U. S. Government

RESEARCH REPORTS

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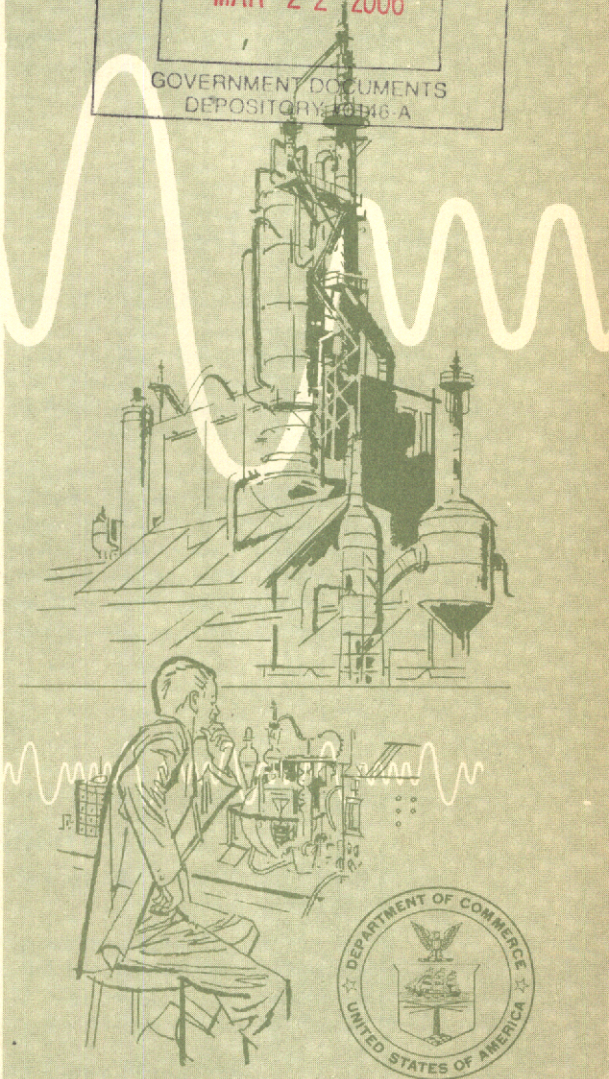

U. S. DEPARTMENT OF COMMERCE
Office of Technical Services

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OFFICE OF TECHNICAL SERVICES
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U. S. DEPARTMENT OF COMMERCE
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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 25, No. 5 May 18, 1956

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Printed Reports Available from OTS Announced in This Issue

CARTOGRAPHY

Cartographic delineation and geographic nomenclature in the coastal area of Wilkes Land, Antarctica. Annual summary report, 1954, on Project NR 388-088. U. S. Dept. of the Interior. Division of Geography. 1954. 4p. Order from LC. Mi $1.80, ph $1.80. PB 119581

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Basic studies on the chemistry of fluorine compounds, by W. T. Miller. Cornell University, Ithaca, N. Y. Sep 1954. 148p graphs, tables. Order from OTS. $3.75. PB 111959

The general purpose of the research at Cornell on the arctic rubber program under subcontract from the M. W. Kellogg Co. was to carry out investigations on fundamental problems directed towards new methods of synthesis of potentially polymerizable fluorine containing monomers and related work aimed at obtaining a better understanding of the basic chemistry of organic fluorine compounds. Period covered is Sep 1950 to Sep 1953. Contract DA-44-109-qm-222, Final report.

Energy distribution in luminescence spectra of organic compounds, by Frank E. E. Germann. Colorado. University. Dept. of Chemistry. Division of Physical Chemistry, Boulder, Colo. Nov 1954. 163p photo, diagrs, graphs. Order from OTS. $4.25. PB 111872

Final report under Contract N6 onr-231, T. O. 12, for the period Sep 1, 1952-Nov 30, 1954. Contents: Division A. Infrared luminescent emission from inorganic and organic phosphors, by Bruno and Inge Witte. - Division B. Luminescence studies. Part I-II. Investigation of the fluorescence of certain organic compounds and a study of energy and transfer in irradiated solutions of mixed phosphors, by Richard Wissell. Part III. Further studies of energy transfer in irradiated solutions of mixed phosphors, by W. F. Schmid and Frank T. Brown.

