ori-71, T. O. V, Project NR 031-182. ILU CES SR104.

Fundamentals of brazing. Third-year final report for the period Jun 23, 1954 - Jun 23, 1955 under Contract no. DA 11-022-ORD-957, by N. Bredzs and H. Schwartzbart. Armour Research Foundation, Chicago, Ill. Dec 1955. 101p photos, drawings, graphs, tables. Order from OTS. $2.75. PB 121553

The most characteristic process in the formation of the metallic bond in the brazed joints investigated is an extremely fast saturation of the molten filler metal by the base metal which takes place during the filling period of the capillary gap, and the subsequent precipitation of the base metal dendrites on the base metal filler metal interface during the cooling period. The brazing temperature can considerably alter the structure of the joint, but not the tensile strength. The sluar strengths of silver brazed joints and copper brazed joints in drill rod have been investigated in order to correlate bonding mechanism with strength. For reports for 1st-2nd years of work see PB 111509 and 111697. ARF Proj B 039.

Internal friction of copper and copper alloys, by Daniel Newson Beshers. Illinois. University. Dept. of Physics, Urbana, Ill. Nov 1955. 100p drawing, diagrs, graphs, tables (part fold.) Order from LC. Mi $5.40, ph $15.30.
PB 124115

Thesis - University of Illinois. 1. Gold-copper alloys - Damping capacity 2. Damping capacity - Measuring equipment 3. Copper - Crystal structure 4. Copper - Damping capacity 5. Copper - Thermal properties 6. Contract N6 ori -071(54), Technical report no. 3.

Interrelation of fatigue cracking, damping and notch sensitivity, by L. J. Demer. Minnesota. University, Minneapolis, Minn. Mar 1957. 164p photos, drawings, graphs, tables. Order from OTS. $4.25. PB 131025

The materials tested in this study were the heat resistant alloy N-155, a high carbon steel in two conditions of heat treatment, gray iron, aluminum alloy, J-1 magnesium alloy, and SAE 1020 steel. The number of cycles to initiation of macrocracking and to fracture were determined for both unnotched and notched specimens during fatigue tests performed over a wide range of stress levels. Crack detection was pricipally by the moist coating and deflection methods. Other supplementary techniques were observed during the fatigue tests to determine the characteristic changes taking place at the higher stress levels both to, and following the initiation of cracking. In addition, observations are presented on the cracking and fracture behavior of unnotched and notched specimens of the materials tested and the variations in these characteristics with stress level of the tests. AD 118157. Project 7360, Task 73604. Covers work from Oct 1955 - Mar 1956 under Contract AF33 (616)-2803 and Contract N8 onr -66207. AF WADC TR 56-408.

Investigation of alloys of magnesium and their properties. Final report, by G. S. Foerster, S. L. Couling, H. Baker and R. Johnson. Dow Chemical Company. Magnesium Laboratories, Midland, Mich. Nov 1956. 93p photos, diagr, graphs, tables. Order from OTS. $2.50.
PB 121801

The work reported under this contract is divided into three sections. Section 1 deals with the development of improved Mg wrought alloys. Two Mg-MM-Th-Zn-Zr wrought alloys (ZE 11 (.6Th-.6Zr) in sheet and ZE31 (1Th-.6Zr) in extrusions) have excellent properties at moderate temperatures, unobtainable in any conventional Mg alloy yet developed. Excellent properties at moderate temperatures can also be obtained by pellet extrusion of high temperature Mg alloys such as HZ32XA. High strength Mg-4Zn-1.5MM-1.5Mn sheet has been developed for room temperature service but is slightly inferior to ZE41XA, a new experimental sheet alloy. In Section 2, recent measurements of the thermal and electrical properties of several Mg alloys (AZ31A, HZ32XA, EK30A, EZ33A and HM21XA) are reported. The plastic deformation and preferred orientation of wrought Mg alloys are discussed in Section 3. Mechanical twinning is significant (15-20 volume per cent) in the cold rolling of AZ31A and AZ31B. The attempt to measure indirectly twin volume was only partly successful. Bend tests of Mg-2A1 sheet indicate that twin volume decreases with increasing temperature but is still appreciable as high as 815°F. The role of heterogeneous deformation or banding in compressive working of Mg alloys is also discussed. AD 110541. Project 7351, Task 73514. Covers work from Mar 1955 through Dec 1955 under Contract AF 33(616)-2337, Suppl. agreement no. S1 (55-1447). AF WADC TR 56-88.

Investigation of the creep-rupture properties of Mo-V low-alloy steels, by Paul Shahinian and Joseph R. Lane. U. S. Naval Research Laboratory. May 1957. 23p photos, graphs, tables. Order from OTS. 75 cents. PB 121953

Creep-rupture properties were determined for low-alloy steels containing higher vanadium and less molybdenum contents than several of the standard types now in use. The steels were tested at 900° and 1100°F in the normalized and normalized-and-tempered conditions using austenitizing temperatures of 1800°, 1950°, and 2000°F. NRL R 4928.

Literature survey on leaded steels (PB 111917).
See entry under subject Bibliography on page 5.

Longitudinal stresses in pipe bends caused by bending; by T. E. Pardue. U. S. Naval Research Laboratory. Feb 1945. 30p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123396

Appendix I: Combined stresses computed for specific cases. 1. Pipe - Bending 2. Pipe - Stresses 3. Bending stresses - Theory 4. NRL 0-2478

Mechanical properties of unalloyed chromium, by Sheldon A. Spachner and William Rostoker. Armour Research Foundation, Chicago, Ill. Dec 1956. 74p photos, diagrs, graphs, tables. Order from OTS. $2.00. PB 121895

Melting, press forging, and machining techniques were developed which permitted production of 3 in. x 1/4 in. chromium test specimens from ten pound heats of commercially available laboratory grade electrolytic chromium. The dependencies of the shear strength, ultimate shear strain, yield stress in shear, and strain hardening exponent upon temperature and strain rate were evaluated over temperature range of 1000°C and a strain rate range of 100:1 by means of a specially constructed torsion machine. The mechanical performance of laboratory grade material at 750°C was compared with that of lots of material which possessed more nitrogen or less oxygen than the laboratory grade permitting an evaluation of the relative effect of these impurities at this temperature. The ductile-brittle transition temperature of the forged laboratory grade material was determined and found to be at 49°C. The general problem of correlating plastic flow curves obtained in tension with those obtained in torsion was explored in an effort to determine what relation the mechanical property information obtained in torsion might have to that of tension. The theory of plastic flow was redeveloped, taking into account the true value of Poisson's ratio of the test material and relations necessary for equilibration of strain rates in tension and torsion. The testing method developed furnishes a method of comparing flow properties of metals in torsion with flow properties of those in tension. AD 118014. Project 7351, Task 70646. Covers work from Apr 1, 1955-Mar 30, 1956 under Contract AF 33(616)-2978. AF WADC TR 56-374 Part 1.

Metallography of aluminum powder extrusions, by F. V. Lenel, E. C. Nelson, G. S. Ansell and M. V. Rose. Rensselaer Polytechnic Institute, Troy, N. Y. Jul 1956. 65p photos, graphs. Order from OTS. $1.75. PB 121526

Determinations of the specific surface of flake aluminum powders used in the production of experimental aluminum powder extrusions have shown that the surface of the flake powder particles is not smooth but has many cracks and irregularities. Using the carbon film replica technique, high resolution electron micrographs were prepared of aluminum powder extrusions, both of those prepared experimentally in the laboratory and of those produced commercially. AD 97155. Project 7351, Tadk 70608. For first report under this contract see PB 121136. AF WADC TR 56-170.

Notch sensitivity of heat resistant alloys at elevated temperatures. Part 3: Final data and correlations, by Howard R. Voorhees and James W. Freeman. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Sep 1956. 88p photos, graphs, tables. Order from OTS. $2.25. PB 121791

Earlier parts of this report summarized rupture lives for smooth and notched round specimens of three heat-resistant alloys, together with pertinent experimental data on tensile stress-strain properties and creep-relaxation characteristics for these alloys. Similar types of data have now been obtained for flat specimens and for two other types of material (a Cr-Si-Mo-V steel and an age-hardening aluminum alloy). AD 97253. Project 7360, Task 73605. Covers work for calendar year 1955 under Contract AF 18 (600)-62. For Part 2 see PB 121184. AF WADC TR 54-175, Part 3.

Notch sensitivity of titanium and titanium alloys, by F. C. Holden. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Apr 1957. 91p drawings, graphs, tables. Order from OTS. $2.50. PB 121627

The notch properties of titanium and titanium alloys are reported. The results of a number of test programs are presented and discussed in terms of present knowledge of the mode of failure in notched specimens. Recommendations are made for further fundamental studies of notch sensitivity. BMI TML R 69.

Phase and free energy relationships in the system titanium-zirconium-oxygen, by Michael Hoch, Patrick Walsh and Yao Chiang. Ohio State University. Dept. of Chemistry and Ohio State University Research Foundation, Columbus, O. Jan 1957. 32p diagrs, graph, tables. Order from OTS. $1.00. PB 121981

The system Ti-Zr-O in which the refractory ZrO_2 and the metals Ti and Zr play an important role, is of possible interest in the study of cermets.

In addition the system is of theoretical interest, because of the wide ranges of solid solubility exhibited by the boundary systems, and the presence of non-stochiometric compounds. In Section I the equipment and materials are described. In Section II, the phase diagram is described and discussed. Section III contains the activity measurements on the Zr-ZrO_2 binary. AD 56-567. Project 5 (7-7350), Task 70634. Covers work from 1 Oct 1955-31 Oct 1956 under Contract AF 33(616)-3189. AD WADC TR 56-567.

Quantitative theory of grain boundary movement and recrystallization in metals in the presence of impurities, by Kurt Lücke and Klaus Detert. Brown University. Metals Research Laboratory, Providence, R. I. Apr 1956. 32p diagrs, tables. Order from OTS. $1.00. PB 121484

The experimental facts concerning the influence of small amounts of impurities upon recrystallization are briefly reviewed and quantitative atomistic theory of these phenomena has been developed. The quantitative formulation of these ideas leads to expressions for the absolute rate of boundary migration, its temperature dependence, for the activation energy of recrystallization, etc. They agree very well with the experimental results so far available. AF OSR TN 56-164. AD 86585.

Reactions of iron-nickel alloys with oxygen, by M. J. Brabers, W. J. Heideger and C. E. Birchenall. Princeton University. James Forrestal Research Center, Princeton, N. J. Feb 1956. 17p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 122410

Fe-Ni alloys of several compositions have been partially oxidized and then equilibrated by maintaining them in a closed system at 1050 or 1095°C. for an extended period. The products have been examined microscopically, by x-ray diffraction and by chemical analysis to determine their structure and composition. The three-phase field for alloy-wüstite-spinel has been located approximately, and the sense of some of the two-phase tie lines has been established. AD 82015. Part of report is based on a thesis submitted by W. J. Heideger. AF OSR TN 56-102. Contract AF 18(600)-967.

Relaxation behavior of titanium alloys, by Franklin J. Gillig. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Dec 1956. 87p photos, drawing, graphs, tables. Order from OTS. $2.25. PB 121978

A relaxation test unit has been designed which provides practically continuous control of the total strain by automatically decreasing the load as the specimen tends to elongate due to creep. The unique feature of this equipment is the ability to apply the initial load in a matter of seconds so that very little relaxation occurs during loading. Relaxation tests have been made using this equipment for three titanium compositions: A-70, C-130AM, and A-110AT. The A-70 and A-110AT were heat treated to produce two different grain sizes and the C-130AM was heat treated to three different grain sizes. Relaxation tests were made on the three compositions in all of the microstructural conditions at room temperature, 600°, and 800°F. The effect of grain size on relaxation characteristics was found to be much the same as in creep testing where the larger grain sizes possess greater resistance to deformation only at the higher test temperatures. AD 110673. Project 7351, Task 73510. Covers work from Apr 1, 1954 - Jan 31, 1956 under Contract AF 33(616)-2340. AF WADC TR 55-458, Part II.

Research and development on electrodeposition of new chromium and chromium-alloy plate, by L. D. McGraw, P. T. Woodberry, J. A. Gurklis, L. Vaaler, J. McCallum, C. A. Snavely, and C. L. Faust. Battelle Memorial Institute, Columbus, O. Dec 1952. 82p photos, tables. Order from OTS. $2.25. PB 111911

A chromium-iron alloy plating bath was developed which produces hard, bright chromium-ion plate with abrasion resistance and a crack system very similar to conventional chromium plate. The crack system makes possible the use of this bath in porous chromium plating but prevents the use of this type plate where complete corrosion protection of the basic metal is required. This trivalent-chromium bath is amenable to alloying additions, and a 94% chromium -6% iron alloy plate retains its hardness at considerably higher temperatures than does unalloyed chromium plate. In addition, the trivalent bath can be formulated and operated to yield a crack-free plate with excellent protective qualities. An improved process for plating mat-type chromium iron alloys is described which provides good corrosion protection. Detailed instructions are given for preparing and operating the baths. Contract NOas 51-713-C.

Research on high temperature sheet materials, by William Murphy and L. I. Ferrall. Crucible Steel Company of America. Crescent Laboratory, New York, N. Y. Nov 1948. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122904

The purpose of this investigation was the development of an alloy which could be fabricated into sheets and which would have a stress-rupture life of 100 hours or more when tested at 1700°F., 6000 psi. Fifty-one different alloy compositions were investigated. These results show that the best alloys are WF31 and 32 which had rupture times at 1700°F., 12000 psi of 90.9 and 125.8 hours, and at 1800°F., 6000 psi of 512.9 and 326.8 hours, respectively. AF TR 5730. ATI 40995. Contract W 33-038-sc-16677, Summary report.

Research on intermetallic containers for melting titanium, by William B. Crandall, Carl H. McMurtry and Daniel D. Button. New York State College of Ceramics, Alfred, N. Y. Feb 1957. 39p photos, drawings, diagrs, tables. Order from OTS. $1.00. PB 121948

The usefulness of Mo_3Al as a container for the melting of titanium has been determined under a number of experimental conditions. Although this container is wet by the titanium during melting, only a total of three per cent of molybdenum and aluminum is taken into the melt if the time and temperature of melting is held to a minimum. AD 118029. Project 7350, Task 70634. Summarizes work from 1 Sep 1955 - 31 Oct 1956 under Contract AF 33(616)-3172. AF WADC TR 56-633.

Solidification and contraction in steel castings, II: Free and hindered contraction of cast carbon steel, by C. W. Briggs and R. A. Gezelius. U. S. Naval Research Laboratory. Sep 1934. 30p photos, drawing, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120479

Part I issued as Report N8-12. For later report see PB 122718. 1. Steel castings - Solidification - Tests 2. Steel, Carbon - Cast - Contraction - Tests 3. NRL M 1075

Some high temperature oxidation characteristics of nickel with chromium additions, by Gordon E. Zima. California Insititute of Technology. Dynamic Properties Lab., Pasadena, California. Apr 1956. 99p photos, diagr, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 125396

The present work indicates that an interstitial diffusion mechanism may become dominant in the oxides of high chromium content. Within the scope of the present work, the high oxidation stability of nickel-chromium alloys has been correlated with the presence of Cr_2O_3 in the oxide layer. Oxidation rates for high purity nickel have been determined at temperatures of 980, 1096 and 1260C, under one atmosphere of oxygen. Published in Transactions of the American Society for Metals, vol. 49, 1957. Contract N6 onr-24430, NR 031-355, Technical report no. 7.

Study of effects of alloying elements on the weldability of titanium sheet, by John F. Rudy, Joseph B. McAndrew and Harry Schwartzbart. Armour Research Foundation, Chicago, Ill. Mar 1957. 151p photos, graphs, tables. Order from OTS. $4.00. PB 131049

This investigation follows a previous investigation which covered the weldability effects of the interstitials, carbon, nitrogen and oxygen, when added individually to several titanium base alloys. Included in these alloys were: 5Al-Ti, 7 Al-3 Mo-Ti, and 25 V-Ti. For present study a fourth composition, 6 Al-4 V-Ti, was added to complete the list of base alloys which were investigated as reported herein. Each of the fifteen alloys was then tested mechanically in the following five conditions: as fabricated to 0.063 inch sheet, as-welded, and after three separate post weld heat treatments. Mechanical testing included tensile and free bend tests, both oriented so that the major loading stresses were transverse to the welding direction. Weldability was determined by these mechanical test results. AD 118135. Project 7351, Task 73510. Covers work from 7 Feb 1955- 31 Aug 1956 under Contract AF 33(616)-206. AF WADC TR 53-230 Part 3.

Thermal conductivity of 347 stainless steel and zirconium, by L. R. Vianey. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Feb 1951. 6p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 123175

DIC project 6627. 1. Steel, Stainless - Thermal properties 2. Zirconium - Thermal properties 3. Contract N5 ori-07827, NR 035-267.

Use of titanium alloy sheet in airframe components, by L. R. Jackson. Battelle Memorial Institute, Titanium Metallurgical Laboratory, Columbus, O. Jul 1955. 23p graphs (part col.) table. Order from LC. Mi $2.70, ph $4.80. PB 124790

The aim of this report is to present quantitatively significant strength-weight criteria for titanium sheet alloys that are within practical realization in commercial quantities, against a background of similar criteria for alternative sheet materials, and to discuss a number of those additional factors governing the use of sheet materials that cannot be expressed quantitatively in any simple manner, in order to provide a more realistic basis for judging the circumstances under which titanium sheet alloys can be used in increasing amounts. It is also brought out that, although the development of titanium alloys of higher strength than are currently available undoubtedly would broaden the potential usability, it would not necessarily be decisive, since other less favorable influences become operative in any material at very high strength levels. BMI TML R5A. Revision of TML report 5 (May 1955) Graphs in part color. Color will not reproduce.

Wear studies with titanium, by Robert J. Benzing and Arthur N. Damask. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jan 1957. 20p photos, drawing, tables. Order from OTS. 50 cents. PB 121885

A study of the wear of titanium using typical oils

was made on the Falex Wear Tester and the Shell Four-Ball Wear Tester. The purpose of this study was to provide data for comparison with other studies dealing in friction coefficients and wear of specimens in non-standard lubricant testers. A mineral oil, diester, silicate ester, silicone, and halogenated hydrocarbon were the oils studied. C-130-AM, Ti-150A, and 3Al-5Cr alloys were used and both cyanided and uncyanided surfaces are included in the program. AD 110585. Project 3044, Task 73312. Covers work from Feb 1955 to Feb 1956. AF WADC TR 56-375.

METEOROLOGY AND CLIMATOLOGY

Collision efficiency of cloud droplets, by R. M. Schotland and E. J. Kaplin. New York University. Dept. of Meteorology and Oceanography, New York, N.Y. Apr 1956. 38p photos, drawing, diagrs. Order from LC. Mi $3.00, ph $6.30. PB 122235

An experimental determination by a modeling technique has been made of the collision efficiencies of water drops. Collision efficiency curves are presented for simulated 11, 14, 17, and 21 micron diameter cloud drops with respect to a range of smaller cloud drops. Examples are shown of the trajectories of pairs of falling drops. Relative trajectories of small drop about the larger overtaking drop are presented. AF CRC TN 55-867. Scientific report no. 1 under Contract no. AF 19 (604)-993.

Empirical determination of surface drag coefficient for extended-range and long-range numerical weather forecasting and the study of the general circulation, by Yale Mintz. California. University. Dept. of Meteorology, Los Angeles, Calif. Jan 1956. 25p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122379

It is shown how the time-averaged vorticity budget of the atmosphere can be used to compute the mean surface stress and the surface drag coefficient in its geographical and seasonal distribution. Some preliminary results are given, using data from the U. C. L. A. General Circulation Project. Some suggestions are made on how this information can be used in extended-range and long-range numerical weather prediction experiments and in the study of the dynamics of the general circulation. Scientific report no. 3 under Contract AF 19(604)-1286.

Graphical prediction model with orographic influences, by M. A. Estoque. Chicago. University, Dept. of Meteorology, Chicago, Ill. Aug 1956. 12p diagrs, tables. Order from LC. Mi $2.40 ph $3.30. PB 124226

The purpose of this paper is to extend a graphical intergration model previously described (Estoque, 1956) so as to incorporate orographic effects in such a manner that the prediction equation can still be integrated graphically. AF CRC TN 56-852.

Handbook of Thule, Greenland, environment, by Robert L. Anstey. U. S. Army. Quartermaster Research and Development Center, Natick, Mass. Aug 1956. 45p photos, maps, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124245

Thule, Greenland, is 700 miles north of the Arctic Circle and has a typical Arctic coastal environment. Although a program of testing is not usually carried on at Thule proper, neighboring, areas include numerous sites which are presently used for Arctic testing; examples are the icecap ice ramp, and the seasonally snow-free coastal area at the edge of the ice. QMC EP TR-34.