Indian synthesis. Quarterly report covering the period Jul 1-Aug 31, 1954 under Contract no. N174S-9851, by Glenn S. Skinner. Delaware. University. Dept. of Chemistry, Newark, Del. Sep 1953. 6p. Order from LC. Mi $1.80, ph $1.80. PB 119804

The purpose of the investigation is the preparation of pure nitramines and multifunctional compounds such as 1,6-diamino-2,3,4,5-hexanetetrol ("1,6-Diaminomannitol") from mannitol for use in investigations by the United States Naval Powder Factory. For previous report see PB 115066. IND S-Q 4.

Plastics and Plasticizers

Adhesives for special Army and Navy uses. Progress report covering period ending Aug 31, 1944. Bakelite Corp. Research and Development Dept., Bloomfield, N. J. Oct 1944. 85f photos, graphs, tables. Order from LC. Mi $4.80, enl pr $15.30. PB 119720

Basic studies and tests were conducted to make it possible to mount an explosive charge to a variety of surfaces, even in a vertical position, and even if the surface was somewhat rough, slightly wet, oily or dirty. However developments resulting from these investigations should find considerable application elsewhere. NDRC Div 19, no. 20. Contract OEMsr-850, Final report.

Apparatus for measuring the response of polymeric materials to a sinusoidal oscillating strain, by Bryce Maxwell. Princeton University. Plastics Laboratory, Princeton, N. J. Jan 1956. 23p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 119810

A device for measuring the dynamic response of plastic materials to a continually alternating tensile and compressive strain is described and analyzed. Under controlled conditions of temperature and strain magnitude, the real and imaginary components of the dynamic modulus and the mechanical loss factor may be determined over a wide frequency range with this apparatus. Data on several polymeric materials (cellulose acetate, cellulose acetate butyrate, polyvinyl chloride) are presented to demonstrate the response of typical plastics and to illustrate the use of this apparatus in categorizing the time and temperature dependence of the properties of visco-elastic materials. Dept. of the Army project 3-99-15-022. Signal Corps project 152B. PU PL TR 40A. SIG Contract DA 36-039-sc-70154.

Asymmetric polymer synthesis, by C. G. Overberger, A. B. Finestone and Louis C. Palmer. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Brooklyn, N. Y. Oct 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 120016

Abstracts of Technical notes I and II issued under this contract.
1. Polymers - Research 2. Contract AF 18(600)-970, Final report 3. AF OSR TR 55-34.

Polymer oxidation research. Quarterly progress report-WAF VIII for the period Jun 1-Aug 31, 1955 under Contract no. AF 33(616)-465, by Harold C. Beachell. Delaware. University. Dept. of Chemistry, Newark, Del. Aug 1955. 13p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 119791

Work was continued on the study of the oxidative degradation of deuterated styrene polymers. The main phase dealt with the synthesis of deuterated styrene polymers which are subsequently used in the oxidation experiments.

Shake flask method for screening fungal resistant plasticizers, by Dorothy A. Beck. U. S. Office of the Quartermaster General. Military Planning Division. Research and Development Branch. Chemicals and Plastics Laboratories, Philadelphia Quartermaster Depot, Philadelphia, Pa. Jun 1950. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 119682

A modification of the submerged culture method for growing microorganisms was adapted to the microbiological screening of plasticizers. The

nutrient requirements and environmental conditions for optimum submerged growth of mixed spores on plasticizers was determined, and the results applied to the development of a practical test method. QMC CPL 121-F.

Ternary polymer solutions, by Robert M. Kallo and Donald E. Braun. Fresno State College. Dept. of Chemistry, Fresno, Calif. Jan 1956. 39p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120017

Five ternary phase diagrams in the dilute region were determined for polystyrenepolyisobutylene-carbon tetrachloride systems of different polymer molecular weights. Ternary phase diagrams were determined for the systems polystyrene-benzene-methanol and polystyrene-benzene-isopropanol. Technical report no. 8 under Contract No. AF 18-(600)-588. Project no. R-351-40-11. AF OSR TR 55-33.