Hemispheric wave number as a weather type for long-range forecasting, by Glenn H. Jung, William W. Hildreth, Jr. and Arnold H. Glaser. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. May 1956. 55p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 123449

The hemispheric wave number is suggested by model studies as a description of the general circulation. The persistence of wave number in the model indicates that wave number might be used as a long-range forecasting aid. The hemispheric wave number was obtained by visual inspection of 500 and 700 mb charts for the years 1946-47 and 1952-54. Contract AF 19(604)-1301. A and M Project 107, Scientific report no. 1. Reference 56-13T. AF CRC TN 56-478.

Radiation temperature of the sky and the sea horizon, by V. W. Myers and P. S. Smith. U. S. Naval Research Laboratory. Apr 1945. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123357

Unclassified 15 Dec 1953. 1. Pyrometers, Radiation - Infrared 2. Clouds - Temperature - Measurements 3. Sky - Radiation - Temperature 4. NRL H 2505

Scientific results of the drift of station "North Pole". (Nauchnye rezul'taty dreifa stantsii 'Severnyi polius), by Petr Petrovich Shirshov. Translated by David Kraus. Feb 1956. 53p diagr, graphs, maps. Order from LC. Mi $3.60, ph $9.30. PB 124186

Summarizes basic results of three Soviet expeditions into the Arctic. Translated from Akademiia nauk SSSR. Obshchee sobranie, Feb 1944, pp. 110-140, by the American Meteorological Society under Contract AF 19(604)-1364.

Summarization of turbulence and ionosphere "Wind" measurement theories with application of the latter to preliminary data at 75 kc/s, by G. S. Sales. Pennsylvania State University. Ionosphere Research Laboratory, University Park, Pa. Aug 1956. 119p diagrs, graphs, tables. Order from LC. Mi $6.00, ph $18.30. PB 124679

The initial problem presented in this report is a study of the modern theories of turbelence and their application. Besides the historical introduction, which is the first section, the work is divided into three main parts. The classical and statistical theories of turbulence are discussed in the first two sections and their applications in the third. AF CRC TN 56-690. PSC IRL SR88. Contract AF 19(604)-1304.

Three dimensional structure of small-scale atmospheric perturbations aloft, by Akira Kasahara. Texas Agricultural and Mechanical College. Dept. of Oceanography, College Station, Tex. Jun 1956. 42p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 124659

A theoretical investigation was made to determine the meteorological features of small-scale disturbances having scales of several hundred kilometers or less, which are frequently observed in the jet stream by aircraft flights. The perturbation equations are derived from the equations of motion, of continuity, and of polytropic change of state. The meteorological patterns are found and illustrated for a perturbation which is superimposed upon a steady uniform zonal current. Contract AF 19 (604)-559, Scientific report no. 7. AD 98714. A and M project 57. Reference 56-18T.

MINERALS AND MINERAL PRODUCTS

Final report under Contract DA 36-039-sc-56718, by W. H. Bauer and K.M. Merz. New Jersey Ceramic Research Station, Rutgers University, New Brunswick, N. J. Mar 1955. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 124191

1. Spinels, Ferromagnetic - Formation 2. Powders, Ferromagnetic - Chemical analysis 3. Powders, Ferromagnetic - Xray inspection 4. Contract DA 36-039-sc-56718, Final report. AD 70830.

Research on elevated temperature resistant ceramic structural adhesives, by Henry G. Lefort, Richard M. Spriggs and Dwight G. Bennett. Illinois. University. Dept. of Ceramic Engineering, Urbana, Ill. Jan 1957. 74p graphs, tables. Order from OTS. $2.00. PB 121941

The object of the investigation was to develop high temperature resistant structural adhesives for type 301 and 302 stainless steel or other desired alloy metals, particularly 17-7 PH, from ceramic-oxide, glassy-bonded coatings, cermets with sintered metal bonds, air-setting, temperature-resistant silicates, aluminates, oxychlorides, oxysulfides, and ceramic-oxide, resin-bonded coatings. Twenty-four ceramic adhesives of the ceramic-oxide, glassy bond type, including three commercially available porcelain enamel ceramic adhesives, were evaluated for use at room and elevated temperatures. Various methods of specimen and ceramic adhesive preparation and fabrication were investigated for increase in shear strength including knurled overlap areas, mechanical scouring of overlap areas, chemical pickling and nickel plating of overlap areas, and the use of various foils and screens as carriers. AD 110736. Project 7340, Task 73401. Covers work from Nov 1955-Oct 1956 under Contract AF 33 (616)-2556. For Part I see PB 121659. AF WADC TR 55-491 Part II.

ORDNANCE AND ACCESSORIES

Adiabatic decomposition of explosives. The measurement of the sensitivity, time lag of explosion and burning velocity of explosives by drop test techniques, by T. K. Collins. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Dec 1955. 55p photo, diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124254

Investigations were conducted to determine the behavior of primary and sensitive secondary explosives under the condition of adiabatic decomposition. First experiments used drop test equipment which yielded data on time lag for initiation and relative sensitivity. Later the equipment was modified to give more accurate time lag data and, in addition, the mean flame velocity in thin layers of the explosive which was initiated. A method was also found to separate the total time lag into two periods, the period between impact of the drop weight and compression of the explosive and the time between compression and initiation. UU ISRP TR 48. Contract N7 onr-45107.

Determination of reaction rates of nonideal explosives from shaped charge penetration data, by A. M. Spencer. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Aug 1955. 54p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 123202

1. Penetration tests. 2. Explosives - Detonation pressures 3. Explosives - Detonation - Velocity - Measurement 4. Contract N7 onr-45107, NR 357-239, Technical report XLVII 5. UU ISRP TR 47

Light armor, Eleventh partial report: Yaw versus bullet protection for homogeneous steel armor plates, tipping screen data and a discussion of 24 ST aluminum deflector plates, by G. R. Irwin, C. H. Kingsbury and A. V. J. Clark. U. S. Naval Research Laboratory. May 1943. 40p photos, graphs (1 fold), tables. Order from LC. Mi $3.00, ph $6.30. PB 120695

1. Armor protection 2. Armor plate - Impact tests 3. Plates, Aluminum alloy - Impact tests 4. Ballistics, Exterior - Yaw 5. NRL O 2068 Unclassified 15 Dec 1953. Parts of this report may not reproduce well.

Reliability specifications for guided missiles, a proposal, by Robert Lusser. U. S. Redstone Arsenal, Huntsville, Ala. Revised. Oct 1955. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 125168

Part I of this study discusses in detail why most of the time honored specifications of quality and reliability are obsolete as far as the components of guided missiles are concerned. Part II discusses how the required "absolute" level of component reliability may be achieved by special reliability specifications supplementing and over-riding existing specifications. In Part III eighteen reliability specifications paragraphs, based on the principle of statistical safety margins between stresses and strengths, are formulated.

PHOTOGRAPHIC AND OPTICAL GOODS

Index of refraction effect on absolute fluorescence measurements, by Allan Shepp. Technical Operations, Inc., Arlington, Mass. Apr 1956. 9p diagr. Order from LC. Mi $1.80, ph $1.80. PB 125644

The spatial distribution and the total quantity of light escaping from a phosphor depends on geometric shape and index of refraction (n). Measurements taken far out on the normal to a plane face, must be corrected by a factor of n^2. Measurements taken off the normal, or close in to the phosphor, or measurements of total light output, are difficult to analyze correctly in the general case. An analysis of previous efficiency measurements is presented. Most of them are subject to complex, though probably small corrections. AD 87057. Contract AF 18 (600)-1134, Technical report no. 1 Report no. TOI 56-12. AF OSR TN 56-184.

Instructional film research reports (Rapid mass learning) Volume II. Pennsylvania State University, University Park, Pa. Jun 1956. 1033p photos, diagrs, tables. Order from OTS. $6.00. PB 131005

Jointly sponsored by the Army and the Navy, this research was conducted to discover how to improve films and how to promote their use as an effective instructional device. 65 technical reports have been issued and are listed in the bibliography of this report. The research projects completed include bibliographic studies, equipment development projects, clinical types of studies in which descriptive qualitative data have been included, and experimental studies relating to instructional sound motion pictures. Several studies of new applications of films have been undertaken. Five of the studies have made direct contributions to research methodology. Contract N6 onr-269, T. O. VII. SDC Human Engineering Project 20-E-4. Compilation of research reports SDC 269-7-37 to SDC 269-7-60 and SDC 269-7-100 to 104. Reports also issued separately. For Vol. I see PB 113995. SDC TR 269-7-61. NAVEXOS P-1543.

Modification of the Luneberg lens, by Roy B. Saunders. Oregon State College. Dept. of Mathematics, Corvallis, Oregon. Oct 1955. 22p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124547

The problem treated here is that of determining the index of refraction of the lens as a function of distance from the center, when the index of refraction at the lens surface is greater than the index of the medium, and the point of focus for incident plane waves is outside the lens. The methods of geometrical optics, giving results which approximate those for radiation of short wavelength, are used to show that this may be done by numerical computation to the degree of accuracy desired. Contract Nonr-1286 (01), NR 384-206. Unclassified 15 Dec 1953.

Prevention of fogging of optics in submarine periscopes, by R. R. Miller. U.S. Naval Research Laboratory. Feb 1943. 18p photo, drawing, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120592

1. Periscopes, Submarine - Vapor reduction 2. Periscopes, Submarine - Fogging prevention Unclassified 15 Dec 1953. NRL P 1997.

PHYSICS

General

Comparison of four methods of encoding elevation information with complex line-inclination symbols, by David B. Learner and Earl A. Alluisi. Ohio State University. Laboratory of Aviation Psychology and Ohio State University Research Foundation, Columbus, O. Nov 1956. 27p diagrs, graphs, tables. Order from OTS. 75 cents. PB 131001

The use of a one- or two-line inclination code has been found, in previous experiments conducted under this contract, to be an effective method for encoding from 10 to 32 possible categories of information. For some purposes, however, a much larger alphabet of symbols is required. This study was a preliminary investigation of the psychological feasibility of employing coding schemes based on complex line-inclination symbols for encoding information, such as elevation, that may require as many as 50 unique symbol categories. The decimal and clock codes were decoded with greater speed than the wheel and binary codes. AD 110547. Project 7192, Task 71596. Initiated under Contract AF 33(616)-43. Contract AF 33(616)-3612. AF WADC TN 56-485.

Decision procedures for the comparison of exponential and geometric populations, by Franklin S. McFeely. Virginia Polytechnic Institute, Blacksburg, Va. Sep 1955. 71p diagr, tables. Order from LC. Mi $4.50, ph $12.30. PB 124205

1. Mathematical equations and solutions 2. Losses, Mathematical - Theory 3. Integration, Numerical 4. Contract DA 36-034-ORD-1527RD, Technical report 11. AD 71922. OOR project 1166. Ordnance Research and Development project TB 2-0001 (1166). Army project no. 599-01-004. Thesis: Virginia Polytechnic Institute.

Development of a mathematical theory of plasticity based on slips, by T. H. Lin. Detroit. University. Research Institute of Science and Engineering, Detroit, Mich. Aug 1956. 52p diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 124110

1. Plasticity - Theory 2. Crystals - Stress analysis 3. Crystals - Elasticity modulus 4. Crystals - Plastic deformation 5. Contract AF 18(600)-1466. 6. AF OSR TR 56-31. AD 96-043.

Discrete compensation of sampled-data and continuous control systems, by E. I. Jury and W. Schroeder. California. University. Div. of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Dec 1955. 82p diagrs, graphs, Order from LC. Mi $4.80, ph $13.80. PB 122417

1. Sampling (Statistics) - Theory 2. Data - Analysis 3. Transformations (Mathematics) 4. UCIER Ser 60, Issue 154 5. Contract AF 18(600)-1521 6. AF OSR TN 55-445

Effect of high pressures on the rates of atom movements in crystals, by Norman H. Nachtrieb. Chicago. University. Institute for the Study of Metals. Chicago, Ill. Apr 1956. 27p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122420

In the efforts of physicists, chemists, and metallurgists to elucidate the detailed mechanism of diffusion in crystalline solids, comparatively little attention has been devoted to rate measurements at various pressures. The purpose of this communication is to suggest that diffusion measurements as a function of pressure provide an essentially different kind of information about the volume of the activated state. A second kind of information arises in the form of a one-to-one correlation between the effect of pressure on the diffusion rate and the effect of pressure on the melting temperature. AD 86594. Paper presented at the Third International meeting on Reactivity of Solids, Madrid, Spain, Apr 2-7, 1956. AF OSR TN 56-174. Contract AF 18(600)-1489.

Estimates of bounded relative error for the ratio of variances of normal distributions, by Stanley Reiter. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Aug 1955. 16p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 124148

1. Statistical theory 2. Sampling (Statistics) - Variables 3. Variance - Analysis 4. Contract N6 onr-25140, NR 342-022 5. SU AMSL TR 29

Forced air flow on a rotating disk, by R. D. Smith. Purdue University. Gas Turbine Laboratory. May 1955. 82 p photos, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 124028

The investigation reported herein is concerned with an experimental study of the forced flow of air over one surface of a rotating disk, simulating the rear face of a radial turbine impeller. The flow patterns of a forced air flow moving in a radial direction through a passage between a stationary flow shield and a rotating disk were determined experimentally . A series of non-dimensional parameters were derived and employed for correlating the results of the experiments. Interim report 55-2. Contract N7 onr-39415.

Four-place logarithms to the base 2 of three-digit numbers, by Earl A. Alluisi and Ilse B. Webb. Ohio State University. Laboratory of Aviation Psychology, and Ohio State University Research Foundation, Columbus, O. Dec 1956. 8p table. Order from OTS. 50 cents. PB 121966

In this report, four-place logarithms to the base 2 are presented in table form for the three-digit numbers between 1.00 and 9.99. The table can be used to obtain the logarithmic values of all three-digit numbers between 0.00000100 and 9,990,000. The logarithms-base-2 are tabled in a form convenient to use, since all values are placed on two facing pages. AD 110581. Project 7192, Task 71596. Contract AF 33(616)-3612. AF WADC TN 56-499.

(Continued after Index)

Fourier transforms, conformal mapping, entire functions, and asymptotic solutions of ordinary differential equations. Report for the period 1 Oct 1954-1 Oct 1955, under Contract N7 onr-28507, by Jacob Korevaar. Wisconsin. University, Madison, Wis. Oct 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 124844

The research carried out during the year October 1, 1954 - October 1, 1955 is described under the following four headings. 1. Theory of distributions developed from the point of view of applied mathematics. 2. Sequences of polynomials whose zeros lie in a given set. 3. A differential equation analog of a non-linear Tauberian theorem of Erdös. 4. Existence of the mean value for a class of multiplicative functions. Contract N7 onr-28507, T.O.7. For earlier report see PB 116093.

Generalizations of the warehousing model, by A. Charnes and W. W. Cooper. Carnegie Institute of Technology. Graduate School of Industrial Administration. Sep 1955. 67p diagrs, tables. Order from LC. Mi $3.90, ph $10.80. PB 125030

One of the classical problems of linear programming was the so-called warehousing problem. One objective of the present paper is to generalize the warehousing problem in order to cover multiple products (and warehouses) and varying prices. Special methods weill then be presented which take advantage of the structure of such problems in order to evolve efficient computational devices. Project: Planning and control of industrial operations. ONR RM 34. Contract Nonr-76001, NR047001.

Incomplete time response to a unit impulse and its application to lightly damped linear systems, by James J. Donegan and Carl R. Huss. U. S. National Advisory Committee for Aeronautics. Dec 1956. 17p graphs. Order as TN 3897 from National Advisory Committee for Aeronautics, 1512 "H" St., N.W., Washington 25, D.C. PB 124439

The results indicate that such a system can be adequately described by an incomplete time response to a unit impulse which is computed from the incomplete-output time history (without the addition of an estimated end correction) and the complete-input time history. The incomplete response to a unit impulse may be used with Duhamel's integral to predict the response of the system to an arbitrary input up to at least 90 percent of the cutoff time of the incomplete-output time response. NACA TN 3897.

Infrared, a bibliography. PB 121998. See entry under subject heading Bibliography on page 5.

Integration methods of Bergman and LeRoux, by J. R. Diaz and G.S.S. Ludford. Maryland University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. May 1956. 11p Order from LC. Mi $2.40, ph $3.30. PB 122453

In a previous note a correspondence was found between the representations of solutions of the canonical form of the linear hperbolic differential equation in two independent variables which have been given by S. Bergman and J. Le Roux. This correspondence has the disadvantage that to regular kernel functions in the sense of Le Roux there may correspond singular kernel functions in the sense of Bergman. The purpose of the present note is to give a second correspondence which avoids this difficulty. AD 86017. Contract AF 18(600)-573. AF OSR TN 56-140. UM BN 69.

Investigation of heat transfer from a stationary and rotating ellipsoidal forebody of fineness ratio 3, by James P. Lewis and Robert S. Ruggeri. U. S. National Advisory Committee for Aeronautics. Nov 1956. 46p photo, diagrs, graphs, tables. Order as TN 3837 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D, C. PB 124395

Experimental convective heat transfer was obtained for a 20-inch-diameter forebody for airspeeds up to 240 knots, rotational speeds up to 1200 rpm, angles of attack of 0°, 3°, and 6°, and both uniform surface temperature and uniform input heat density. The results agree well with theoretical predictions. NACA TN 3837

Linear decision rule for production and employment scheduling, by Charles C. Holt, Franco Modigliani, and Herbert A. Simon. Carnegie Institute of Technology. Graduate School of Industrial Administration, Pittsburgh, Pa. May 1955. 55p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 125029

This paper reports some of the findings of a research team that has been developing new methods to enable production executives to make better decisions and to make them more easily than they can with prevailing procedures. With the cooperation of a manufacturing concern, the new methods have been developed in the context of a set of concrete production scheduling problems that were found in a factory operated by the company. The new method, published for the first time in this paper, involves: (1) formalizing and quantifying the decision problem (using a quadratic criterion function) and (2), calculating a generalized optimal solution of the problem in the form of a (linear) decision rule. For Appendix II see PB 125029s. Project: Planning and control of industrial operations. ONR RM 30. Contract Nonr-76001, NR 047001.

Method for calculating effects of dissociation flow variables in the relaxation zone behind normal shock waves, by John S. Evans. U. S. National

Advisory Committee for Aeronautics. Dec 1956. 52p graphs, tables. Order as TN 3860 from National Advisory Committe for Aeronautics, 1512 "H" St., N. W., Washington 25, D.C. PB 124411

Generalized expressions and charts are presented for the temperature, pressure, density, and flow velocity behind a shock wave that depend on the shock Mach number, the initial state of the gas, and an enthalpy parameter. NACA TN 3860.

Multiplet structure of excitons in ionic crystals, by Albert W. Overhauser. Cornell University. Dept. of Physics, Ithaca, N. Y. Nov 1955. 38p graphs. Order from LC. Mi $3.00, ph $6.30. PB 124833

The excited states of crystals arising from the configuration in which an electron is transferred from a negative ion to a nearest neighbor positive ion are analyzed. It is concluded that 72 overlapping exciton bands result for crystals having the NaCl structure. For crystals having the CsCl structure 96 bands occur which collapse into 40 energy levels at k=0, 6 of which can be reached from the ground state by allowed optical dispole transitions. It is concluded that the lifetime of exciton states, as limited by interaction with optical phonons, is sufficiently short to account for the width and temperature dependence of fundamental absorption lines. Approximate wave functions describing the exciton states are constructed and a procedure for calculating energy levels and relative intensities of absorption components is formulated. ONR TR 19. Contract N6 ori-91, Task 11.

Note on the non-linear power of adjacent extreme point methods of linear programming, by A. Charnes and W. W. Cooper. Carnegie Institute of Technology. Graduate School of Industrial Administration, Pittsburgh, Pa. Sep 1955. 15p. Order from LC. Mi $2.40, ph $3.30. PB 125031

Project: Planning and control of industrial operations. 1. Industry - Organization, control, etc. 2. Linear systems - Computing methods 3. Contract N onr-76001, NR 047001 4. ONR RM 35

On curves of minimal length with a constraint on average curvature, and with prescribed initial and terminal positions and tangents, by L. E. Dubins. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Apr 1956. 33p diagrs. Order from LC. Mi $3.00, ph $6.30. PB 122424

The purpose of this paper is to prove a theorem which implies that an R-geodesic is necessarily a continuously differentiable curve which consists of not more than four pieces, each of which is either a straight line segment or an arc of a circle of radius R. AD 86304. Contract AF 18(600)-1138, Technical report no. 10. AF OSR TR 56-12.

Piecewise linear isotropic plasticity applied to a circular cylindrical shell with symmetrical radial loading, by P. G. Hodge, Jr. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Sep 1955. 37p diagrs, graphs, tables. Order from LC. Mi $3.00, ph $6.30. PB 124801

A theory of plasticity is developed with specific reference to a circular cylindrical shell subjected to axially symmetric radial loading. The yield condition is expressed in terms of the stress resultants and is represented by a square in stress space. The plastic potential flow law is extended to include the corners of the yield condition, under the assumption that the strain-hardening is isotropic and linear. Next, the flow law at all points is piecewise integrated and expressed as a direct relation between stress and strain but containing certain unknown functions. Under certain restrictions on the loading, the two classical minimum principles of minimum potential and complementary energy are shown to be valid. Finally, these minimum principles are applied to an example and compared with the exact solution. PIB AL 297. Contract N onr-267(00), NR 360-001.

Recommended definition of turbulent friction in incompressible fluids, by F. W. S. Locke, Jr. U. S. Bureau of Aeronautics. Jun 1952. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123183

A brief survey of the literature yielded fifteen different formula for estimating turbulent skin friction coefficients. A study of these formula was undertaken, and it is recommended that the Schoenherr Mean Line be adopted for work requiring a knowledge of the turbulent skin friction coefficients of flat surfaces in incompressible fluids. Tabulated values for Reynolds numbers from 1×10^5 to 1×10^{10} are appended. Research Division report 1415.

Rings of analytic functions on an open Riemann surface, by H. L. Royden. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Aug 1955. 17p. Order from LC. Mi $2.40, ph $3.30. PB 125306

This paper extends the theorem of Bers to Riemann surfaces and shows in addition that any homomorphism of the ring of analytic functions on one surface into the ring of functions on a second is actually induced by an analytic mapping of the second surface into the first. The third section of the present paper is devoted to the proof of a generalization of Weierstrass' theory of entire functions in the plane. AD 72663. Dept. of the Army project 5B99-01-004. Ordnance Research and Development project TB 2-0001. Office of Ordnance Re-

search project 1323. A considerably modified version appeared in "Transactions of the American Mathematical Society", v. 83, no. 2, pp. 269-276, Nov 1956 under title: "Rings of analytic and meromorphic functions". SU AMSL TR 2. Contract DA 04-200-ORD-343, Technical report no. 1.

Simplified theory of turbulent fluid motion. Part II, by Max M. Munk. Catholic University of America, Washington, D.C. Jun 1955. 21p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124098

A summary of principal formulas for kinetic energy, relative velocity of turbulence lump, dissipation of energy of turbulence lump, mixing coefficient, energy balance (Couette of flow) etc. For Part I see PB 124098. Contract N6 onr-255, T. O. 5.

Some rationality questions on algebraic groups, by Maxwell A. Rosenlicht. Northwestern University, Evanston, Ill. Jul 1956. 44p. Order from LC. Mi $3.30, ph $7.80. PB 124858

A theorem going back to Maurer asserts that a connected linear algebraic group over the field of complex numbers can be rationally parametrized. In its algebraic formulation this result says that if G is a connected linear algebraic group defined over a field K, then (under certain conditions on k) the field k(G) of rational functions on G that are defined over k is k-isomorphic to a subfield of a purely transcendental extension of k. Chevalley has recently given a proof of this when k is any field of characteristic zero, and in addition he has shown that if k is also algebraically closed than k(G) is itself purely transcendental extension of k. The main result of the present paper extends the first of these results to the case where k is an arbitrary perfect field. AD854. Contract AF 18(600)-1571. AF OSR TN 56-318.

Statistical analysis of military risks resulting from extreme enviromental conditions, by W. A. Thompson, Jr., and C.C. Beazley. Virginia. Agricultural Eperiment Station, Blacksburg, Va. Jun 1955. 38p tables. Order from LC. Mi $3.00, ph $6.30. PB124189

By a study of the duality relationships of a large number of balanced and partially balanced incomplete block designs, certain ones have been found which lend themselves nicely to interblock analysis. Besides facilitating this analysis, these designs make possible the use of a new method for studying the relative variability of the inter- and intra-block error. Finally, there is an illustrative example making use of the methods and tables introduced in this paper. It includes a new computing method to be used for finding estimates of the treatment effects in a mixed model experiment. AD 70501. Project 7-83-05-003. Typed on cover: Interblock analysis of incomplete block designs. Contract DA 44-109-qm -1488, report no. 7.

Study of a family of Laves-type intermediate phases, by Rodney P. Elliott. Armour Research Foundation, Chicago. Ill. Apr 1956. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123116

The periodic variation of the crystal structure type of the Laves phases of titanium, zirconium, hafnium, niobium and tantalum may be correlated with electronic variations. Allotropy is the exception rather than the rule and occurs only for those binary phases that have electron: atom ratios near a critical value. Consideration of ternary Laves-type phases indicates that there are two Brillouin Zone overlaps governing the structure types. On the assumption that the valency of titanium is near four, it has been possible to calculate the valencies of the first transition elements as follows: Ti, 3.92; Zr, 3.23: V, 2.19; Cr, 1.69; Mn, 1.35; Fe, 0.92; and Co, 0.72. Valencies of 0.25 and 0.00 nickel and copper, respectively, are consistent with the foregoing valencies. AD 88033. Contract AF 18(600)-1399, Technical report no. 1. AF OSR TR 56-22. ARF proj B 079, Techical report no. 1.

Stylus-groove relations in phonograph records, by Frank G. Miller. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Mar 1950. 151f photos, drawings, diagrs, graphs, tables. Order from LC. Mi $7.50, enl pr $25.80. PB 125454

The objective of this research is to obtain a theory that combines the effects of tracing distortion and record deformation in an analysis that will apply realistically to the physical situations encountered in practice. The problem is approached from both experimental and theoretical points of view. The experimental program first provides the data necessary to apply the theory, and then contains experiments intended to test the validity of the theory. The results of these experiments verify the conclusions of the theory in all important respects. HU ARL TM 20. Contract N 5 ori -76, T. O. X, NR 014-903.

Travel time in a layer with constant gradient (with tables of antigudermannians for 0° to 23°), by Robert A. Lufburrow. Woods Hole Oceanographic Institution, Woods Hole, Mass. Jul 1955. 51p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122455

1. Mathematical equations and solutions 2. Time study 3. Tables, Mathematical 4. Contract Nonr 891(00), NR 086-002, Technical report 5. WHOI Ref 55-39. AD 70729. Unpublished manuscript.

Unsteady-state diffusion through thin sheets, by A. S. Yue and A. G. Guy. Purdue University. Purdue Research Foundation, Lafayette, Ind. Dec 1955. 28p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122412

A theoretical formulation is proposed for treating the process of steady-state diffusion in substitutional solid solutions. Equations governing steady-state diffusion and the approach to the steady-state are derived. A proposed experimental arrangement is analyzed. AF OSR TN 56-35. PRF report no. 2. Contract AF 18(600)-1463.

Nuclear

Halogenated hydrocarbon-dye water equivalent method for measuring X- and gamma radiation, by Sanford C. Sigoloff. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Mar 1956. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 124537

This paper deals with the preparation and application of a water equivalent method of dosimetry for x-and gamma radiation. Data present the effects of varying (1) the total dose, (2) the effective energies, (3) the dose rate, and (4) the temperature during irradiation. The advantages and disadvantages of employing this system are discussed. AF SAM R 56-15.

Progress report, 37th, under Contract N5 ori-07806 for period Jun-Aug 1955. Massachusetts Institute of Technology. Laboratory for Nuclear Science, Cambridge, Mass. Aug 1955. 76p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 124590

Reports activity of various groups for this period and lists addresses and publications by members of the fission elements, nuclear chemistry, cosmic ray, neutron physics, cyclotron, and synchrotron groups. Contract AT(30-1)-905. Contract N5 ori-07806, 37th progress report.

Radiochemical researches. Final report under Contract no. AF 18(600)-663 for the period 1 Feb 1953-31 Jul 1956, by E. A. Martell. Chicago. University. Enrico Fermi Institute for Nuclear Studies. Aug 1956. 31p tables. Order from LC. Mi $3.00 ph $6.30. PB 124799

The research has included the further development of sensitive, absolute counting methods, the hot atom chemistry of radiocarbon, exchange rate and reaction rate studies, determination of excitation functions of nuclear reactions and the investigation of beta decay processes. A cumulative list of publications of other research carried out with the support of this contract is included at the end of the report. Project no. R-351-30-20. Contents: I. Introduction. - II. Reaction rates for slow reactions, by Dwight Conway. - III. Hot atom chemistry of radio carbon, by Colin MacKay. -IV. Negative pi meson activation of silver, by Wataru Goishi. -V. Cumulative list of publications.

PHYSIOLOGY

Dark adaptation: Time to become dark adapted after stimulation by various brightnesses and colors, by E. O. Hulbert. U. S. Naval Research Laboratory. Mar 1943. 21p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122680

Unclassified Apr 1947. 1. Optics, Physiological 2. Vision - Dark adaptation - Effect of red illumination 3. Vision - Dark adaptation - Effect of bright illumination 4. NRL H 2035

Energy expenditure during some subarctic bivouac activities, by Farrington Daniels, Jr. and Robert Madden. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Research Division, Quartermaster Research and Development Center, Natick, Mass. Apr 1956. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 124866

The energy cost for the performance of certain activities was measured at Fort Churchill, Canada. The energy costs varied from about 40 Cal/m^2/hr. (in sleeping bag at night) to about 325 Cal/m^2/hr. (simulated infantry assault), an eight-fold increase. Other activities, such as cutting snow blocks, chopping ice, pitching tents, etc., were also measured and the energy costs were in the range 200-300 Cals/m^2/hr. The importance of these findings to the design of Arctic clothing is discussed. Project reference: 7-64-12-004D. QMC EP TR 20.

Intracellular oxidative enzymes: Succinic dehydrogenase, DPN cytochrome c reductase, cytochrome oxidase, catalase, and total protein of retina and choroid, by Bertram Eichel and Arnold A. Swanson. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. May 1956. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124607

The retina and choroid were examined for total protein, succinic dehydrogenase, DPN cytochrome c reductase, cytochrome oxidase, and catalase activity. Comparison was made between each tissue. AF SAM R 56-71.

Man's thermal balance in warm environments, by Alan H. Woodcock, James J. Powers, Jr., and John R. Breckenridge. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Jul 1956. 20p graphs. Order from LC. Mi $2.40, ph $3.30. PB 124637

A theoretical analysis of the factors influencing stress in warm and hot environments is developed using physical equations of heat and moisture transfer. Two different situations are considered, the first where all sweat is evaporated and cooling limited by sweat secretion, and the second with skin wet where cooling is limited by the amount of sweat which can be evaporated. Consideration is also given to the practical case of complete evaporation from some areas of the skin and incomplete evaporation from others. Graphical presentation is used to demonstrate the separate and combined effects of various environmental factors and to indicate how clothing alters these effects. The theoretical results are shown to agree with the experimental findings of others. Project reference: 7-83-01-003. QMC EP TR 30.

Oculomotoric pattern of circular eye movements during increasing speed of rotation, by Siegfried J. Gerathewohl, Hubertus Strughold and William F. Taylor. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1956. 20p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 124532

The basic pattern of guided cirular eye movements during increasing rotational speed was photographed and analyzed with the use of a master ophthalmograph as recording device. Experiments were made with (1) saccadic eye movements at a constant speed of 15 r. p. m., (2) during increasing speeds from 20 to 45 r. p. m., and (3) from 40 to 85 r. p. m. The data were evaluated with regard to (a) number, and (b) extent of eye movements per cycle, per second, and per movement. The results indicate that as the rotational speed of the target increases, the movements of the eyes become more frequent, extensive, and irregular. AF SAM R 56-33.

Physiological adaptation to chronic hypoxia. D. Oxygen transport, by A. B. Otis and G. S. Husson. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Mar 1956. 8p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 124534

Some features of oxygen transport in hypoxia of circulatory origin are presented and compared with the situation present in altitude hypoxia. The polycythemia which develops in both types of hypoxia is described and discussed. It is concluded that polycythemia is an adaptation which is of especial advantage in the case of hypoxia of circulatory origin. AF SAM R 56-26.

PSYCHOLOGY

Adaptability screening of flying personnel: Human maze performance as a function of increasing levels of anxiety, by Joseph D. Matarazzo, George A. Ulett and George Saslow. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1956. 12p photo, graphs. Order from LC. Mi $2.40, ph $3.30. PB 124540

One hundred one male sophomore students, serving as subjects in a large experiment were administered the Modified Taylor Manifest Anxiety Scale, an intelligence test, and a standard stylus maze. The results, using time as a learning measure, supported the hypothesis that aniexty, as an acquired drive, would facilitate learning up to a point and that beyond this level increased anxiety would be associated with a decrement in performance. Since time is a continuous factor and trials a discrete variable, it was concluded that the hypothesis was generally supported. AF SAM R 55-120.

Effects of absolute and conditional probability distributions of instrument setting on scale reading: Repeated exposures of the same setting, by Virginia L. Senders and Jerome Cohen. Antioch College, Yellow Springs, O. Oct 1954. 52p photo, graphs, tables, diagr. Order from LC. Mi $3.60, ph $9.30. PB 125145

This paper analyses response sequences in the limiting case in which repeated successive exposures of the same stimulus are administered. Under these conditions information transmitted from scale settings to responses increases with exposure number in a manner approximately described by a growth function. When the same stimuli are presented in random sequence, only a very slight, approximately linear increase in transmitted information is found. Increasing the exposure time or the number of graduations on the scale increases the amount of information transmitted, and increasing the exposure time also increases the rate of gain of information. Mean square error decreases with successive exposures, and the correlation between the logarithm of this measure and information transmitted is -.86. AD 54628. Contract AF 18(600)-50. AF WADC TR 54-253.

Effects of choice of working partner on student achievement and attitudes, by Arlen R. Stafford, John V. Moore, Henry L. Adams and Arthur J. Hoehn. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Aids, Research Laboratory, Chanute Air Force Base, Ill. Dec 1955. 20p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 124847

The results of the study indicate that those students who were allowed to work in mutually acceptable pairs achieved significantly more than those who were not allowed to do so. Although it cannot be predicted with assurance that the results of the experiment would be duplicated in working groups whose structure was dissimilar to that of the experimental population, consideration for the operational use of the procedure in similar situations

appears justified. The report outlines possible methods for implemenation. Project 7714, Task 77249. Reported at the 1951 meeting of the Midwestern Psychological Association in a paper entitled "Interpersonal desirability and steel-mill 'hot strip' accidents." AF PTRC TN 55-61.

Non-linear approach to human tracking, by Harold L. Platzer. Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Dec 1955. 38p diagrs, graphs, table. Order from LC. Mi $3.00, ph $6.30. PB 124680

The phase-plane has been used to study response characteristics of the human operator in tracking problems. This study has revealed strong evidence of non-linear behavior. The phase-plane can be used as a tracking display, and since it presents more information than a conventional display, improved performance should be observed. This was found to be the case, especially when the phase-plane display had an optimum switching line marked on it. Interim technical report I-2490-1. Contract N onr-1571(00), NR 145-099.

Research on group structure and function as related to the personality characteristics and interest of group members. Final report under Contract N8 onr-66216, by Donald W. Olmsted and Elio D. Monachesi. Minnesota. University, Minneapolis, Minn. Sep 1955. 252p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $39.35. PB 124895

This research is concerned with factors related to the effectiveness of small organized groups. One of the primary objectives of the study was concerned with whether personality characteristics of group members affected in any appreciable degree the effectiveness of the group in the performance of group tasks or in providing satisfactions to group members. Group functions, group member's attitudes, interpersonal patterns among group members, formal leadership of groups and structural characteristics of groups were also studied. AD 72940.

Response mechanisms at the visual threshold, a methodological study. Final report, 16 Oct 1952-30 Jun 1955 under Contract N 5 ori-07639, by William S. Verplanck, Willard C. Day and Donald N. O'Connell. Harvard University. Psychological Laboratories, Cambridge, Mass. Jun 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 124007

1. Visual research 2. Visual perception 3. Contract N 5 ori-07639, NR 140-015. AD 70236. PL R-31. For Status reports I -II see PB 107381 and PB 118615.

Review of research on perceptual-motor performance under varied display-control relationships, by Burton G. Andreas and Bernard Weiss. Rochester. University. Dept. of Psychology, Rochester, N. Y. May 1954. 120f. Order from LC. Mi $6.00, enl pr $19.80. PB 124780

1. Psychomotor tests - Bibliography 2. Psychomotor tests - Apparatus - Design 3. Contract AF30 (602)-200, Scientific report no. 2. Includes abstracts of most of the studies listed in Scientific report no. 1.

RUBBER AND RUBBER PRODUCTS

Copolymer development reports, Jul 1, 1949-Apr 30, 1955. Prices for individual reports in microfilm or photocopy will be furnished upon request by the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D.C. PB 126248

These reports (approximately 1500 items) were prepared by research contractors participating in the synthetic rubber research and development program conducted under the auspices of the Federal Facilities Corporation and its predecessor agencies.

Index to copolymer development reports, Jul 1, 1949-Apr 30, 1955. Mi $11.10, ph $82.80. PB 126248s

Design data for O-rings and similar elastic seals, by Frank W. Tipton. Boeing Airplane Company, Seattle, Wash. Nov 1956. 113p photos, drawings, diagrs, graphs, tables (1 fold). Order from OTS. $3.00. PB 121898

In order to fully utilize materials for seal design, a knowledge of the relationship between the physical properties of the materials and sealing efficiency is required. This report includes a literature survey on O-rings and seal design and functional tests of O-rings prepared from rubber compounded to have various physical properties. No definite relationship between seal life and physical properties was found. The inability of the O-ring to maintain sufficient internal pressure and to withstand mechanical conditions are believed to be the two reasons for seal failure. AD 110598. Project 7340, Task 73405. Covers work from Jul 1955-Apr 1956 under Contract AF 33(616)-2867. AF WADC TR 56-272.

High temperature resistant sealant materials, by Leonard C. Boller, John M. Snider, John H. Emigh, Wendell Olson and Frank Hirosawa. Coast Pro-Seal and Mfg. Co., Los Angeles, Calif. Dec 1956. 67p photos, tables. Order from OTS. $1.75. PB 121911

This project was undertaken to develop fuel tank

sealant compounds capable of withstanding fuel vapor temperatures of 540°F and liquid fuel temperatures of 380°F for a limited period of time. A formula was developed for a sealant compound which was unaffected by JP-5 jet fuel under these conditions, retained flexibility and adhesion and withstood proof testing under flexing and pressure at the liquid and vapor fuel temperatures required. A study was made of the thermal stability of the various commercially available types of butadiene-acrylonitrile polymers and combinations of them with various commercial phenolic resins. Studies were made with added antioxidants and in inert atmospheres. Some preliminary work was started with coatings based on aqueous dispersions of polytetrafluoroethylene. Test procedures were developed using the Parr high pressure apparatus for liquid fuel at 380°F and fuel vapor at 540°F. Procedures and apparatus were developed for proof testing coatings under conditions of flexing under pressure at these temperatures. AD 110633. Project 7340, Task 73405. Covers work from Nov 1954 - Nov 1955 under Contract AF 33(616)-2767. AF WADC TR 56-155.

Static and dynamic properties of rubberlike materials. Final report under Contract N6-ori-83, T.o. 1, NR-330-003. University of Notre Dame. Dept. of Physics, Notre Dame, Ind. May 1955. 15p. Order from LC. Mi $2.40, ph $3.30. PB 124066

This report presents a combined bibliography and summary of technical reports issued under this contract, with a list and present addresses of men whose theses were based on work performed under this contract, from May 1, 1946 to Mar 31, 1955.

TEXTILES AND TEXTILE PRODUCTS

Effect of drawing on the infra-red dichroism of nylon 66 filaments, by Gino Caroti and Joseph H. Dusenbury. Textile Research Institute, Princeton, N. J. Apr 1956. 21p photos, graphs, table. Order from LC. Mi $2.70 ph $4.80. PB 125643

If a high-polymeric material is to be used as a textile fiber, it is well known that the polymer molecules usually must be oriented in a direction generally parallel to the fiber axis. This is accomplished, in the case of nylon, by drawing out initially unoriented fibers at a temperature well below the melting point. Infra-red absorption measurements in the 3-micron region, using polarized radiation, have been made for a series of nylon 66 filaments, ranging in draw ratio from one (undrawn) to four. From consideration of the dichroic ratios obtained it is suggested that there is a random arrangement of nylon 66 polymer chains at draw ratio one, with these chains becoming increasingly aligned with respect to the filament axis as the drawing increases. The method used to prepare a filament for infra-red examination is particularly important, since it has been found that improper preparative procedures may induce orientation in a filament. Contract Nonr-09000. Contract N onr-09001, Technical report 16. Published in Journal of Polymer Science, vol. 22, p. 399-407, Dec 1956.