Paints, Varnishes and Lacquers

Influence of copper ions on adherence of vitreous coatings to stainless steel, by D. G. Moore and A. G. Eubanks. U. S. National Advisory Committee for Aeronautics. Feb 1956. 14p photos, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119879

In another phase of an investigation of adherence of ceramic coatings to metals, the effect of copper oxide in promoting adherence of vitreous coatings to AISI type 321 stainless steel was studied. The goal of this particular study was to determine whether the action of the copper ions was similar to that of cobalt ions in coatings for iron or whether the two actions were entirely different. NACA TN 3679.

Nickel dip, a radioisotope study of metallic deposits in porcelain enameling, by Joseph C. Richmond, Harry B. Kirkpatrick and William N. Harrison. U. S. National Advisory Committee for Aeronautics. Feb 1956. 26p photos, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119857

Radioisotope tracer techniques were used to study the effect of the nickel dip on the deposition of cobalt metal during firing of a cobalt-bearing ground coat on pickled and sandblasted iron, the effect of surface pretreatment on the amount and distribution of nickel deposited from the nickel dip on enameling iron, and the effect of application and firing of cobalt-free and cobalt-bearing enamels on the chemical form and physical distribution of nickel previously deposited on enameling iron by the nickel dip. NACA TN 3577.

Oxidation-resistant coatings for molybdenum, by J. R. Blanchard. Climax Molybdenum Co., Detroit, Mich. Jun 1955. 43p photos, drawings, tables. Order from OTS. $1.25. PB 111965

Oxidation tests at 1800° and 200°F and/or tests under conditions of rapid thermal cycling between room temperature and 1800°F were conducted, using panels of unalloyed molybdenum coated with: (1) sprayed aluminum-chromium-silicon (2) sprayed nickel-chromium-boron (3) sprayed composites of (1) and (2), (4) sprayed nickel-silicon-boron, (5) electrodeposited chromium, (6) electrodeposited nickel, (7) electrodeposited nickel plus chromium, (8) aluminum alloy 13 applied by dipping in a molten bath. Covers work during the period May 1954-May 1955 under Contract AF 33(616)-2488. Studies completed between May and Dec 1954 were reported in AF WADC TR 54-492. AF WADC TR 55-205.

Inorganic Chemicals

Disproportionation equilibrium of titanium trichloride, by Benjamin S. Sanderson, III, and George E. MacWood. Ohio State University. Dept. of Chemistry, Columbus, Ohio. Mar 1955. 33p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120050

The disproportionation equilibrium was followed by measuring the $TiCl_4$ pressure as a function of temperature and the solid phase composition. From these and other data, measured and estimated, a consistent set of thermodynamic constants has been given for the titanium chlorides. OSURF Proj 553, Technical report no. 4. Contract Nonr-495(06), Project NR 037-024.

Handbook: Field handling of concentrated hydrogen peroxide (over 52 weight percent hydrogen peroxide). U. S. Bureau of Aeronautics. Jul 1955. 127p photos, diagrs, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 120070

1. Hydrogen peroxide - Handling 2. Hydrogen peroxide - Storage 3. Hydrogen peroxide - Analysis 4. NAVAER 06-25-501.

Heat of formation of titanium dichloride, by David G. Clifton and George E. MacWood. Ohio State University. Dept. of Chemistry, Columbus, Ohio. Mar 1955. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 120018

The heat of formation of solid titanium dichloride has been determined by measuring the heats of solution of liquid tetrachloride and solid dichloride in an HCl-$FeCl_3$ solution, and by measuring the heats of solution of solid dichloride and solid trichloride in an HCl solution, in an ice calorimeter. OSURF Proj 553, Technical report no. 2. Contract Nonr-495(06), NR 037-024.

Heat of formation of titanium trichloride, by David G. Clifton and George E. MacWood. Ohio State University Research Foundation, Columbus, Ohio. Mar 1955. 33p drawings, diagr, graph, tables. Order from LC. Mi $3, ph $6.30. PB 119786

The heat of formation of solid titanium trichloride has been determined by measuring the heats of solution of liquid tetrachloride and solid trichloride in an $HCl-FeCl_3$ solution in an ice calorimeter. OSURF Proj 553, Technical report no. 1. Contract Nonr-495(06), NR 037-024.