History of dyeing of equipage fabrics, by A. R. McCormac. U. S. Office of the Quartermaster General. Jeffersonville Quartermaster Depot. Engineering Division, Jeffersonville, Ind. Oct 1945. 10p. Order from LC. Mi $1.80, ph $1.80. PB 122860

1. Dyes, Sulfur - Use 2. Fabrics, Cotton - Dyes and Dyeing 3. Duck (Textile) - Dyes and dyeing 4. Twill - Dyes and dyeing

Study of the effects of chemicals on the properties of parachute fabrics, by David M. Cates. North Caroline State College. School of Textiles, Raleigh, N. C. Nov 1956. 29p tables. Order from OTS. 75 cents. PB 121679s

The objective of this work was the statistical analysis of data reported in WADC TR 55-340 (PB 121679). The experimental data were obtained by determining the percent loss in strength of nylon and Dacron fabric was treated with chemicals under various conditions. AD 110524. Proj 7320, Task 73201. Covers work from Mar-Jun 1956 under Contract AF 33(616)-2530. Supplement PB 121679. AF WADC TR 55-340, Suppl. 1.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Airline pilot questionnaire study on cockpit visibility problems, by George L. Pitman and Thomas M. Edwards. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1950. 41p photos, diagr, graphs, tables. Order from LC. Mi $3.30 ph $7.80. PB 122306

1. Cockpits - Visibility 2. CAA TDR 123

Development of infra-red defrosting for aircraft canopies, by Leon Bennett, Wm. D. Murray and Harold K. Work. New York University. College of Engineering. Research Division. Mar 1957. 96p drawings, (part fold), diagrs, graphs, tables. Order from OTS. $2.50. PB 131032

Infra-red defrosting is studied with respect to power required, sources, materials, canopy tem-

peratures, automatic temperature regulation, visible light output, efficiency and other factors. A final design, based on this study plus numerous laboratory experiments, is prepared for the B-47B units submitted to Air Materiel Command for test. AD 118065. Project 6145. Contract AF 33(600)-20561. AF WADC TR 53-115.

Instruments

Design of controls, by Jerome H. Ely, Robert M. Thomson and Jesse Orlansky. Dunlap and Associates, Inc., Stamford, Conn. Nov 1956. 107p photos, diagrs, graphs, tables. Order from OTS. $2.75. PB 121970

This report provides a compilation of human engineering recommendations concerning various aspects of control selection and design. It is divided into three main parts: selection of proper control, general control design consideration, and detailed design recommendations for specific controls. AD 118023. Project 7180, Task 71501. Chapter VI of the Joint Services' Human engineering guide to equipment design. Includes Bibliography of 85 items. Contract AF 33(616)-419. AF WADC TR 56-172.

Effect of exponential type control lags on the speed and accuracy of positioning a visual indicator, by Melvin J. Warrick. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeromedical Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1955. 16p diagrs, graphs, tables. Order from OTS. 50 cents. PB 121359

There is inherent in many controller systems a lag between the time that an operator positions his control and the time that the corresponding effect is achieved. Very frequently this lag approximates an exponential function. The present investigation was conducted to determine what effect, if any, such controller system lags have on the human operator's ability to position a visual indicator rapidly and accurately. Project no. 7182. AF WADC TN 55-348.

Interim report on type test of AN/ASG-10, by I.W. Fuller and M.L. Burnett. U. S. Naval Research Laboratory. Aug 1945. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 122789

Unclassified 15 Dec 1953. 1. Releases, Bomb - Tests 2. Bombing, Precision - Instruments - Tests 3. NRL R-2609

Engines and Propellers

Analytical investigation of the effect of water injection on supersonic turbojet-engine: Inlet matching and thrust augmentation, by Andrew Beke. U. S. National Advisory Committee for Aeronautics. Jan 1957. 25p diagrs, graphs. Order as TN 3922 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124449

1. Diffusers, Intake - Theory 2. Diffusers, Subsonic - Theory 3. Diffusers, Supersonic - Theory 4. Turbines, Gas - Liquid injection 5. Flow, Subsonic - Theory 6. Cooling systems - Controls 7. Jet engines, Tubo-jet - Cooling 8. NACA TN 3922

Effect of ambient-temperature variation on the matching requirements of inlet-engine combinations at supersonic speeds, by Eugene Perchonok and Donald P. Hearth. U. S. National Advisory Committee for Aeronautics. Jan 1957. 16p graphs. Order as TN 3834 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124393

1. Bodies of revolution - Aerodynamics - Effect of Mach number 2. Jet engines, Turbo-jet - Effect of temperature 3. Jet engines, Turbo-jet - Air inlets - Theory 5. Ducts, Air - Inlet pressure 6. NACA TN 3834

Effect of forward-flight speed on the propulsive characteristics of a pulse-jet engine mounted on a helicopter rotor, by Robert D. Powell, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1957. 23p photos, graphs, drawing, diagrs. Order as TN 3855 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D. C. PB 124475

1. Helicopters - Wind tunnel tests 2. Jet engines, Pulse-jet - Thrust - Measurement 4. Helicopters - Rotors - Models - Tests 5. NACA TN 3855.

Expanded resin cuffs for modifying inboard sections of high speed model propeller test blades, by George T. Wright. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Propeller Laboratory, Wright-Patterson Air Force Base, Dayton, O. Dec 1956. 22p photos, graphs. Order from OTS. 75 cents. PB 121884

A method of applying expanded resin cuffs to model propeller blades for use in aerodynamic test programs on the USAF propeller dynamometer in the Cornell Aeronautical Laboratory Variable Density Wind Tunnel is presented. In addition to the method of application, a brief resume of the proof testing of the cuff material is presented. AD 110671. Project 3345, Task 33040. AF WADC TR 56-625.

Exploratory investigation of the use of area suction to eliminate air-flow separation in diffusers having large expansion angles, by Curt A. Holzhauser and Leo P. Hall. U. S. National Advisory Committee for Aeronautics. Oct 1956. 18p drawings, graphs. Order as TN 3793 from National Advisory Committe for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124369

1. Diffusers, Conical - Flow - Separation 2. Boundary layer - Suction effect 3. NACA TN 3793

Retainer materials for aircraft gas-turbine bearings, by Peter F. Mataich and F. Clifton Wagner. Horizons, Inc., Cleveland, O. Aug 1956. 34p photos, diagrs, graph, table. Order from OTS. $1.00. PB 121935

The development work was concentrated on nickel base silver impregnated materials produced by powder metallurgy techniques. Various boride, carbide, and silicide additions were made to the nickel base, and several compositions were found which had superior wear characteristics. In addition to this work a series of oil evaluation tests were made, and the wear rates of both the new and the standard materials were determined while using these oils as lubricants. AD 97235. Project 3066, Task 73599. Covers research from 1 Apr 1955-30 Apr 1956 under Contract AF 33(616)-2949. AF WADC TR 56-294.

Airports and Airways

Summary of joint FIL-TDC simulation activities in air traffic control, by Samuel M. Berkowitz, Edward L. Fritz and Roger S. Miller. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Mar 1957. 32p diagrs, graph, tables. Order from OTS. $1.00. PB 121919

This report summarizes the joint air traffic control simulation activities performed at the Franklin Institute Laboratories (FIL) and the Technical Development Center (TDC) during a two-year contract period ending June 1955. Simulation processes included analytical, graphical, and dynamic techniques described in CAA TDR 191, 222 (PB 111367) and 251. Prepared for Air Navigation Development Board under Project no 6.7. Appendix A: Comparative results and duscussion of some terminal-area studies. CAA TDR 297.

Aerodynamics

Drag interference between a pointed cylindrical body and triangular wings of various aspect ratios at Mach numbers of 1.50 and 2.02, by Elliott D. Katzen and George E. Kaattari. U. S. National Advisory Committee for Aeronautics. Nov 1956. 41p photos, drawings, graphs, tables. Order as TN 3794 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124370

1. Mach number - Effect 2. Interference, Aerodynamic - Theory 3. Drag, Aerodynamic - Theory 4. Airplanes - Skin - Friction - Theory 5. Wings, Triangular - Drag 6. Wings, Triangular - Interference 7. NACA TN 3794 Supersedes RM 51 C27. For first report in this series see PB 124371.

Flow establishment and wall interference in transonic wind tunnels, by B. H. Goethert. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jun 1954. 62p diagrs, graphs, table. Order from LC. Mi $3.90, ph $10.80. PB 124731

The work conducted for modifying the WADC 10ft wind tunnel from a subsonic to a slotted transonic wind tunnel is described. Then, investigations of individual problems of transonic testing are presented in connection with the development of a large transonic wind tunnel at the AEDC. Particularly, it is shown that snall-grain perforated test-section walls offer a good possibility to accomplish satisfactory shock-wave cancellation. From the view point of optimum total-power requirements of wind tunnels, the advantages of plenum-chamber suction by means of auxiliary compressors are pointed out and confirmed in wind-tunnel model tests. Finally, some tests of a complete airplane model in both a small, as well as a large transonic wind tunnel, are presented. Excerpts from report were presented at the National Summer meeting of the Institute of the Aeronautical Science, Jun 21 - 24, 1954, at Los Angeles. AF AEDC TR 54-44.

Investigation of vertical drag and periodic airloads acting on flat panels in a rotor slipstream, by Robert A. Makofski and George F. Menkick. U. S. National Advisory Committee for Aeronautics. Dec 1956. 23p photo, diagr, graphs. Order as TN 3900 from National Advisory Committee for Aeronautics, 1512 "H" Street, N. W., Washington 25, D.C. PB 124442

1. Wings, Rotating - Loads 2. Wings, Rotating - Theory 3. Helicopters - Rotors - Slipstream 4. NACA TN 3900

Lift and pitching-moment interference between a pointed cylindrical body and triangular wings of various aspect ratios at Mach numbers of 1.50 and 2.02, by Jack N. Nielsen, Elliott D. Katzen, and Kenneth K. Tang. U. S. National Advisory Committe for Aeronautics. Dec 1956. 49p photos, drawing, diagr, graphs, tables. Order as TN 3795 from National Advisory

Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124371

1. Mach number - Effect 2. Wings, Triangular - Aspect ratio 3. Wings, Triangular - Pitching moment 4. Wings, Triangular - Interference 5. Interference, Aerodynamic - Theory 6. NACA TN 3795. Supersedes RM A50F06

Method for the determination of the damping-in-pitch of semi-span models in high-speed wind-tunnels and some results for a triangular wing, by Kazimierz Orlik-Rückemann and Carl Olof Olsson. Flygtekniska Försöksanstalten (FFA) Stockholm, Jan 1956. 26p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122872

The model is mounted elastically by means of a torsion bar with cruciform section. The initial oscillation amplitude is built up electromagnetically, after which the disconnection of the energy source results in a free oscillation, which is automatically evaluated on a special electronic apparatus, called the "Dampometer". The method is used to determine the damping-in-pitch of a semi-span model of a triangular wing of aspect ratio 1.45 oscillating around the 60 per cent point at subsonic, transonic and supersonic speeds. The most interesting result is the rapid fall of the damping-in-pitch in the transonic speed range. The values agree well with existing theories and are considerably lower than theoretical values at supersonic speeds. FFA 62

Second test region of a free-jet supersonic wind tunnel as a region of variable Mach number, by J. D. Lee and G. L. Von Eschen. Ohio State University. Dept. of Aeronautical Engineering. Aerodynamic Laboratory, Columbus, O. Jun 1956. 25p diagr, graphs. Order from OTS. 75 cents. PB 121708

A method of using a supersonic nozzle designed for a fixed Mach number to obtain a "second test region" of theoretically uniform supersonic flow whose Mach number may be varied rapidly over a moderate range has been studied in a 12-inch by 12-inch supersonic, free-jet, blowdown wind tunnel. The region is generated by a controlled two-dimensional wave system generated at the exit of the fixed nozzle. A region whose Mach number could be varied in the range $2.0 < M < 2.65$ was generated in the two-dimensional free-jet from a fixed nozzle designed for a Mach number of 2.008. The quality of the flow in this second test region was generally comparable with that of the usual test region or first rhombus of the nozzle. The size of the variable region at any given Mach number was found to be approximately equal to that which could be expected from a 12-inch nozzle designed for that particular Mach number. Models and mounts of useful size and shape, properly located in the second test region, were found to have no effect upon the available Mach number range. Project 5-(1-1363), Task no. 70115. Contract AF 33(616)-2755. AF WADC TR 56-337.

Theoretical and experimental investigation of the effect of tunnel walls on the forces on an oscillating airfoil in two-dimensional subsonic compressible flow, by Harry L. Runyan, Donald S. Woolston and A. Gerald Rainey. U. S. National Advisory Committee for Aeronautics. 1956. 23p photo, diagr, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 124465

1. Wings - Vibrations - Calculations
2. Wind tunnels, Subsonic - Walls - Effects
3. NACA 1262

Rockets and Jet Propulsion

Project Squid. Semi-annual progress report which covers the unclassified work accomplished during the period 1 Oct 1954-31 Mar 1955, by prime and subcontractors under Contract N6 ori-105, T.O. III, NR 098-038. Princeton University, James Forestal Research Center. Apr 1955. 147p graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 124103

A cooperative program of fundamental research as related to jet propulsion for the Navy, Air Force, and Army. For earlier reports see PB 107680, 114392, 116870, 118188, 122560 and 122573. Contents: Mixing of supersonic and subsonic gas streams (Princeton). - Fundamental investigation of nonstationary flow phenomena (Cornell). - Investigation of turbulence (John Hopkins). - Interactions of discontinuities (Michigan). - Transport properties of liquids (Princeton). - Heat conductivity of gases (M. I. T.). - Prandtl number determination (California). - Physical properties of the oxides of nitrogen (Cal. Tech.). - Studies of heat transfer from hot gases and the mechanism of liquid fluid film cooling (Purdue). - Porous wall cooling studies (Brooklyn). - Vaporization and combustion of multi-component fuel droplets (Northwestern). - Combustion studies of homogeneous droplet-air mixtures (Dartmouth). - Investigation of the basic problems associated with gaseous combustion (Delaware). - Flame and flow interaction (Cornell). - Flame and ignition phenomena (Bureau of Mines). - Spark ignition, ionization in flames, and high flow combustion (Experiment, Inc.). - High output combustion (M. I. T.). - Turbulent flames, flame stability, and rough burning (Alantic Research). - Study of chemical kinetics and basic combustion processes (Princeton). - Theory of detonations and flame propagation in gases (Wisconsin). - Index to reports by contracting agencies. - Appendix A. - Reports and publications.

Land Transportation

Techniques for the evaluation of track and road-wheel design, by S. J. Weiss. U. S. Arsenal,

Detroit. Land Locomotion Research Laboratory, Detroit, Mich. Mar 1956. 29p drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123107

Alignment charts allowing the rapid estimation of tracked vehicle sinkage have been prepared in accordance with four existing tank sinkage theories. Additional illustrative design problems have been presented to demonstrate the possible use of these charts. This work has been undertaken in order to provide an objective assessment objective of the relative performance of different combinations of running gear components to supplement the practical experience of vehicle design personnel when it was envisioned that certain combinations of road wheels and track widths would provide optimum solutions to vehicle performance problems within the space limitations of exixting design conventions. Project TT1 696. D.A. project 572-01-001. DA LLRL TM M-01.

MISCELLANEOUS

Naval Research logistics, quarterly, Vol. I, no. 1. U.S. Office of Naval Research. Mar 1954. 75p diagr, table. Order from OTS. $2.50. PB 121993

Contents: Logistics, what is it? by Henry E. Eccles. Priorities in the Naval supply system, by William M. Young. - On the span of central direction, by T. M. Whitin. - Dual method of solving the linear programming problem, by C. E. Lemke. - Linear programming in bid evaluation, by E. D. Stanley, D. P. Honig and Leon Gainen. - Some blotto games, by D. W. Blackett. - Optimal two-and three-stage production schedules with setup times included, by S. M. Johnson. - News and memoranda. - Recent publications.

Report of NRL progress. U. S. Naval Research Laboratory. Jun 1957. 44p. Order from OTS. $1.25. Also available on annual subscription rate of $10 a year in the U. S. A., foreign rate $13 a year. PB 131097

Contents: High-temperature plasmas, by A.C. Kolb. - NRL Radiation Calibration Laboratory, by A. E. Nash and W. E. Kunz. - Calculation of the critical mass of the NRL reactor, by A. F. DiMeglio and S. Podgor. - Scientific program: Problem notes: Applications research: Comparative evaluation of three approaches to helicopter instrumentation for hovering flight. - Astronomy and astrophysics: Atmospheric radioactivity along the 80th meridian during 1956. - Chemistry: Friction and wettability of aliphatic polar compounds and effect of halogenation.....Mechanical durability of aliphatic polar compounds and effect of halogenation.... Infrared absorption studies of some halogenated acetic acids. - Mechanics: Work-hardening effects of applying static and dynamic loads to 1045 carbon steel....Comparison of critical crack extension force values for cracks propagating parallel and perpendicular to rib stiffeners in stainless steel. - Metallurgy and ceramics: Susceptibility of alloys to hydrogen embrittlement....Room temperature thermal resistivity of copper alloys.... Helical dislocations.... An analysis of temperature coefficients of solubility in dilute liquid metal solutions.... Carbon dioxide-sodium silicate process for bonding foundry sands....Explosion-bulge test performance of machine welded 1-inch thick HY-80 steel.... Corrosion products in ferrous systems. - Nuclear and atomic physics: On the kinematics of hyperon decays. - Radio: Antenna transformer couples energy from 600-ohm balanced circuit to 70-ohm unbalanced circuit....Periodicity of audio-frequency musical atmospherics known as "dawn chorus". - Solid-state physics: Defects in quartz crystals....A strain-gage method of measuring the magnetostriction of polycrystalline metals. - Supporting techniques: Determination of the thickness of adhesive bonds. - Published reports. Papers by NRL staff members. - Patents.

ATOMIC ENERGY COMMISSION REPORTS

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

Health and safety aspects of new materials feed plant for thorium production, by O. R. Magoteaux, E. W. Mautz, and T. C. Reunion. National Lead Company of Ohio, Cincinnati, Ohio. Mar 1953. Contract No. AT(30-1)-1156. 18p. Order from OTS. 30 cents. FMPC-150 (Del.)

Fourth Atomic Energy Commission air cleaning conference held at Argonne National Laboratory, November 1955 by Howard Caterson and others. Division of Reactor Development, Washington, D. C. Jun 1956. 27p. Order from OTS. 35 cents. TID-7513(Pt. 2)

Semiannual report for period ending December 31, 1956 by Robert S. Stone and Gail D. Adams. Radiological Laboratory, University of California School of Medicine, San Francisco, California. Feb 1957. Contract No. AT-11-1-GEN-10. 24p. Order from OTS. 25 cents. UCSF-14

Some effects of variation in exposure time and input pulse shape in the production of radiant energy thermal burns by F. W. Payne and J. R. Hinshaw. The University of Rochester, Atomic Energy Project, Rochester 20, N.Y. Mar 1957. Contract W-7401-eng-49. 24p. Order from OTS. 25 cents. UR-486

Chemistry and Chemical Engineering

Manual of analytical methods. Volume II. Part 2. Analysis of refined materials and by-products by Lewis G. Bassett, Daniel J. Pflaum, Robert J. Rutman, Clement J. Rodden and N. H. Furman. Manhattan District, Madison Square Area, New York, N.Y. Jan 1946. 121p. Order from OTS. 60 cents. A-2912 (Vol. II, Pt. 2)

The structure and properties of artificial and natural graphite by T. J. Neubert, J. Royal and A. R. Van Dyken. Argonne National Laboratory, Lemont, Ill. Jun 1955. 71p. Order from OTS. 45 cents. AECD-3723

Process waste water treatment plant preliminary report by Oak Ridge National Laboratory, Oak Ridge, Tennessee and Burns and McDonnell Engineering Company, Kansas City, Missouri. Feb 1957. Contract Nos. W-7405-Eng-26 and AT (40-1)-2008. 51p. Order from OTS. 45 cents. AECU-3370

Decomposition and recombination in irradiated static water systems at high temperatures by J. R. Humphreys, E. K. Abers, and Y. Solomon. Argonne National Laboratory, Lemont, Ill. Mar 1953. Contract No. W-31-109-eng-38. 56p. Order from OTS. 30 cents. ANL-5004

Chemical engineering division summary report by Stephen Lawroski, W. A. Rodger, R. C. Vogel and V. H. Munnecke. Argonne National, Laboratory, Lemont, Ill. Dec 1956. Contract No. W-31-109-eng-38. 147p. Order from OTS. 80 cents. ANL-5633

Semiannual progress report for the period July 1956 through December 1956 by L.C. Nelson, D. Aaron, C. L. Zyskowski and others. New Brunswick Laboratory. Apr 1957. 20p. Order from OTS. 20 cents. NBL-134

A microscopic study of oxide films formed on chrome-iron containing approximately 1.25% copper exposed to 0.17 M uranyl sulfate solution at 250°C. for 12 weeks by T. E. Willmarth and F. D. McNeer. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1952. 17p. Order from OTS. 30 cents. CF-52-1-181

Final slurex runs by A. C. Jealous. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1952. 7p. Order from OTS. 25 cents. CF-52-1-194

The abrasive properties of thorium oxide by J. P. McBride. Oak Ridge National Laboratory, Oak Ridge, Tenn. Aug 1953. 4p. Order from OTS. 20 cents. CF-53-8-149

A turbidimeter for in-process analysis of organic contamination by D. W. Colvin. E. I. du Pont de Nemours & Co., Savannah River Laboratory. Oct 1956. Contract AT(07-2)-1. Oct 1956. 15p. Order from OTS. 20 cents. DP-178

Decreasing and pickling of uranium chips by B. G. Ryle, R. W. Vest and J. F. Blum. National Lead Company of Ohio, Cincinnati, Ohio. Dec 1954. Contract AT(30-1)-1156. 18p. Order from OTS. 30 cents. FMPC-497

Physical properties of the system uranyl nitrate-aluminum nitrate-nitric acid-water-hexone. Part VI. Distribution coefficients of plutonium (IV) nitrate by C. Groot, I. M. Rehn and C. M. Slansky. Hanford Works, Richland, Washington. Dec 1950. Contract W-31-109-eng-52. 16p. Order from OTS. 30 cents. HW-19303

The identification and characterization of explosive residues produced by dissolution of uranium-zirconium alloys by W. W. Schulz, F. A. Scott and E. E. Voiland. Hanford Atomic Products Operation, Richland, Washington. Nov 1954. 36p. Order from OTS. 40 cents. HW-32410

Hanford use of experimental water filter plant by W. R. Conley, C. W. Botsford and R. W. Pitman. Hanford Atomic Products Operation, Richland, Washington. Aug 1956. Contract W-31-109-eng-52. 30p. Order from OTS. 35 cents. HW-45008

Production of pure thorium and uranium compounds by the acid dissolution of monazite sand by G. L. Bridger, K. G. Shaw, M. E. Whatley and J. Bochinski. Ames Laboratory, Iowa State College, Iowa. Sep 1951. Contract W-7405 eng-82. 37p. Order from OTS. 40 cents. ISC-170

Effect of phosphate rock particle size on recovery of uranium from superphosphate by William W. Davis and Morton Smutz. Ames Laboratory, Iowa State College, Ames, Iowa. Dec 1955. Contract W-7405-eng-82. 26p. Order from OTS. 25 cents. ISC-678

The formation of thallium chloride complexes and their extraction into ether by D. L. Horrocks and A. Voigt. Ames Laboratory Iowa State College Ames, Iowa. Nov 1955. Contract W-7405-eng-82. 73p. Order from OTS. 45 cents. ISC-703

Comparative yields of $Fe^{54}(\gamma, pn)Mn^{52}$ and $Fe^{54}(\gamma, 2n)Fe^{52}$ by R. M. Henry and D. S. Martin. Ames Laboratory, Iowa State College, Ames Iowa. Aug 1955. Contract W-7405-eng-82. 30p. Order from OTS. 25 cents. ISC-726

Critical mass studies: Part II by Beck, Callihan and Murray. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1948. 51p. Order from OTS. 40 cents. K-126

Selected analytical methods for Purex process control by B. F. Rider and E. L. Bernier (du Pont). General Electric Company, Schenectady, N.Y. Apr 1953. Contract W-31-109-eng-52. 142p. Order from OTS. 80 cents. KAPL-890(Rev.)

Corrosion behavior of zirconium-base uranium alloys by U. Merten and D. C. Belouin. General Electric Company, Schenectady, N.Y. Jun 1956. Contract W-31-109-eng-52. 39p. Order from OTS. 40 cents. KAPL-1570

Project summary decontamination of UO_2SO_4 solutions (57-C) by F. Fahnoe and others. Vitro Corporation of America, New York City, N.Y. Jul 1953. 41p. Order from OTS. 35 cents. KLX-1617

Electrokinetic processes - nuclear aspects. Quarterly progress report for August 1 - October 31, 1954. Job 1099 by H. F. Reichard, J. J. Shyne, H. N. Barr and W. D. Fletcher. Vitro Laboratory, West Orange, N.J. Nov 1954. Contract AT(30-1)-850. 47p. Order from OTS. 45 cents. KLX-1737

Homogeneous reactor fuel reprocessing by CaF_2 adsorption of rare earths by H. F. Reichard, J. D. McAdoo, R. J. Abelson, G. K. Koenig and G. J. Weiss. Vitro Laboratory, West Orange, N.J. Dec 1954. Contract W-7405-eng-26. 30p. Order from OTS. 35 cents. KLX-1739

Homogeneous reactor fuel reprocessing quarterly progress report for July 1 - September 30, 1955 by H. F. Reichard, J. D. McAdoo, S. J. Klach, G. K. Koenig and P. E. Smith. Vitro Laboratory, West Orange, N. J. Nov 1955. Contract W-7405-eng-26. 21p. Order from OTS. 35 cents. KLX-10012

Homogeneous reactor fuel reprocessing quarterly report October 1 - December 31, 1955 by H. F. Reichard, J. D. McAdoo, S. J. Klach, G. K. Koenig and P. E. Smith. Vitro Laboratory, West Orange, N. J. Jan 1956. Contract W-7405-eng-26. 26p. Order from OTS. 25 cents. KLX-10020

A qualitative survey of the physical factors affecting the precipitation of uranium from uranyl nitrate solution by hydrogen peroxide by B. L. Kelchner. Los Alamos Scientific Laboratory, Los Alamos, New Mexico. Jul 1950. Contract W-7405-eng-36. 62p. Order from OTS. 50 cents. LA-1089

Some experiments on the precipitation of plutonium compounds from tributyl phosphate solutions by L. J. Mullins and W. J. Maraman. Los Alamos Scientific Laboratory, Los Alamos, New Mexico. Jun 1956. Contract W-7405-eng-36. 8p. Order from OTS. 25 cents. LA-2050

The dissolution of zirconium-clad uranium target elements by R. H. J. Gercke and W. H. McVey. Livermore Research Laboratory, Livermore, Calif. Dec 1953. Contract AT(11-1)-74. 17p. Order from OTS. 30 cents. LRL-73(Rev.)

The removal of molybdenum from solutions of uranyl nitrate prepared from pitchblende by A. E. Ruehle and others. Mallinckrodt Chemical Works, St. Louis, Mo. Apr 1946. Contract W-7405-eng-1. 14p. Order from OTS. 30 cents. MCW-18

Development of continuous ether extraction process for purification of uranium derived directly from pitchblende ore by J. V. Opie and others. Mallinckrodt Chemical Works, St. Louis, Mo. Apr 1946. Contract W-7405-eng-1. 32p. Order from OTS. 35 cents. MCW-19

The distribution of boron and molybdenum in the recovery of nitric acid and calcium nitrate from raffinates originating with pitchblende by A. E. Ruehle and others. Apr 1946. Contract W-14-108-eng-8. 8p. Order from OTS. 25 cents. MCW-23

The reaction of uranium dioxide with hydrogen fluoride to produce uranium tetrafluoride, and related topics by E. I. Miller and others. Mallinckrodt Chemical Works, St. Louis, Mo. Apr 1946. Contract W-7405-eng-29. 18p. Order from OTS. 30 cents. MCW-24

Equilibrium ratio of hydrogen fluoride and water in the fluorination of uranium dioxide at high temperatures by C. W. Kuhlman and others. Mallinckrodt Chemical Works, St. Louis, Mo. Jul 1948. 7p. Order from OTS. 25 cents. MCW-118

Reaction rate of the fluorination of uranium dioxide at a continuously increasing temperature by C. W. Kuhlman and others. Mallinckrodt Chemical Works, St. Louis, Mo. Jul 1948. 7p. Order from OTS. 25 cents. MCW-121

The distribution of tracer plutonium and fission products between molten uranium and solid uranium and solid uranium oxide, carbide, and nitrate by F. J. Keneshea, Jr., A. M. Saul and C. T. Young. Atomic Energy Research Department, North American Aviation, Inc., Downey, Calif. Sep 1954. Contract AT 11-1-GEN-8. 34 p. Order from OTS. 35 cents. NAA-SR-1032

Semi-annual report on the investigation of pyrochemical processing of Th-U fuel September, 1954 - February, 1955 by F. J. Keneshea, Jr., A. G. Buyers and E. E. Motta. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Jan 1957. Contract AT-11-1-Gen-8. 17p. Order from OTS. 30 cents. NAA-SR-1374

Separations chemistry quarterly progress report July - September, 1955 by A. G. Buyers, S. J. Yosim and E. E. Motta. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Jun 1956. Contract AT-11-1-1-Gen-8. 26p. Order from OTS. 35 cents. NAA-SR-1529

Separations chemistry quarterly progress report October to December, 1955 by E. Motta, A. Buyers, S. Yosim and J. Foltz. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Jul 1956. Contract AT-11-1-Gen-8. 45p. Order from OTS. 45 cents. NAA-SR-1628

Separations chemistry quarterly progress report July - September 1956 by E. E. Motta, A. G. Buyers and W. J. Gardner. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Jan 1957. Contract AT-11-1-Gen-8. 31p. Order from OTS. 35 cents. NAA-SR-1759

Separations chemistry quarterly progress report January - March, 1956 by E. E. Motta, A. G. Buyers and J. R. Foltz. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Oct 1956. Contract AT-11-1-Gen-8. 23p. Order from OTS. 35 cents. NAA-SR-1676

The volatilization of fission products from molten and solid thorium-uranium alloy by T. A. Milne and C. T. Young. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Dec 1956. Contract AT-11-1-Gen-8. 19p. Order from OTS. 30 cents. NAA-SR-1680

Separations chemistry quarterly progress report April - June, 1956 by A. G. Buyers, W. J. Gardner, E. E. Motta and G. Brand. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. Dec 1956. Contract AT-11-1-Gen-8. 33p. Order from OTS. 40 cents. NAA-SR-1697

Use of surface active agents to prevent emulsions in slurex extractions by R. Piper and A. E. Ruehle. Mallinckrodt Chemical Works, St. Louis, Mo. Aug 1952. Contract W-14-108-Eng-8. 14p. Order from OTS. 25 cents. NYO-1347

The reactivity of uranium oxides by Karl S. Willson. The Harshaw Chemical Company, Cleveland, Ohio. Feb 1952. Contract W-7405 -Eng-276. 23p. Order from OTS. 35 cents. NYO-1466

Summary report on the long range program for the period, February 16, 1953 to April 30, 1953 by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. Jun 1953. 80p. Order from OTS. 55 cents. NYO-2040

Determination of oxygen in uranium and uranium hydride by reaction with bromine trifluoride by S. Johnson, D. L. Henry and M. D. Banus. Metal Hydrides Incorporated, Beverly, Mass. Apr 1954. Contract AT(30-1)1350. 16p. Order from OTS. 30 cents. NYO-3798

The removal of "vitamin" (boron) and $SO_4^{=}$ from soda salt by T/3 A. L. Grunewald. Mallinckrodt Chemical Works, St. Louis, Mo. Dec 1945. Contract W-7405-Eng-1. 9p. Order from OTS. 25 cents. NYO-5147

The oxidation of UO_2 in air and under conditions of storage by J. Stevenson and J. Boyd. Mallinckrodt Chemical Works, St. Louis, Mo. Apr 1948. 27p. Order from OTS. 35 cents. NYO-5224

A report on the use of a hydrofluoric acid recovery system by W. A. Oppeld. Mallinckrodt Chemical Works, St. Louis, Mo. 6p. Order from OTS. 25 cents. NYO-5258

A comparison of pycnometric and X-ray densities for the sodium chloride - sodium bromide and potassium chloride - potassium bromide systems by W. E. Wallace and J. S. Wollam. University of Pittsburg, Pittsburg, Pa. Oct 1956. Contract AT (30-1)-647. 9p. Order from OTS. 15 cents. NYO-6333

Decomposition of water and aqueous solutions under pile radiation by A.O. Allen, T. W. Davis, G. V. Elmore, J.A. Ghormley, B. M. Haines and C. J. Hochanadel. Oak Ridge National Laboratory, Oak Ridge, Tenn. Oct 1949. Contract W-7405, eng 26. 64p. Order from OTS. 45 cents. ORNL-130

Tributyl phosphate as an alternate solvent for extraction of "25" from spent MTR fuel assemblies by T. C. Runion and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Sep 1950. Contract W-7405-eng 26. 12p. Order from OTS. 25 cents. ORNL-801

The hydrolysis of tributyl phosphate and its effect on the Purex process by V. J. Reilly and W. B. Lanham. Oak Ridge National Laboratory , Oak Ridge, Tenn. Dec 1951. Contract W-7405, eng 26. 22p. Order from OTS. 30 cents. ORNL-1138

Laboratory development of the Thorex process: Progress report for February 1, 1953 to July 31, 1953 by A. T. Gresky and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Apr 1954. Contract W-7405-eng-26. 91p. Order from OTS. 60 cents. ORNL-1610(Rev.)

Separation of uranium (VI) from other metals by filter paper partition chromatography with 2-methyltetrahydrofuran and its quantitative determination. I. Separation studies by use of radioisotopes by C. D. Susano, M. T. Kelley, H. P. Raaen and P. F. Thomason. Oak Ridge National Laboratory, Oak Ridge, Tenn. Aug 1954. Contract W-7405-eng-26. 43p. Order from OTS. 45 cents. ORNL-1690

Preliminary cost estimation: Chemical processing and fuel costs for a thermal breeder reactor power station by E. D. Arnold, A. T. Gresky, R. J. Klotzbach and A. R. Irvine. Oak Ridge National Laboratory, Oak Ridge, Tenn. Feb 1955. Contract W-7405-eng-26. 58p. Order from OTS. 50 cents. ORNL-1761

Products produced in batch neutron irradiation of thorium by A. T. Gresky and E. D. Arnold. Oak Ridge National Laboratory, Oak Ridge, Tenn. Dec 1955. Contract W-7405-eng-26. 37p. Order from OTS. 40 cents. ORNL-1818

The isolation and purification of americium by D.O. Campbell. Oak Ridge National Laboratory, Oak Ridge, Tenn. Apr 1956. Contract W-7405-eng-26. 23p. Order from OTS. 20 cents. ORNL-1855

Monex process: Terminal report by R. J. McNamee and R. P. Wischow. Oak Ridge National Labor-

atory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 36p. Order from OTS. 40 cents. ORNL-1873

Determination of corrosion products and additives in homogeneous reactor fuel. II. Polarographic determination of chromium by M. T. Kelley, C. D. Susano, A. D. Horton and P. F. Thomason. Oak Ridge National Laboratory, Oak Ridge, Tenn. Oct 1955. Contract W-7405-eng-26. 12p. Order from OTS. 30 cents. ORNL-1887

Development of the Excer process. II, by J. A. Marinsky. Oak Ridge National Laboratory, Oak Ridge, Tenn. Apr 1956. Contract W-7405-eng-26. 32p. Order from OTS. 25 cents. ORNL-1979

Interim evaluation of the Fluorox process for UF_4 and UF_6 manufacture by J. E. Moore. Oak Ridge National Laboratory, Oak Ridge, Tenn. May 1955. Contract W-7405-eng-26. 10p. Order from OTS. 25 cents. ORNL-1985

Feed materials processing status report for October, 1956 by R. E. Blanco and W. K. Eister. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1957. Contract W-7405-eng-26. 17p. Order from OTS. 30 cents. ORNL-2209

Digestion and filtration of leached zone in pilot plant by G. L. Dugger, J. B. Adams and R. Bart. International Minerals and Chemical Corporation, Chicago, Ill. Feb 1955. AT(49-1)-545. 35p. Order from OTS. 50 cents. RMO-2044

The chelate process I by J. R. Thomas and H. W. Crandall. University of California. Mar 1947. Contract W-7405-eng-48b. 58p. Order from OTS. 40 cents. TID-10002

Conference on the use of organic materials in nuclear reactors--August 5-6, 1953, Downey, California by R. L. Loftness. Atomic Energy Research Department, North American Avaition, Inc., Downey, Calif. Dec 1953. Contract AT-11-1-gen-8. 146p. Order from OTS. 70 cents. TID-10041

Quarterly progress report for the period ending March 31, 1953 by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. n. d. 86p. Order from OTS. 55 cents. TID-10143

Quarterly progress report for the period ending June 30, 1953 by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. n. d. 66p. Order from OTS. 50 cents. TID-10158

Quarterly progress report for the period ending September 30, 1953 by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. Mar 1954. 48p. Order from OTS. 45 cents. TID-10159

Quarterly progress report for the period ending September 30, 1952 by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N. J. n. d. 91p. Order from OTS. 60 cents. TID-10162

Chemistry division quarterly report December 1956, January, February 1957 by M. Calvin, B. M. Tolbert and others. Univ. of Calif. Radiation Laboratory, Berkeley, Calif. Mar 1957. Contract W-7405-eng-48. 96p. Order from OTS. 50 cents. UCRL-3710

The heat of dissociation of Bi_2 by E. Brackett and L. Brewer. Univ. of Calif. Radiation Laboratory, Berkeley, Calif. Mar 1957. Contract W-7405-eng-48. 5p. Order from OTS. 15 cents. UCRL-3712

The pilot plant conversion of uranyl ammonium phosphate to uranium tetrafluoride on a continuous basis by E. D. Shipley, G. H. Clewett and others. Y-12 Research Laboratory, Oak Ridge, Tenn. Dec 1949. Contract W-7405-eng-26. 119p. Order from OTS. 70 cents. Y-536

Clarity of borated water in concrete tanks by H. P. House and C. D. Susano. Y-12 Area, Oak Ridge National Laboratory, Oak Ridge, Tenn. Jul 1951. Contract W-7405-eng-26. 4p. Order from OTS. 20 cents. Y-B31-273(Del.)