Investigation of the effect of raw material production variables on the physical and chemical properties of carbides, nitrides, and borides, by H. Blumenthal. American Electro Metal Corp., Yonkers, N. Y. Jun 1955. 105p photos, diagrs, graphs, tables. Order from OTS. $2.75. PB 111989

This report is divided into five sections. The first section is devoted to a study of the as-received titanium carbide materials. Studies of chemical composition, the effect of ball milling and the purification of fine powders by leaching and flotation were made. The second section deals with hot pressing of unbonded titanium carbide bars. Measurements of their electrical resistivity and corrosion resistance were obtained. The third section deals with infiltration of titanium carbide skeletons. The fourth section is mainly an investigation of the effect of various impurities. In section V, microstructures of titanium carbide bars produced in different ways are given and an attempt is made to evaluate structures in the light of physical performance of the respective bars. Project no. 7350. Covers work conducted from Sep 1953 to Sep 1954 under Contract AF 33(616)-89. AF WADC TR 54-13, Part II.

Photometric analysis of barium nitrate in airhydrogen, oxyhydrogen, and oxyacetylene flames, by Joseph W. Lavitt. U. S. Picatinny Arsenal, Samuel Feltman Ammunition Laboratories, Dover, N. J. Jul 1955. 23p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119943

A flame photometric investigation of purified barium nitrate was made using airhydrogen, oxyhydrogen, and oxyacetylene flames. The data show that barium emits considerable light in the red and blue portions of the spectrum as well as in the green. Spectrograms were obtained which show emission between approximately 350 and 850 millimicrons. Ordnance project WD OAC 47001420-19-99105. PA TR 2192.

Preparation and properties of inorganic hydrides. Final report for the period Dec 31, 1951-Dec 31, 1954 under Contract no. Nonr-664(00), NR 356-228, by Albert E. Finholt. St. Olaf College, Northfield, Minn. Feb 1955. 8p table. Order from LC. Mi $1.80, ph $1.80. PB 119684

Research on organic reductions with sodium aluminum hydride and hydrogenation of phosphonitrile chlorides.

Research on the properties of ozone for the Bureau of Aeronautics, U. S. Navy. Final report under Contract no. NOa(S)-10945. Linde Air Products Co. Tonawanda Laboratory, Tonawanda, N. Y. May 1955. 114p drawings, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 120055

This final report presents the results of research completed under Contract NOa(s)10945 for the Bureau of Aeronautics, United States Navy on the physical and thermodynamic properties of liquid and gaseous ozone and ozone-oxygen mixtures. Compressibility data for gaseous ozone and ozone-oxygen mixtures were computed at the Massachusetts Institute of Technology under the supervision of Professor Beattie by Mr. Charles M. Apt. A list of the progress reports are given in the Appendix.

Structure sensitivity of the X-ray coloration of NaCl crystals, by R. B. Gordon and A. S. Nowick. Yale University, Hammond Metallurgical Laboratory, New Haven, Conn. Nov 1955. 29p graphs. Order from LC. Mi $2.70, ph $4.80. PB 120001

Room temperature measurements of the rate of coloring of NaCl crystals by X-rays at different depths below the irradiated surface and for different states of deformation and heat treatment are reported. From the results it is concluded that two mechanisms of coloring operate in these crystals. The first mechanism results from vacancies already present in the unirradiated crystal, while the second is due to the generation of F-centers at dislocations. These two mechanisms may be readily separated in terms of their coloration efficiencies and their dependence on dislocation density. Project no. R-355-40-14. AF OSR TN 55-438. Contract AF 18(600)-850-2.

Sublimation pressure of titanium trichloride, by Benjamin S. Sandersnn, III, and George E. MacWood. Ohio State University. Dept. of Chemistry, Columbus, Ohio. Mar 1955. 24p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120019

In this investigation the sublimation pressure of titanium trichloride has been measured over a range of temperatures and for different average compositions of the solid phase. From these measurements, are calculated thermodynamic equations for the sublimation reaction: $TiCl_3(s) = TiCl_3(g)$. OSURF Proj 553, Technical report no. 3. Contract Nonr-495(06), NR 037-024.