Engineering

Reactor engineering division quarterly report section II, July, August, September, 1956 by Members of the Reactor Engineering Division. Argonne National Laboratory, Lemont, Ill. Dec 1956. Contract W-31-109-eng-38. 68p. Order from OTS. 40 cents. ANL-5657

Design and performance of a dual-clone liquid separator by James C. Bresee. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1956. Contract W-7405-eng-26. 9p. Order from OTS. 15 cents. CF-56-3-171

A collection of pseudo-shear diagrams obtained in a low temperature capillary tube viscometer, by R. H. Nimmo and A. S. Kitzes. Oak Ridge National Laboratory, Oak Ridge, Tenn. Dec 1956. Contract W-7405-eng-26. 31p. Order from OTS. Mi $3.00, ph $6.30. CF-56-12-124

Criticality calculations for hydrogenous systems, by J. R. Knight. Union Carbide Nuclear Company, K-25 Plant, Oak Ridge, Tenn. Nov 1955. Contract W-7405-eng-26. 20p. Order from OTS. 30 cents. K-1260

Neutron shielding materials, by T. M. Snyder. General Electric Company, Knolls Atomic Power Laboratory, Schenectady, N.Y. Feb 1952. Contract W-31-109-eng-52. 6p. Order from OTS. 20 cents. KAPL-704

Torquing of bolts for nuclear reactors, by F. J. Mehringer. General Electric Company, Knolls Atomic Power Laboratory, Schenectady, N.Y. Aug 1956. Contract W-31-109-eng-52. 124p. Order from OTS. 60 cents. KAPL-1645

An estimate of the lapre power and steam flow characteristics, by F. P. Durham. Los Alamos Scientific Laboratory of the University of Calif. Aug 1954. 27p. Order from OTS. 30 cents. LA-1724

Reactor waste processing cost analysis, Information report, by M. McEwen. Mar 1952. 16p. Order from OTS. 25 cents. MLM-672

The diffusion of xenon from uranium--carbide impregnated graphite at high temperatures, by H. Pearlman, S. Siegel and C. Starr. Atomic Energy Research Department, North American Aviation, Inc., Downey, Calif. Oct 1952. Contract AT-11-1-gen-8. 40p. Order from OTS. 35 cents. NAA-SR-194

Use of the SRE fuel in an exponential experiment, by R. A. Laubenstein. North American Aviation, Inc., Downey, Calif. Oct 1954. Decl. Feb 1957. 10p. Order from OTS. 15 cents. NAA-SR-Memo-1116

Radiation effects quarterly progress report October-December, 1954, by F. E. Faris and T. R. Johnson. North American Aviation, Inc., Downey, Calif. Jul 1955. Contract AT-11-1-gen-8. 47p. Order from OTS. 30 cents. NAA-SR-1286

Reactor safety quarterly progress report, November, 1955--January, 1956, by S. H. Fitch and N. E. Huston. North American Aviation, Inc., Canoga Park, Calif. Jul 1956. Contract AT-11-1-gen-8. 31p. Order from OTS. 35 cents. NAA-SR-1634

Moving bed reactor pellet development program (Laboratory investigation), by P. W. Henline, A. J. Klee and E. J. Walter. National Lead Company of Ohio, Cincinnati, Ohio. May 1956. Contract AT(30-1)-1156. 64p. Order from OTS. 50 cents. NLCO-651

Pilot plant studies of liner hardening, section 4 of the series; "uranium metal by bomb reduction", by L. G. Weber and others. Uranium Project Plants, Mallinckrodt Chemical Works, St. Louis, Mo. Jun 1952. Contract W-14-108-eng-8. 28p. Order from OTS. 35 cents. NYO-1334

Low-power criticality experiments on the homogeneous reactor, experiment (HRE-1), by S. Visner and P. M. Wood. Oak Ridge National Lab., Oak Ridge, Tenn. Contract W-7405-eng-26. 91p. Order from OTS. 50 cents. ORNL-1858

Spherical segment with circular hole at vertex loaded axisymmetrically along the edges, appendix A: Axially loaded circular cylinder attached to spherical shell, by F. J. Stanek. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 39p. Order from OTS. 35 cents. ORNL-2207

Progress report of process test section for June, 1956, by A. D. Ryon and K. O. Johnsson. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 12p. Order from OTS. 15 cents. ORNL-2212

Progress report of process test section for July, 1956, by A. D. Ryon and K. O. Johnsson. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 14p. Order from OTS. 20 cents. ORNL-2213

Remote welding of stainless steel containers, by E. E. Pierce. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 8p. Order from OTS. 15 cents. ORNL-2280

A method for presentation of cost estimates and process economics as recommended by the Atomic Energy Commission, by J. Klemenic. Grand Junction Operations Office, Grand Junction, Colorado. Jul 1956. 21p. Order from OTS. 25 cents. RMO-3000

Reactor heat transfer progress, by J. E. Viscardi. Nuclear Development Corporation of America, White Plains, N.Y. Feb 1957. Contract AT (30-1)862. 27p. Order from OTS. 25 cents. NDA-33

PWR fuel element specifications, by T. J. Burke and others. Westinghouse Electric Corporation, Pittsburgh, Pa. Apr 1956. 85p. Order from OTS. 60 cents. TID-5302

Sodium graphite reactor - upflow design, by M. Welhoelter and others. Atomic Electric Project, Monsanto Chemical Company, Union Electric Company of Missouri, St. Louis, Mo. Sep 1953. 124p. Order from OTS. 60 cents. TID-10014

Report of industrial reactor study, by Pacific Gas & Electric Company and Bechtel Corporation, San Francisco, Calif. May 1952. 104p. Order from OTS. 50 cents. TID-10031

Summary report on the reactor hazards associated with the danger coefficient test facility (DCTF), by W. O. Bateson, J. R. Beyster, J. R. Brown, M. Danzker, F. J. Jankowski and A. H. Toepfer. Westinghouse Electric Corporation, Atomic Power Division, Pittsburgh, Pa. Apr 1951. Contract AT-11-1-gen-14. 191p. Order from OTS. 80 cents. TID-10052

The effect of heavy isotope build-up on the critical volume and breeding possibilities, by H. C. Ott. The Clinton National Laboratory. Jan 1948. Contract W-35-058-eng-71. 53p. Order from OTS. 40 cents. TID-10092

Investigation of burnout heat flux in rectangular channels at 2000 PSIA, by H. S. Jacket, J. D. Roarty and J. E. Zerbe. Bettis Plant, Westinghouse Electric Corporation, Pittsburgh, Pa. Dec 1955. Contract AT-11-1-gen-14 and No. NObs-56404. 52p. Order from OTS. 35 cents. WAPD-A1W(IM)-3

Geology and Mineralogy

Uranium investigations in Mohave County, Arizona, by Olin M. Hart. Salt Lake Exploration Branch, Division of Raw Materials, Salt Lake City, Utah. Feb 1955. 18p. Order from OTS. 20 cents. RME-2029

Monazite placers on Rabon Creek, Laurens County, and Big Generostee Creek, Anderson County, South Carolina, by L. A. Hansen and D. W. Caldwell. Bureau of Mines, Geological Survey, Washington, D. C. Feb 1955. 27p. Order from OTS. 25 cents. RME-3118

Deadwood conglomerate monazite deposit Bald Mountain Area, Sheridan and Big Horn Counties, Wyoming, by A. A. McKinney and H. W. Horst. Bureau of Mines, Washington, D. C. Mar 1953. 40p. Order from OTS. 30 cents. RME-3128

Annual report for April 1, 1955 to March 31, 1956. Part II, by J. W. Gruner, D. K. Smith, Jr. and J. A. Knox. University of Minnesota, Minneapolis, Minn. Apr 1956. 24p. Order from OTS. 25 cents. RME-3137(Pt. II)

Geologic investigations of radioactive deposits. Semiannual progress report for June 1 to November 30, 1956, by R. M. Wallace, C. H. Roach and others. Geological Survey, Washington, D. C. Dec 1956. 327p. Order from OTS. $1.50. TEI-640

Health and Safety

Designs for potato irradiation facilities, by L. E. Brownell, J. V. Nehemias and J. J. Bulmer. Engineering Research Institute, University of Michigan, Ann Arbor, Mich. Nov 1954. Contract AT(11-1)-162. 37p. Order from OTS. 30 cents. AECU-3184

Radium and mesothorium posioning and dosimetry and instrumentation techniques in applied radioactivity, by R. D. Evans and others. Radioactivity Center of the Department of Physics, Massachusetts Institute of Technology, Cambridge, Mass. May 1956. Contract AT(30-1)-952. 97p. Order from OTS. 55 cents. AECU-3261

Project Sunshine bulletin No. 12, by E. A. Martell. Enrico Fermi Institute for Nuclear Studies, University of Chicago, Chicago, Ill. Aug 1956. Contract AT(11-1)-281. 59p. Order from OTS. 40 cents. AECU-3297

Pig thyroid monitor, by L. D. Test, L. J. Seigneur and L. K. Bustad. Hanford Atomic Product Operation, Richland, Wash. Feb 1957. Contract W-31-109-eng-52. 28p. Order from OTS. 25 cents. HW-48712

Health and safety in powder metal handling, W. B. Harris. Health and Safety Laboratory, New York Operations Office, New York, N. Y. Apr 1957. 18p. Order from OTS. 20 cents. NYO-4869

Agricultural research program. Semi-annual progress report for January 1, 1956 to June 30, 1956. by Members of the Research Staff. University of Tennessee, Knoxville, Tenn. Feb 1957. Contract AT-40-1-gen-242. 65p. Order from OTS. 40 cents. ORO-160

Survey of radioactivity in the sea near Bikini and Eniwetok Atolls, June 11 - 21, 1956, by L. D. Donaldson, A. H. Seymour, E. E. Held, N. O. Hines, F. G. Lowman, P. R. Olson and A. D. Welander. Applied Fisheries Laboratory, University of Washington, Seattle, Wash. Jul 1956. Contract AT(45-1)540. 39p. Order from OTS. 30 cents. **Declassified Nov. 1956** UWFL-46

Instrumentation

An automatic flaw detector for aluminum cans, by J. D. Ross. E. I. du Pont de Nemours & Co. Explosives Department - Atomic Energy Division, Savannah River Laboratory. Oct 1956. Contract AT(07-2)-1. 12p. Order from OTS. 25 cents. DP-179

An alpha monitor for waste streams, by E. C. Wingfield. E. I. du Pont de Nemours & Co. Explosives Department, Atomic Energy Division, Savannah River Laboratory. Jan 1957. Contract AT(07-2)-1. 8p. Order from OTS. 15 cents. DP-197

Measurement of the uranium hexafluoride flow into mass spectrometers, by E. C. Evans and others. Carbide and Carbon Chemicals Company, Union Carbide and Carbon Corporation, K-25 Plant, Oak Ridge, Tenn. Dec 1953. Contract W-7405-eng-26. 14p. Order from OTS. 25 cents. K-1083

A manual of HRE control and instrumentation, by L. R. Quarles and W. P. Walker. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1952. Contract W-7405-eng-26. 108p. Order from OTS. 55 cents. ORNL-1094

Development of Du Mont photomultiplier tubes. Report No. 21 for December 1, 1954 to May 31, 1956, by B. R. Linden, P. A. Snell and R. E. Rutherford. Tube Research Laboratories, Allen B. Du Mont Laboratories, Inc., Passaic, N. J. Oct 1956. Contract AT(30-1)-1336. 25p. Order from OTS. 35 cents. RIB-16

Eddy current electrical conductivity measurement as an analysis for molybdenum in binary molybdenum-uranium alloys, by R. E. Cofield. Y-12 Plant, Union Carbide Nuclear Company, Oak Ridge, Tenn. Apr 1957. Contract W-7405-eng-26. 32p. Order from OTS. 25 cents. Y-1152

Metallurgy and Ceramics

Special welding techniques, Final summary report for 1954. Glenn L. Martin Company, Baltimore, Md. Jan. 1955. Contract W-7405-eng-26. 41p. Order from OTS. 35 cents. AECU-3174

The anodic oxidation of some dilute binary zirconium alloys, by G. B. Adams, Jr., C. E. Borchers and P. V. Rysselberghe. University of Oregon, Eugene, Oregon. Jan 1957. Contract AT(45-1)-535. 26p. Order from OTS. 25 cents. AECU-3388

The manufacture of enriched uranium fuel slugs for the experimental breeder reactor, by A. B. Shuck. Argonne National Laboratory, Lemont, Ill. Apr 1953. Contract W-31-109-eng-38. 57p. Order from OTS. 50 cents. ANL-4847(Rev.)

Effect of rolling temperature on the preferred orientation in rolled uranium rods, by M. H. Mueller and H. W. Knott. Argonne National Laboratory, Lemont, Ill. Mar 1957. Contract W-31-109-eng-38. 31p. Order from OTS. 25 cents. ANL-5329

Experiments in corrosion mechanism: Aluminum at high temperatures, by J. E. Draley and W. E. Ruther. Argonne National Laboratory, Lemont, Ill. Apr 1957. Contract W-31-109-eng-38. 26p. Order from OTS. 25 cents. ANL-5658

Aqueous corrosion of uranium and uranium - 6 w/o zirconium alloy, by W. E. Ruther and W. B. Seefeldt. Argonne National Laboratory, Lemont, Ill. Jan 1957. Contract W-31-109-eng-38. 15p. Order from OTS. 20 cents. ANL-5672

The thermal conductivity of uranium, by K. F. Smith. Argonne National Laboratory, Lemont, Ill. Apr 1957. Contract W-31-109-eng-38. 34p. Order from OTS. 30 cents. ANL-5700, Part A

Corrosion of uranium-zirconium alloys in water at temperatures up to 100 C, by H. A. Pray and W. E. Berry. Battelle Memorial Institute, Columbus, Ohio. Dec 1953. Contract W-7405-eng-92. 26p. Order from OTS. 30 cents. BMI-893

Metal spraying in inert atmospheres, by R. E. Monroe, D. C. Martin and C. B. Voldrich. Battelle Memorial Institute, Columbus, Ohio. Dec 1953. Contract W-7405-eng-92. 21p. Order from OTS. 30 cents. BMI-894

Surface alloying of uranium, by H. A. Saller, J. R. Keeler and E. S. Hodge. Battelle Memorial Institute, Columbus, Ohio. Jan 1954. Contract W-7405-eng-92. 17p. Order from OTS. 30 cents. BMI-895

Development of dimensionally stable uranium alloys, by F. R. Shober, L. L. Marsh and G. T. Muehlenkamp. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. Contract W-7405-eng-92. 37p. Order from OTS. 35 cents. BMI-961

Classification of stringers and identification of inclusions in reactor-grade uranium, by H. A. Saller. Battelle Memorial Institute, Columbus, Ohio. Nov 1954. Contract W-7405-eng-92. 21p. Order from OTS. 30 cents. BMI-965

The development of cast fuel elements, by H. A. Saller, R. F. Dickerson, A. W. Hare and N. E. Daniel. Battelle Memorial Institute, Columbus, Ohio. Feb 1955. Contract W-7405-eng-92. 26p. Order from OTS. 30 cents. BMI-983

Effect of radiation on the thermal conductivity of uranium-1.6 w/o, by H. W. Deem, M. Poberezkin, E. C. Lusk, C. F. Lucks and G. D. Calkins. Battelle Memorial Institute, Columbus, Ohio. Mar 1955. Contract W-7405-eng-92. 19p. Order from OTS. 30 cents. Declassified Feb 1957. BMI-986

Solid-phase-reaction studies of control-rod materials, by A. F. Gerds and M. W. Mallett. Battelle Memorial Institute, Columbus, Ohio. Mar 1956. Contract W-7405-eng-92. 38p. Order from OTS. 40 cents. BMI-1078

The effects of ternary alloying additions on the corrosion resistance of epsilon-phase uranium-zirconium alloys, by J. E. Reynolds, W. E. Berry, H. R. Ogden, R. E. Peoples and R. I. Jaffee. Battelle Memorial Institute, Columbus, Ohio. Apr 1956. Contract W-7405-eng-92. 34p. Order from OTS. 40 cents. BMI-1087

An experimental survey of the heat-treatment response of some zirconium-uranium alloys, by H. A. Saller, F. A. Rough and W. Chubb. Battelle Memorial Institute, Columbus, Ohio. Jun 1956. 30p. Order from OTS. 35 cents. BMI-1096

Uranium alloys for high-temperature application, by H. A. Saller, R. F. Dickerson and W. E. Murr. Battelle Memorial Institute, Columbus, Ohio. Jun 1956. Contract W-7405-eng-92. 45p. Order from OTS. 30 cents. BMI-1098

Progress relating to civilian applications during October, 1956, by R. W. Dayton and C. R. Tipton, Jr. Battelle Memorial Institute, Columbus, Ohio. Nov 1956. Contract W-7405-eng-92. 72p. Order from OTS. 50 cents. BMI-1144

Fabrication of urania-bearing graphite, by H. Z. Schofield, J. A. Slyh and L. D. Loch. Battelle Memorial Institute, Columbus, Ohio. May 1950. Contract W-7405-eng-92. 16p. Order from OTS. 30 cents. BMI-T-26

Extraction test in a pulse column using a slurry feed containing 20% solids, by A. C. Jealous. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jul 1951. 6p. Order from OTS. 25 cents. CF-51-7-110

Progress report on metallurgy of tuballoy, by Battelle Memorial Institute, Columbus, Ohio. May 1944. Contract W-7405-eng-92. 43p. Order from OTS. 40 cents. CT-1697

Spray coating of graphite molds, by G. M. Shera. National Lead Company of Ohio, Cincinnati, Ohio. Oct 1953. Contract AT(30-1)-1156. 19p. Order from OTS. 30 cents. FMPC-339

Standard operating procedure for pilot plant-metallurgical area reduction of UF_4 to metal containing up to 3% U-235, Section 1. 5. 2. 3, by S. L. Reese. National Lead Company of Ohio, Cincinnati, Ohio. Sep 1954. Contract AT(30-1)-1156. 13p. Order from OTS. 25 cents. FMPC-467

Mechanical and physical properties of uranium. Chapter 8 of nuclear metallurgy lectures, by R. E. Hueschen. Hanford Atomic Products Operation, Richland, Wash. May 1955. Contract W-31-109-eng-52. 32p. Order from OTS. 35 cents. HW-34868 C 8

Mechanization of nondestructive tests, by F. B. Quinlan. Hanford Atomic Products Operation, Richland, Wash. Apr 1955. Contract W-31-109-eng-52. 32p. Order from OTS. 35 cents. HW-38016

Thermal stresses in cylindrical reactor fuel elements, by K. R. Merckx. Hanford Atomic Products Operation, Richland, Wash. Sep 1956. W-31-109-eng-52. 28p. Order from OTS. 25 cents. HW-42665

A controlled environment growth chamber for plants, by J. H. Rediske, A. A. Selders and J. F. Cline. Hanford Atomic Products Operation. Sep 1956. Contract W-31-109-eng-52. 8p. Order from OTS. 15 cents. HW-45505

Nuclear aspects of proposed 19-plate fuel assemblies, by G. H. Hanson and H. L. McMurry.

Atomic Energy Division, Phillips Petroleum Company, Idaho Falls, Idaho. Dec 1952. AT (10-1)-205. 11p. Order from OTS. 25 cents. IDO-16046

Quarterly summary research report in metallurgy for October, November, December 1953, by Ames Laboratory Staff. Ames Laboratory at Iowa State College, Ames, Iowa. May 1954. Contract W-7405-eng-82. 48p. Order from OTS. 40 cents. ISC-453

Quarterly summary research report in metallurgy for July, August, and September 1954, by Ames Laboratory Staff. Ames Laboratory at Iowa State College, Ames, Iowa. Feb 1955. Contract W-7405-eng-82. 36p. Order from OTS. 40 cents. ISC-531

The stress-strain characteristics of uranium, by D. A. McCutchan and G. Murphy. Ames Laboratory, Iowa State College, Ames, Iowa. Dec 1955. Contract W-7405-eng-82. 37p. Order from OTS. 30 cents. ISC-700

Increasing the effective void space in a dispersion-type nuclear fuel by plastic deformation in tension, by S. M. Bishop. Knolls Atomic Power Laboratory, Schenectady, N. Y. Jan 1956. Contract W-31-109-eng-52. 20p. Order from OTS. 35 cents. KAPL-1466

Silica-uranium fuel systems, by W. M. Cashin and H. G. Sowman. Knolls Atomic Power Laboratory, Schenectady, N. Y. Feb 1956. Contract W-31-109-eng-52. 18p. Order from OTS. 20 cents. KAPL-1475

The effects of postirradiation annealing of uranium-zirconium alloys, by W. V. Johnston. Knolls Atomic Power Laboratory, Schenectady, N. Y. Jul 1956. Contract W-31-109-eng-52. 30p. Order from OTS. 25 cents. KAPL-1562

Electrowinning of uranium from its oxides. II. A preliminary engineering evaluation, by L. W. Niedrach and A. C. Schafer. Knolls Atomic Power Laboratory, Schenectady, N. Y. Apr 1957. Contract W-31-109-eng-52. 32p. Order from OTS. 25 cents. KAPL-1668

A determination of the coefficient of thermal expansion of alpha plutonium, by R. O. Elliot and R. E. Tate. Los Alamos Scientific Laboratory of the University of California. Mar 1952. Contract W-7405-eng-36. 20p. Order from OTS. 30 cents. LA-1390

The pressures and temperatures developed during the reduction of uranium tetrafluoride by the bomb method, by B. R. Hayward. Los Alamos Scientific Laboratory of the University of Calif. Aug 1951. Contract W-7405-eng-36. 19p. Order from OTS. 30 cents. LA-1397

Feasibility of fabrication uranium spheres by powder metallurgical techniques, by C. H. Bean and H. T. Campion. Livermore Research Laboratory, Livermore, Calif. May 1954. Contract AT(11-1)-74. 15p. Order from OTS. 30 cents. LRL-135(Rev.)