Thermodynamic properties of gaseous nitrogen, by Harold W. Woolley. U. S. National Bureau of

Standards. Mar 1956. 114p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120100

The NBS-NACA tables of thermal properties of gaseous nitrogen are grouped together in this report for convenient use. They include the thermodynamic functions for the gas, both real and ideal, the transport properties for the gas, and the vapor pressure of the liquid and the solid. The tables are in dimensionless form and conversion factors to frequently used units are given. Deviation plots or tables indicating the agreement or discordance of the experimental data are included. NACA TN 3271.

Ordnance Chemicals

Use of volatile corrosion inhibitors as a preservative medium for long term storage of ordnance materiel - Addendum V: Results after six years of exposure, by R. E. Johnson. U. S. Arsenal, Rock Island, Ill. Nov 1955. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 119454

After six years in storage, two volatile corrosion inhibitors and three petrolatum type corrosion preventives employed in packaging stored ordnance materiel were evaluated comparatively for the long term protection of gun and howitzer tubes, hydropneumatic recoil rods and cylinders, sintered iron specimens, and non-ferrous specimens. Dept. of the Army project no. 591-07-001. Ordnance project no. TB5-11010, Report no. 10. RIAL R 55-4161.

Analytical Chemistry

Chromatography, its development and various applications. U. S. Quartermaster Food and Container Institute. Library Branch, Chicago, Ill. Dec 1953. 179p. Order from LC. Mi $8.10, ph $27.30. PB 119813

1. Chromatography - Bibliography 2. QMC FCI BS 3.

Supplement no. 1. Sep 1954. 187p. Order from LC. Mi $8.40, ph $28.80. PB 119813s

1. Chromatography - Bibliography 2. QMC FCI BS 3, suppl. 1.

Colorimetric method for the assay of o-dianisidine and compound 34 (U), Interim report, by David N. Kramer. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Sep 1955. 12p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 119787

A colorimetric assay method is described for o-dianisidine and compound 34 based on the diazotization of the amine and coupling with resorcinol. Titrimetric assay methods were attempted but were found to be unsatisfactory. Project 4-08-04-008. CC CRL R 486.

Chemical Engineering and Equipment

Location factors in the petrochemical industry with special reference to future expansion in the Arkansas-White-Red River basins, by Walter Isard and Eugene W. Schooler. Massachusetts Institute of Technology. Dept. of City and Regional Planning. Urban and Regional Studies Section. Jul 1955. 125p diagr, maps, graphs, tables. Order from OTS. $3. PB 111640

This study considers the locational forces to which the petrochemical industry responds and is also a contribution to the whole field of locational theory. Tables give transport cost differentials, economies of scale, and input requirements for various chemicals.

Miscellaneous Chemicals

Interaction of ammonia and nitrocellulose, by Roger A. Strehlow and Marjory A. Watermeier. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1955. 33p drawing, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119574

Permeability measurements, spring balance weighings of films and fibrous nitrocellulose to determine the percent amino nitrogen, percent nitrate nitrogen, and rate of depolymerization of the nitrocellulose were made over the temperature ranges of 0 to 73° C at one atmosphere pressure. Spring balance weighings were also made at room temperature over the pressure range of 1/10th to 1 atmosphere pressure to determine the dependence of solubility on pressure. Dept. of the Army project no. 5B0302001. Ordnance research and development project no. TB3-0110. APG BRL R 947.

Investigation of several desiccants with regard to their use in the dryer system of the 40 x 40 cm supersonic wind tunnels of the Naval Ordnance Laboratory, by K. H. Gruenwald. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1950. 32p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119739

An investigation of several desiccants, suitable for wind tunnel dryers, has been made. These were sova bead, coarse silica gel, fine silica gel, indicator gel, activated alumina, and soya bead which was split into small pieces. NOL M 10518.

Solid state properties and catalytic activity. Fifteenth periodic status report for the period

Jan 2-Mar 31, 1955 under Contract no. N6 onr-27018, NR 051-265, by Hugh Taylor. Princeton University. Dept. of Chemistry. Mar 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 120035

For 9th-14th reports see PB 114084, 115107, 116327, 117473, 118386, 119034.
1. Chemisorption 2. Catalysts, Oxidation.