Chambers works process for the manufacture of crude metallic uranium, by G. Firth. Jackson Laboratory, E. I. duPont de Nemours and Co. Wilmington, Del. Jan 1945. Contract W-7412-eng-2. 10p. Order from OTS. 25 cents. M-2147

The distribution of precious metals in various residues obtained in the preparation of uranyl nitrate from pitchblende, by C. D. Harrington, R. W. Shearer and J. H. Yeager. Mallinckrodt Chemical Works, St. Louis, Mo. Apr 1946. Contract W-14-108-eng-8. 9p. Order from OTS. 25 cents. MCW-17

Distribution of uranium in impregnated graphite rods, by M. C. Sanz, R. Randolph and L. Martin. North American Aviation, Inc., Los Angeles, Calif. Dec 1947. 7p. Order from OTS. 25 cents. NAA-AL-345

Diffusion of uranium carbide in graphite, by R. L. Loftness, E. R. Cohen and J. K. Thornton. North American Aviation, Inc., Downey, Calif. Aug 1950. Contract AT-11-1-gen-8. 24p. Order from OTS. 35 cents. NAA-SR-64

Stability of iron toward lithium at elevated temperatures under cyclotron irradiation, by A. Andrew, A. A. Epp, Jr., K. Imlah, R. D. Moeller, W. W. Parkinson, Jr., L. Silverman, W. J. Taylor, W. J. Stephan and K. K. Trego. North American Aviation, Inc., Downey, Calif. Aug 1952. Contract AT-40-1-gen-1064. 47p. Order from OTS. 40 cents. NAA-SR-73

The magnetic susceptibility of graphite and the effect of irradiation on artificial graphite, by J. J. Donoghue and J. D. McClelland. North American Aviation, Inc., Downey, Calif. Dec 1951. Contract AT-11-1-gen-8. 18p. Order from OTS. 30 cents. NAA-SR-153

Compatibility of sodium, graphite and stainless steel, by T. A. Coultas, R. Cygan and others. North American Aviation, Inc., Downey, Calif. Jul 1953. Decl. Apr 1957. Contract AT-11-1-gen-8. 30p. Order from OTS. 30 cents. NAA-SR-258

Annual summary report on thorium research for the period October 1, 1954, to June 30, 1955, by Northwest Electrodevelopment Laboratory. National Lead Company of Ohio, Cincinnati, Ohio. Jul 1955. Decl. Apr 1957. Contract AT (30-1)-1156. 28p. Order from OTS. 35 cents. NLCO-578

The fabrication of arc-melted thorium metal, by J. A. Stanley, T. C. Runion and F. L. Cuthbert. National Lead Company of Ohio, Cincinnati, Ohio. Apr 1956. Decl. Apr 1957. Contract AT (30-1)-1156. 14p. Order from OTS. 30 cents. NLCO-624

Evaluation of uniformity of uranium concentration in two coextruded aluminum-uranium alloy tubes by specific volume and chemical analysis methods, by J. L. Klein and L. R. Aronin. Metallurgical Project, Nuclear Metals, Inc., Cambridge, Mass. Jan 1955. Contract AT(30-1)-1565. 24p. Order from OTS. 35 cents. NMI-1128

Electrical, thermoelectric, hardness, and corrosion properties of vanadium-base alloys, by H. J. Cleary. Nuclear Metals, Inc., Cambridge, Mass. Sep 1956. Contract AT(30-1)-1565. 34p. Order from OTS. 30 cents. NMI-1161

Effects of radiation damage on precipitation-hardening alloys with special reference to copper-iron alloys, by A. Boltax. Nuclear Metals, Inc., Cambridge, Mass. Oct 1956. Contract AT(30-1) 1565. 21p. Order from OTS. 20 cents. NMI-1165

The fabrication of thorium by powder metallurgy, by J. G. Klein and K. G. Wikle. Brush Beryllium Company, Cleveland, Ohio. Nov 1952. Contract AT-(30-1)-541. 37p. Order from OTS. 40 cents. NYO-1115

Non-destructive testing of uranium slugs: Summary report through May 1953, by R. Hochschild. U. S. Atomic Energy Commission, New York Operations Office, N.Y. May 1953. Decl. Apr 1957. 38p. Order from OTS. 40 cents. NYO-3578

Reduction of uranium oxides, quarterly report no. 4, by S. Johnson. Metal Hydrides, Inc., Beverly, Mass. Oct 1953. Decl. Apr 1957. Contract AT(30-1)-1350. 14p. Order from OTS. 25 cents. NYO-3796

Fifth quarterly report on the reduction of uranium oxides. Period covered: October 1, 1953 through December 31, 1953, by S. Johnson and others. Metal Hydrides, Inc., Beverly, Mass. Feb 1954. Decl. Apr 1957. Contract AT(30-1) 1350. 15p. Order from OTS. 25 cents. NYO-3797

Second annual report on the preparation of uranium hydride for the period July 1, 1953 through June 30, 1954, by S. Johnson and others. Metal Hydrides Inc., Beverly, Mass. Aug 1954. Decl. May 1957. Contract AT(30-1)-1350. 37p. Order from OTS. 40 cents. NYO-3800

Application of chemical thermodynamics to the study of alloy formation. Progress report for January 1, 1956 to April 1, 1956, by W. E. Wallace, R. S. Craig, C. A. Krier, W. Saba and M. G. Zabetakis. University of Pittsburgh, Pittsburgh, Pa. Dec 1956. Contract AT(30-1)-647. 7p. Order from OTS. 15 cents. NYO-6330

The adaptation of new research techniques to mineral engineering problems. Progress report, by Project Research Staff. Massachusetts Institute of Technology, Department of Metallurgy, Cambridge, Mass. Jan 1957. Contract AT(30-1) 956. 39p. Order from OTS. 30 cents. NYO-7705

Scale formation studies of water-cooled aluminum heat transfer surfaces, by R. Van Winkle and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jun 1949. Decl. Apr 1957. Contract W-7405-eng-26. 73p. Order from OTS. 45 cents. ORNL-315

Extrusion of 2% U-Al alloy fuel rods for the Argonne CP-3 reactor, by W. D. Manly and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jul 1950. Decl. Apr 1957. Contract W-7405-eng-26. 20p. Order from OTS. 30 cents. ORNL-766

Interim report on metallurgy of thorium and thorium alloys, by J. H. Frye, Jr., D. E. Hamby and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Dec 1951. Decl. Apr 1957. Contract W-7405-eng-26. 82p. Order from OTS. 60 cents. ORNL-1090

Handling techniques for rubidium, by H. E. McCoy and E. E. Hoffman. Oak Ridge National Lab., Oak Ridge, Tenn. Dec 1955. Decl. Apr 1957.

Contract W-7405-eng-26. 11 p. Order from OTS. 25 cents. ORNL-1991

A study of preferred orientation techniques, by W. P. Chernock and L. W. Kates. Sylvania Electric Products, Inc., Bayside, N. Y. Apr 1952. Decl. Apr 1957. Contract AT(30-1)-gen-366. 35p. Order from OTS. 40 cents. SEP-88

Equipment and procedures for hot-pressing uranium and uranium hydride powders, by H. M. McCullough and J. L. Zambrow. Sylvania Electric Products, Inc., Bayside, N. Y. Apr 1953. Decl. Apr 1957. Contract AT-30-1-gen-366. 27p. Order from OTS. 35 cents. SEP-110

Semi-quantitative determination of preferred orientation in 600°C rolled uranium sheet, by W. P. Chernock and D. Wahl. Sylvania Electric Products, Inc., Bayside, N. Y. n. d. Decl. Apr 1957. Contract AT(30-1)-gen-366. 15p. Order from OTS. 25 cents. SEP-140

Studies on non-aqueous methods of separation, by S. Ruby. Atomic Energy Division, Sylvania Electric Products, Inc., Bayside, N. Y. Jun 1956. Decl. Apr 1957. Contract AT-30-1-gen-366. 14p. Order from OTS. 30 cents. SEP-214

Integrated thorium-uranium target elements. Terminal report, by R. H. Witt, J. Nylin and H. M. McCullough. Atomic Energy Division, Sylvania Electric Products, Inc., Bayside, N. Y. Oct 1956. Decl. Apr 1957. Contract AT-30-1-gen-366. 78p. Order from OTS. 55 cents. SEP-231

The extrusion of composite compacts of particles of a heavy metal in an aluminum matrix. The hot pressing and extrusion of zirconium by electrical resistance heating. Final report, by A. B. Backensto, Jr., N. F. Hopson and F. V. Lenel. Powder Metallurgy Laboratory, Rensselaer Polytechnic Institute, Troy, N. Y. Jun 1951. Decl. May 1957. Contract AT(30-3)-37. 82p. Order from OTS. 60 cents. SO-3004

Technical papers of the eight metallographic group meeting held at the Oak Ridge National Laboratory, December 9 and 10, 1953, by H. P. Roth. Metallurgical Project, Nuclear Metals, Inc., Cambridge, Mass. Sep 1954. Decl. Apr 1957. 64p. Order from OTS. 50 cents. TID-5243(Rev.)

Studies of graphite for fuel elements, by L. D. Loch, J. A. Slyh and W. H. Duckworth. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. Decl. Apr 1957. Contract W-7405-eng-92. 71p. Order from OTS. 45 cents. TID-10001

Quarterly progress report for the period ending December 31, 1952, by C. J. Rodden. New Brunswick Laboratory. New Brunswick, N. J. Apr 1953. Decl. Apr 1957. 93p. Order from OTS. 60 cents. TID-10157

Zirconium-water reactions, by B. Lustman. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Dec 1955. Decl. Apr 1957. Contract AT-11-1-gen-14. 42p. Order from OTS. 60 cents. WAPD-137

Corrosion of structural materials in chemical control solutions. Interim report, by P. E. Brown. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Aug 1954. Decl. Apr 1957. 28p. Order from OTS. 35 cents. WAPD-C(PC)-18

The fabrication of Zircaloy-2 clad U-Mo and U-Nb rods for irradiation in the materials testing reactor, by W. B. Haynes. Westinghouse Electric Corporation, Atomic Power Division, Pittsburgh Pa. Oct 1955. Decl. Apr 1957. Contract AT-11-1-gen-14. 51p. Order from OTS. 45 cents. WAPD-FE-1105

The oxidation of a zirconium - 50w/o uranium alloy in oxygen, by L. D. Kirkbride and D. E. Thomas. Westinghouse Electric Corporation, Atomic Power Division, Pittsburgh, Pa. Sep 1955. Decl. Apr 1957. 11p. Order from OTS. 25 cents. WAPD-LSR(MM)-43

Uranium alloy newsletter, by E. Epremian. Technical Information Service Extension, Oak Ridge, Tenn. Feb 1957. Decl. Apr 1957. 36p. Order from OTS. 40 cents. WASH-701

Physics

Study of the feasibility of aqueous recovery of spent fuels. Part 3. Calculated distribution of fission product nuclides, by J. V. Nehemias, R. C. Dennis and E. Ambo. Engineering Research Institute, University of Michigan, Ann Arbor, Mich. Jun 1954. 143p. Order from OTS. 80 cents. AECU-3044

Applications of Monte Carlo, by H. Kahn. RAND Corporation, Santa Monica, Calif. Apr 1954. Rev. Apr 1956. Contract AT(11-1)-135. 250p. Order from OTS. $1.25. AECU-3259

Extension of useful life of exhaust air filters after ammonium nitrate loading, by R. P. Craig, P. D. Erickson, J. A. Geer and F. J. Linck, Jr. Rocky Flats Plant, Dow Chemical Company, Denver, Col. Oct 1956. Contract AT(29-1)-1106. 24p. Order from OTS. 25 cents. AECU-3417

Reactor physics studies, by G. E. Putman and W. S. Hogan. Monsanto Chemical Company and Union Electric Company of Missouri, St. Louis, Mo. Sep 1953. 122p. Order from OTS. 60 cents. AEP-101

Physics division summary report September through December, 1956, by L. A. Turner. Argonne National Laboratory, Lemont, Ill. Feb 1957. Contract W-31-109-eng-38. 99p. Order from OTS. 50 cents. ANL-5667

Radiological physics division semiannual report July through December, 1956, by J. E. Rose. Argonne National Laboratory. Lemont, Ill. Feb 1957. Contract W-31-109-eng-38. 106 p. Order from OTS. 55 cents. ANL-5679

Neutron leakage spectrum of the bulk shielding reactor, by J. E. Faulkner. Oak Ridge National Laboratory, Oak Ridge, Tenn. Aug 1954. Decl. May 1957. 12p. Order from OTS. 25 cents. CF-54-8-101

A series of thermal, epithermal and fast neutron measurements in the MTR, by J. B. Trice. Oak Ridge National Laboratory, Oak Ridge, Tenn. Oct 1955. Contract W-7405-eng-26. 88p. Order from OTS. 50 cents. CF-55-10-140

Effects of heat generation and heat removal on HRT shutdown and dump, by M. W. Rosenthal and H. C. Claiborne. Oak Ridge National Laboratory Oak Ridge, Tenn. Feb 1956. Contract W-7405-eng-26. 55p. Order from OTS. 40 cents. CF-56-2-128

Bibliography on aerosols, 1950 - 1955. Supplement to report SO-1003, by W. J. Scheffy. Engineering Experiment Station, University of Illinois, Urbana, Ill. Jun 1956. Contract AT(11-1)-276. 109p. Order from OTS. 60 cents. COO-1016

MTR structure temperatures with 3 x 9 lattice - 1953, by G. H. Hanson and A. V. Grimaud. Phillips Petroleum Company. Idaho Operations Office. Feb 1954. Decl. Apr 1957. Contract AT(10-1)-205. 42p. Order from OTS. 35 cents. IDO-16146

Self-consistent criteria for evaluation of neutron interaction, by H. F. Henry, C. E. Newlon and J. R. Knight. Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tenn. Dec 1956. Decl. Apr 1957. 23p. Order from OTS. 35 cents. K-1317

Enhancement of leakage by internal voids in a shield, by L. Tonks. Knolls Atomic Power Laboratory, Schenectady, N. Y. Jan 1949. Decl. Apr 1957. Contract W-31-109-eng-52. 12p. Order from OTS. 25 cents. KAPL-107

Leakage of neutrons past a step in an annulus, by L. Tonks. Knolls Atomic Power Laboratory, Schenectady, N. Y. n. d. Decl. Apr 1957. Contract W-31-109-eng-52. 11p. Order from OTS. 25 cents. KAPL-201

Secular equations for breeding, by H. Brooks. Knolls Atomic Power Laboratory, Schenectady, N. Y. Apr 1950. Decl. Apr 1957. Contract W-31-109-eng-52. 20p. Order from OTS. 25 cents. KAPL-334

A suggestion concerning the direct generation of electricity from fission energy, by K. H. Kingdon. Knolls Atomic Power Laboratory, Schenetady, N. Y. May 1950. Decl. Apr 1957. Contract W-31-109-eng-52. 8p. Order from OTS. 20 cents. KAPL-335

Report of the physics section for March, April, May 1956, by T. M. Snyder, E. R. Gaerttner and C. W. Tucker, Jr. Knolls Atomic Power Laboratory, Schenectady, N. Y. Jul 1956. Decl. May 1957. Contract W-31-109-eng-52. 46p. Order from OTS. 45 cents. KAPL-1565

Energy distribution of fast neutron beam, by N. Nereson and others. Los Alamos Scientific Laboratory of the University of California. Feb 1951. Decl. Apr 1957. Contract W-7405-eng-36. 37p. Order from OTS. 35 cents. LA-1234

Multi-velocity Serber-Wilson neutron diffusion calculations, by B. Carlson and others. Los Alamos Scientific Laboratory of the University of Calif. Mar 1952. Decl. May 1957. Contract W-7405-eng-36. 34p. Order from OTS. 40 cents. LA-1391

Predictions of fast neutron scattering data with a diffuse surface potential well, by J. R. Beyster and others. Los Alamos Scientific Laboratory, Los Alamos, New Mexico. Apr 1957. Contract W-7405-eng-36. 165p. Order from OTS. $1.00. LA-2099

A problem in the design of an optimal external breeding blanket, by G. Goertzel and K. Martin. Technical Information Service, Oak Ridge, Tenn. Sep 1947. Decl. Apr 1957. 18p. Order from OTS. 25 cents. MonP-386

Thermal neutron flux in a lattice cell, by E. R. Cohen and others. North American Aviation, Inc., Downey, Calif. Nov 1951. Decl. Apr 1957. Contract AT 11-1-gen-8. 24p. Order from OTS. 30p. Order from OTS. 30 cents. NAA-SR-155

Measurement of neutron attenuation in shield materials, by W. W. Brown and B. A. Engholm. North American Aviation, Inc., Downey, Calif. Nov 1954. Decl. Apr 1957. 38p. Order from OTS. 40 cents. NAA-SR-Memo-1143

Transient pressure in the water boiler kinetic experiment, by D. L. Hetrick and M. E. Remley. North American Aviation, Inc., Downey, Calif. Mar 1955. Decl. Apr 1957. 15p. Order from OTS. 30 cents. NAA-SR-Memo-1306

Reactor physics quarterly progress report February - April 1955, by R. A. Laubenstein. North American Aviation, Inc., Downey, Calif. Sep 1955. Decl. Apr 1957. Contract AT-11-1-gen-3. 20p. Order from OTS. 30 cents. NAA-SR-1432

Progress report on the study of low probability, high hazard, fast reactor accidents, by R. Deane and others. Nuclear Development Associates, Inc., White Plains, N. Y. Nov. 1955. 55p. Order from OTS. 40 cents. NDA-14-107

The Ψ_3 approximation to the transport equation for cylindrical geometry, by N. Tralli and E. Puechl. Walter Kidde Nuclear Laboratories, Inc., Garden City, N. Y. May 1953. Decl. May 1957. Contract AT(30-1)-1374. 17p. Order from OTS. 25 cents. NYO-3923

Annual report on research project, by H. H. Rossi and others. Radiological Research Laboratory, Columbia University, N. Y. Apr 1956. Contract AT-30-1-gen-70. 161p. Order from OTS. $1.00. NYO-4698

Research on properties of rare metals. Final report and supplements, by J. E. Goldman, S. Foner and G. L. Guthrie. Laboratory for Magnetics Research, Carnegie Institute of Technology, Pittsburgh, Pa. Aug 1956. Contract AT (30-1)-1596. 36p. Order from OTS. 30 cents. NYO-7257

Heat transfer in Manhatten District and Atomic Energy Commission Laboratories: A critical survey, by W. B. Harrison. Oak Ridge National Laboratory, Oak Ridge, Tenn. Oct 1948. Decl. Apr 1957. Contract W-7405-eng-26. 255p. Order from OTS. $1.10. ORNL-156

The motion of gas bubbles in the HRE reactor core, by F. N. Peebles. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1952. Decl. Apr 1957. Contract W-7405-eng-26. 48p. Order from OTS. 35 cents. ORNL-1171

Generated error in the solution of certain partial difference equations, by A. S. Householder. Oak Ridge National Laboratory, Oak Ridge, Tenn. Contract W-7405-eng-26. 38p. Order from OTS. 30 cents. ORNL-2230

On the solution of a Fredholm integral equation, by C. L. Gerberich. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 58p. Order from OTS. 40 cents. ORNL-2241

Some analytical solutions of the slowing down problem in hydrogen, by L. Dresner and A. Simon. Oak Ridge National Laboratory, Oak Ridge, Tenn. n. d. Contract W-7405-eng-26. 15p. Order from OTS. 20 cents. ORNL-2276

Unclassified U.S. Atomic Energy Commission reports on civilian power reactors and test reactors. A literature search, by T. W. Scott. Technical Information Service Extension, Oak Ridge, Tenn. Nov 1956. 4p. Order from OTS. 10 cents. TID-3501

Unclassified U.S. Atomic Energy Commission reports on reactor safety. A literature search, by H. E. Voress. Technical Information Service Extention, Oak Ridge, Tenn. Nov 1956. 9p. Order from OTS. 15 cents. TID-3503

Pile neutron production yield curves calculated using the UCRL differential analyzer, by R. J. Barrett and others. Radiation Laboratory and Department of Chemistry, University of California. Oct 1953. Decl. Apr 1957. Contract W-7405-eng-8. 108p. Order from OTS. 55 cents. UCRL-2387

High-energy particle data. Volume I, by B. H. Willis and C. H. Stableford. University of California, Radiation Laboratory, Berkeley, Calif. Nov 1956. Contract W-7405-eng-48. 87p. Order from OTS. 50 cents. UCRL-2426

Bevatron beam induction electrodes, by H. G. Heard. University of California. Radiation Laboratory, Berkeley, Calif. Feb 1957. 23p. Order from OTS. 25 cents. UCRL-3609
Contract W-7405- Eng -48

Formation of reversible colored modification at low temperatures by bombardment with electrons, by Y. Hirshburg. University of California. Radiation Laboratory, Berkeley, Calif. Feb 1957. Contract W-7405-eng-48. 16p. Order from OTS. 20 cents. UCRL-3690

The application of charge independence to strange-particle reactions, by T. Kotani. University of California. Radiation Laboratory, Berkeley, Calif. Mar 1957. Contract W-7405-eng-48. 26p. Order from OTS. 25 cents. UCRL-3702

Split-word floating-decimal routine, by K. O. Malmquist, Jr. University of California. Radiation Laboratory, Livermore Site, Livermore, Calif. Jun 1956. Contract W-7405-eng-48. 26p. Order from OTS. 25 cents. UCRL-4714

A description of a shock wave in free particle hydrodynamics with internal magnetic fields, by S. A. Colgate. University of California. Radiation Laboratory, Livermore Site, Livermore, Calif. Feb 1957. Contract W-7405-eng-48. 20p. Order from OTS. 20 cents. UCRL-4829

On the ratio of maximum to average power density, by M. J. Galper. Westinghouse Electric Corp., Bettis Field Plant, Pittsburgh, Pa. Jul 1953. Decl. Apr 1957. Contract AT-11-1-gen-14. 33p. Order from OTS. 30 cents. WAPD-87

Subpower range start-up transients, by E. G. Good. Westinghouse Electric Corp., Bettis Field Plant, Pittsburgh, Pa. Mar 1956. Decl. Apr 1957. Contract AT-11-1-gen-14. 116p. Order from OTS. 70 cents. WAPD-TM-1

Ensign code, by B. L. Anderson and others. Westinghouse Electric Corp., Bettis Field Plant, Pittsburgh, Pa. Jan 1957. Contract AT-11-1-gen-14. 20p. Order from OTS. 20 cents. **WAPD-TM-33**

A code to invert the Fourier cosine transform - FT I-1, by R. R. Goldberg and H. G. Kuehn. Westinghouse Electric Corp., Bettis Plant, Pittsburgh, Pa. Mar 1957. Contract AT-11-1-gen-1 14. 14p. Order from OTS. 20 cents. WAPD-TM-46

Proposed 200,000 kilowatt pressurized water reactor plant. Plant design and cost estimate, by Westinghouse Electric Corp., Pittsburgh, Pa. Mar 1955. 105p. Order from OTS. $1.85. WIAP-12

Reactors

Corrosion and stability tests on chemical poisons in high-temperature water, by C. R. Breden and A. Abers. Argonne National Laboratory, Lemont, Ill. Sep 1953. Decl. Apr 1957. Contract W-31-109-eng-38. 49p. Order from OTS. 45 cents. ANL-5147(Rev.)

The Mighty Mouse research reactor preliminary design study, by L. E. Link and others. Mar 1957. Contract W-31-109-eng-38. 84p. Order from OTS. 50 cents. ANL-5688

Styrofoam simulation of boiling and temperature effects in the EBWR cold critical experiments, by J. A. DeShong, Jr. Argonne National Laboratory, Lemont, Ill. Mar 1957. Contract W-31-109-eng-38. 18p. Order from OTS. 20 cents. ANL-5697

An experimental and theoretical study of the subcritical BNL reactor, by J. Chernick and others. Brookhaven National Laboratory, Upton, N. Y. Jun 1950. 109p. Order from OTS. 55 cents. BNL-60

LMFR-9 liquid metal fuel reactor fuel processing studies, by C. Raseman and others. Brookhaven National Laboratory, Upton, N.Y. Jan 1955. Decl. Apr 1957. 22p. Order from OTS. 22p. 30 cents. BNL-345

Report on the feasibility of a 12' I. D. pressure vessel proposed for the CEPS-1111 design, by Members of the Commonwealth Edison - Public Service Group. Commonwealth Edison Co., Chicago, Ill. Apr 1953. Decl. Apr 1957. 19p. Order from OTS. 25 cents. CEPS-1129

Reactor design and feasibility problem. "Research and isotope producing reactor", by J. Dutton and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Aug 1951. Decl. Apr 1957. 64p. Order from OTS. 50 cents. CF-51-8-193(Rev.)

Reactor physics of teapot-part IV, linearized kinetics, by P. R. Kasten. Oak Ridge National Laboratory, Oak Ridge, Tenn. Sep 1952. Decl. May 1957. 27p. Order from OTS. 35 cents. CF-52-8-128

The influence of the method of calculating resonance capture on the fast leakage in breeders, by M. Tobias and M. C. Edlund. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jun 1953. Decl. Apr 1957. Contract W-7405-eng-26. 21p. Order from OTS. 35 cents. CF-53-6-158

Control of xenon poisoning by stripping with gas, by R. E. Aven. Oak Ridge National Laboratory, Oak Ridge, Tenn. Feb 1954. Decl. May 1957. Contract W-7405-eng-26. 17p. Order from OTS. 30 cents. CF-54-2-200

Constants for HRT nuclear calculations, by P. M. Wood. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1954. Decl. Apr 1957. Contract W-7405-eng-26. 10p. Order from OTS. 25 cents. CF-54-3-160

Feasibility study of a canned rotor centrifuge for use in homogeneous reactor and other radioactive systems, by C. M. Ambler. Sharples Corp., Philadelphia, Pa. Aug 1955. Decl. Apr 1957. Contract W-7405-eng-26. Subcontract No. 574. 51p. Order from OTS. 50 cents. CF-55-8-169

Gas cooled, natural uranium, D_2O moderated power reactor; reactor design and feasibility problem, by R. C. Dahlberg and others. Oak Ridge School of Reactor Technology, Oak Ridge, Tenn. Aug 1956. 155p. Order from OTS. 75cents. CF-56-8-207 (Del.)

Slug temperatures in an off-center annulus, by A. J. Dempster and others. Metallurgical Laboratory. Nov 1944. Decl. Apr 1957. Contract W-7401-eng-37. 22p. Order from OTS. 35 cents. CP-2314 (Rev.)

Proposed reactor for power combining features of LMFR-SGR, by Nuclear Research Laboratory, Dow Chemical Company, Midland, Mich. Feb 1955. Contract AT(11-1)-329. 35p. Order from OTS. 40 cents. DOW-NR-55001-1-S

"Bulk parameters" for MTR, by G. H. Hanson. Atomic Energy Division, Phillips Petroleum Company, Idaho Falls, Idaho. Aug 1952. 20p. Order from OTS. 30 cents. IDO-16025

The engineering test reactor critical facility hazards summary report, by D. R. deBoisblanc and others. Phillips Petroleum Co., Idaho Operations Office, Idaho. Mar 1957. Contract AT(10-1)-205. 94p. Order from OTS. 50 cents. IDO-16332

Reversing time of high-flux pile control rod, by J. Sandock, A. E. Johnson and T. A. Kirkham. Massachusetts Institute of Technology. Nov 1948. Decl. May 1957. Contract W-7405-eng-26. 14p. Order from OTS. 25 cents. K-314

Variation of fast fission effect with homogeneity in infinite slab reactor, by F. H. Clark. Knolls Atomic Power Laboratory, Schenectady, N. Y. May 1952. Decl. Apr 1957. Contract W-31-109-eng-52. 36p. Order from OTS. 30 cents. KAPL-743

Report of the nuclear physics section for December 1954, January, February 1955, by T. M. Snyder, E. R. Gaerttner, E. A. Luebke and J. W. Moyer. n. d. Decl. Apr 1957. Contract W-31-109-eng-52. 47p. Order from OTS. 45 cents. KAPL-1302

Health physics report for October, November, December 1956, by L. J. Cherubin. Apr 1957. Contract W-31-109-eng-52. 36p. Order from OTS. 30 cents. KAPL-1699

Homogeneous reactor fuel reprocessing. Job 87. Quarterly progress report for October 1- December 31, 1953, by W. R. Peterson and others. Vitro Corporation of America, New York, N. Y. Jan 1954. Decl. Apr 1957. Contract W-7405-eng-26. 28p. Order from OTS. 35 cents. KLX-1711

A measurement of the neutron temperature in a natural uranium D_2O lattice, by A. T. Biehl and others. North American Aviation, Inc., Downey, Calif. Sep 1951. Decl. May 1957. Contract AT-11-1-gen-8. 23p. Order from OTS. 25 cents. NAA-SR-140

Low enrichment uranium thermal reactors for the production of plutonium and useful power, by E. F. Weisner and others. North American Aviation, Inc., Downey, Calif. Jul 1952. Decl. Apr 1957. Contract AT-11-1-gen-8. 106p. Order from OTS. 65 cents. NAA-SR-179(Rev.)

Sodium graphite reactor. Quarterly progress report for March-May 1953, by G. M. Inman. North American Aviation, Inc., Downey, Calif. Sep 1953. Decl. Apr 1957. Contract AT-11-1-gen-8. 110p. Order from OTS. 65 cents. NAA-SR-274

Sodium graphite reactor quarterly progress report for December 1953-February 1954, by G. M. Inman. North American Aviation, Inc., Downey, Calif. Aug 1954. Decl. Apr 1957. Contract AT-11-1-gen-8. 71p. Order from OTS. 55 cents. NAA-SR-1027

Reactor safety quarterly progress report August - October, 1955, by S. H. Fitch and N. E. Huston. Atomics International, A Division of North American Aviation, Inc., Canoga Park, Calif. May 1956. Decl. Apr 1957. Contract AT-11-1-gen-8. 29p. Order from OTS. 35 cents. NAA-SR-1568

The determination of pressure drop factors through typical fuel element channels for high temperature gas-cooled thermal piles, by C. L. Segaser. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jul 1948. Decl. Apr 1957. 58p. Order from OTS. 50 cents. ORNL-89

Reactor shielding with an iron aggregate concrete-comparison with ordinary concrete, by E. P. Blizard and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1949. Decl. Apr 1957. Contract W-7405-eng-26. 40p. Order from OTS. 35 cents. ORNL-209

The cooling of irradiated 25 MTR fuel assemblies and its effect on 25 inventory in the MTR project, by H. E. Goeller. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1950. Decl. Apr 1957. Contract W-7405-eng-26. 33p. Order from OTS. 40 cents. ORNL-611

The production of transuranic isotopes in the MTR, by H. E. Goeller. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1950. Decl. Apr 1957. Contract W-7405-eng-26. 35p. Order from OTS. 40 cents. ORNL-612

Mixing in the core of the HRE, Special report, by J. S. Culver, C. B. Graham and R. H. Wilson. Oak Ridge National Laboratory, Oak Ridge, Tenn. Nov 1950. Decl. Apr 1957. Contract W-7405-eng-26. 23p. Order from OTS. 25 cents. ORNL-794

Boiling reactors.A preliminary investigation, by J. M. Stein and P. R. Kasten. Oak Ridge National Laboratory, Oak Ridge, Tenn. Nov 195L Decl. Apr 1957. Contract W-7405-eng-26. 66p. Order from OTS. 45 cents. ORNL-1062

Homogeneous reactor project quarterly progress report for period ending August 15, 1951, by W. E. Thompson. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jan 1952. Decl. May 1957. Contract W-7405-eng-26. 191p. Order from OTS. $1.10. ORNL-1121(Rev.)

Homogeneous reactor project quarterly progress report for period ending January 31, 1954, by W. E. Thompson and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Mar 1954. Decl. Apr 1957. Contract W-7405-eng-26. 102p. Order from OTS. 70 cents. ORNL-1678

Homogeneous reactor project, quarterly progress report for period ending April 30, 1955, by H. F. McDuffie, D. C. Kelly and others. Oak Ridge National Laboratory, Oak Ridge, Tenn. Jul 1955. Decl. Apr 1957. Contract W-7405-eng-26. 202p. Order from OTS. $1.10. ORNL-1895

Operation of the ORNL graphite reactor and the low-intensity test reactor - 1955. LITR Flux Traverses, by A. F. Rupp and J. A. Cox. Oak Ridge National Laboratory, Oak Ridge, Tenn. Aug 1956. Decl. Apr 1957. Contract W-7405-eng-26. 36p. Order from OTS. 40 cents. ORNL-2071

Homogeneous reactor project quarterly progress report for period ending January 31, 1957, by R. B. Briggs, C. E. Winters and others. n. d. Contract W-7405-eng-26. 180p. Order from OTS. $1.10. ORNL-2272

HRP civilain power reactor conference held at Oak Ridge, March 21-22, 1956, by U. M. Staebler and others. Research and Development Division Oak Ridge Operations Office, Oak Ridge, Tenn. Mar 1956. 258p. Order from OTS. $1.50. TID-7524

Elementary study of the neutron cycle in homogeneous epithermal reactors, by R. Balent and C. Roderick. North American Aviation, Inc., Downey, Calif. Nov 1951. Decl. Apr 1957. Contract AT-11-1-gen-8. 21p. Order from OTS. 25 cents. TID-10037

A 37,500 KW power reactor with competitive possibilities, by W. I. Thompson and K. Cohen. Walter Kidde Nuclear Laboratories, Inc., Garden City, N. Y. Feb 1954. Decl. Apr 1957. Contract AT(30-1)-1374-Task IV. 112p. Order from OTS. 55 cents. TID-10058

Energy spectrum of neutrons from thermal neutron fission of U^{235} and from an untamped multiplying assembly of U^{235}, by G. M. Frye, Jr., J. H. Gammel and L. Rosen. Los Alamos Scientific Laboratory, Los Alamos, New Mex. May 1954. Decl. Apr 1957. Contract W-7405-eng-36. 18p. Order from OTS. 25 cents. TID-10073

Reactor design evaluation program, quarterly progress report 2 - April through June 1953, by E. D. Kane. Livermore Research Laboratory, Livermore, California. Jun 1954. Decl. Apr 1957. Contract AT(11-1)-74. 18p. Order from OTS. 25 cents. TID-10076

Plutonium power reactor with oxide fuel elements, by E. A. Luebke. Knolls Atomic Power Laboratory, Schenectady, N. Y. May 1954. Decl. Apr 1957. Contract W-31-109-eng-52. 27p. Order from OTS. 25 cents. TID-10078

Reactor studies --final report. Part I, by Babcock and Wilcox Company, Akron, Ohio. Nov 1955. Decl. Apr 1957. 169p. Order from OTS. $1.10. TID-10117

In-pile heat transfer burnout tests at the MTR, by H. F. Dobel, S. J. Green and J. E. Zerbe. Atomic Power Division, Westinghouse Electric Corporation, Pittsburgh, Pa. 1955. Decl. Apr 1957. Contract AT-11-1-gen-14. 61p. Order from OTS. 50 cents. WAPD-LSR(IM)-2

Pressurized water reactor program. Technical progress report for the period March 1, 1954 to April 22, 1954, by O. J. Woodruff and others. Westinghouse Electric Corporation, Pittsburgh, Pa. n. d. Decl. Apr 1957. Contract AT-11-1-gen-14. 66p. Order from OTS. 50 cents. WAPD-MRP-44(Rev.)

Pressurized water reactor program technical progress report for the period July 15, 1954 to August 26, 1954, by O. J. Woodruff and others. Westinghouse Electric Corporation, Pittsburgh, Pa. n. d. Decl. Apr 1957. Contract AT-11-1-gen-14. 93p. Order from OTS. 60 cents. WAPD-MRP-47(Rev.)

Pressurized water reactor program technical progress report for the period September 9 to October 20, 1955, by J. E. Nolan and others. Westinghouse Electric Corporation, Pittsburgh, Pa. n. d. Decl. Apr 1957. Contract AT-11-1-gen-14. 95p. Order from OTS. 60 cents. WAPD-MRP-57(Rev.)

Pressurized water reactor program technical progress report for the period January 13, 1956 to February 23, 1956, by A. L. Bethel. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Feb 1956. Decl. Apr 1957. Contract AT-11-1-gen-14. 71p. Order from OTS. 60 cents. WAPD-MRP-60

Pressurized water reactor program technical progress report for the period February 23, 1956 to April 23, 1956, by A. L. Bethel. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Apr 1956. Decl. Apr 1957. Contract AT-11-1-gen-14. 72p. Order from OTS. 60 cents. WAPD-MRP-61

Pressurized water reactor program technical progress report for the period June 23, 1956 to August 23, 1956, by A. L. Bethel. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Aug 1956. Contract AT-11-1-gen-14. 76p. Order from OTS. 60 cents. WAPD-MRP-63

Pressurized water reactor program technical progress report for the period August 24, 1956 to October 23, 1956, by J. W. Simpson. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Nov 1956. Contract AT-11-1-gen-14. 76p. Order from OTS. 60 cents. WAPD-MRP-64

Pressurized water reactor (PWR) project technical progress report for the period October 24, 1956 to December 23, 1956, by J. W. Simpson. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Jan 1957. Contract AT-11-1-gen-14. 88p. Order from OTS. 60 cents. WAPD-MRP-65

Resume of uranium alloy data - IX, by E. F. Losco, Z. M. Shapiro and others. Technical Information Extension, Oak Ridge, Tenn. Sep. 1955. Decl. Apr 1957. Contract AT-11-1gen-14. 89 p. Order from OTS. 60 cents. WAPD-PMM-262

Proposal for dynamic in-pile cycling test of PWR fuel materials at the MTR--WAPD-25, by W. Schwartz. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Feb 1956. Decl. Apr 1957. 18p. Order from OTS. 30 cents. WAPD-PWR-CP-1832

PWR reference fuel rod design, by J. Sherman and P. S. Sherba. Westinghouse Electric Corporation, Pittsburgh, Pa. Aug 1955. Decl. Apr 1957. 25p. Order from OTS. 35 cents. WAPD-RDa-71

Status and recommendations for PWR seed development program, by F. R. Lorenz. Westinghouse Electric Corporation, Bettis Plant, Pittsburgh, Pa. Nov 1955. Decl. Apr 1957. 4p. Order from OTS. 25 cents. WAPD-PWR-FE-1122

Miscellaneous

Chemistry division semiannual progress report for period ending June 20, 1955, by E. H. Taylor and M. A. Bredig. Oak Ridge National Laboratory, Oak Ridge, Tenn. Oct 1955. Decl. Apr 1957. Contract W-7405-eng-26. 85p. Order from OTS. 60 cents. ORNL-1940

Nuclear power, the challenge to industry, a monograph, by Rear Admiral H. G. Rickover, USN. Technical Information Service, Atomic Energy Commission, Washington 25, D.C. Mar 1957. 11p. Order from OTS. 15 cents. TID-8014

Quarterly progress report for the period ending September 30, 1951, by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N. J. Jan 1952. Decl. Apr 1957. 102p. Order from OTS. 65 cents. TID-10153

Quarterly progress report for the period ending December 31, 1951, by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N. J. May 1952. Decl., Apr 1957. 118p. Order from OTS. 70 cents. TID-10154

Quarterly progress report for the period ending March 31, 1952, by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. Sep 1952. Decl. Apr 1957. 121p. Order from OTS. 70 cents. TID-10155

Quarterly progress report for the period ending June 30, 1951, by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. Dec 1951. Decl. Apr 1957. 233p. Order from OTS. $1.35. TID-10161

Quarterly progress report for the period ending June 30, 1954, by C. J. Rodden. New Brunswick Laboratory, New Brunswick, N.J. Jul 1954. Decl. Apr 1957. 86p. Order from OTS. 60 cents. TID-10175

U. S. DEPARTMENT OF COMMERCE FIELD OFFICES

SERVE THE BUSINESS COMMUNITY

The Department of Commerce maintains Field Offices to enable the business community to avail itself locally of Government facilities designed to promote commerce. Working closely with various units in the Department and, when necessary, with other Government agencies, the Field Offices provide business services to manufacturers, wholesalers, retailers, trade publications, trade associations, advertising agencies, research groups, financial institutions, and exporters and importers.

Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

GENERAL

- Management and business aids
- Establishing a new business

BASIC ECONOMIC DATA

- Census data, with national and often State and regional breakdowns, on manufacturing, wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

MARKETING AND DISTRIBUTION

- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

PRODUCTION

- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

FOREIGN TRADE AND INVESTMENT

- Tariff and exchange regulations
- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

COOPERATIVE OFFICES

To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

Department Field Offices

ALBUQUERQUE, N. MEX., Post Office Bldg.
ATLANTA 3, GA., 66 Luckie Street NW.
BOSTON 9, MASS., Post Office and Courthouse
BUFFALO 3, N. Y., 117 Ellicott Street
CHARLESTON 4, S. C., Sergeant Jasper Bldg., West End Broad Street
CHEYENNE, WYO., Federal Office Bldg.
CHICAGO 6, ILL., 226 West Jackson Blvd.
CINCINNATI 2, OHIO, Post Office and Courthouse
CLEVELAND 14, OHIO, 1100 Chester Avenue
DALLAS, TEX., 500 South Ervay Street
DENVER 2, COLO., New Custom House
DETROIT 26, MICH., Federal Bldg.
GREENSBORO, N. C., Post Office Bldg.
HOUSTON 2, TEX., 430 Lamar Avenue
JACKSONVILLE 1, FLA., Federal Bldg.
KANSAS CITY 6, MO., Federal Office Bldg.
LOS ANGELES 15, CALIF., 1031 South Broadway
MEMPHIS 3, TENN., 22 North Front Street
MIAMI 32, FLA., 300 NE. First Avenue
MINNEAPOLIS 1, MINN., Metropolitan Bldg.
NEW ORLEANS 12, LA., 333 St. Charles Avenue
NEW YORK 17, N. Y., 110 E. 45th Street
PHILADELPHIA 7, PA., 1015 Chestnut Street
PHOENIX, ARIZ., 137 N. Second Avenue
PITTSBURGH 22, PA., 107 Sixth Street
PORTLAND 4, OREG., Old U. S. Courthouse
RENO, NEV., 1479 Wells Avenue
RICHMOND 19, VA., 1103 East Main Street
ST. LOUIS 1, MO., New Federal Bldg.
SALT LAKE CITY 1, UTAH, 222 S. W. Temple Street
SAN FRANCISCO 11, CALIF., 555 Battery Street
SAVANNAH, GA., U. S. Courthouse and Post Office Bldg.
SEATTLE 4, WASH., Federal Office Bldg.

For local telephone listing, consult section devoted to U. S. Government