ELECTRICAL MACHINERY

Communication Equipment

On a theory of the transmission and confirmation of messages in noise, by James P. Egan, Frank R. Clarke and Edward C. Carterette. Indiana. University. Hearing and Communication Laboratory, Bloomington, Ind. Oct 1955. 53p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 119496

In a series of experimental studies, the severe restrictions imposed upon the communication process by an articulation test were slightly relaxed by increasing the number of events in the communication sequence. This report presents some of the theoretical considerations which have grown out of this research. AF CRC TN 55-67. Contract no. AF 18(600)-571.

Operational evaluation of teletypewriter sets AN/FGC-20, AN/FGC-20X and AN/FGC-21. U. S. Air Proving Ground Command, Eglin Air Force Base, Fla. Apr 1955. 23p photos. Order from LC. Mi $2.70, ph $4.80. PB 119742

1. Teletypewriters - Evaluation 2. APGC Proj APG/CSR/560-A.

Visual message presentation. Scientific report no. 3 for the period Mar 1-Aug 31, 1955 under Contract no. AF 19(604)-1039, by S. H. Chang, H. L. Stubbs, L. O. Dolansky, J. Wiren, H. S. Littleboy and C. R. Howard. Northeastern University. Electronics Research Laboratory, Boston, Mass. Aug 1955. 36p photos, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119577

The research is directed toward the specification of important parameters of speech for visual-message purposes and for use in speech-compression systems. The formant tracker for nonturbulent sounds is described briefly. The "V" filter for measuring dispersion of turbulent-sound spectra has been further tested and its central frequency has been made automatically controllable, tracking the centroid of the spectrum. Several steps in the automatic classification of nonturbulent sounds by fractional power have been completed, using commercial computing equipment. AF CRC TN 55-580.

Wide-band differential amplifier oscilloscope attachment, by A. William Carlson. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate, Cambridge, Mass. Jun 1955. 17p photos, diagrs. Order from OTS. 50 cents. PB 111953

A differential amplifier having a single-ended output is described. The amplifier is useful in converting a single channel oscilloscope into a differential oscilloscope. The circuit has many of the advantages of the cathode follower, such as wide bandwidth and low output impedance. AF CRC TR 55-110.

Electronics

Analysis of multiple-rate-sampled systems, by George M. Kranc. Columbia University. Electronics Research Laboratories. Dept. of Electrical Engineering. Nov 1955. 42p diagrs, table. Order from LC. Mi $3.30, ph $7.80. PB 119802

A general analytical technique described in this paper, permits the extension of Z-transform methods to sampled-data systems containing synchronized switches which do not operate with the same sampling rate. Sampling periods of each switch are first expressed in the form $T/p_1 \ldots T/p_n$ (where $p_1 \ldots p_n$ are integers not equal to zero) and then it is shown that each switch with a period T/p can be replaced by a system of switches and advance and delay elements where each switch operates with a sampling period T. CU-17-55-AF-677-EE. CUN ERL TR T-11/B. Contract AF 18-(600)-677. AF OSR TN 56-2.

Application of the method of Musson-Genon to the Heil electron gun, by Tameichi Kuwabara. Ohio State University. Dept. of Electrical Engineering, Columbus, Ohio. Aug 1955. 53p photos, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 120000

The problem of the potential distribution and corresponding electron trajectories in the presence of space charge in the Heil electron gun has been studied using the method of Musson-Genon. Three successive approximations were necessary to arrive at the final result. OSURF Proj 580, Technical note no. 3. AF OSR TN 55-419. Contract AF 18(600)-980.

Application of the relaxation method of analysis to the Heil electron gun, by R. P. Anand. Ohio State University. Dept. of Electrical Engineering, Columbus, Ohio. Jun 1955. 36p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119522

The relaxation method is used to obtain an approximate solution of Poisson's equation in a 1/5-size

Heil electron gun. A resistance-network analogue which can do most of the relaxation calculation automatically has been used. The solution has been carried to a second approximation. The current flow is not laminar, and the current density is very nonuniform near the nozzle. To obtain a better approximation, it is necessary to construct a finer network. OSR TN 55-250. OSURF Proj 580, Tech. note no. 2. Contract AF 18(600)-980.

Calculation of charge density distribution of multilayers from transit time data, by Samuel N. Karp and Jerry Shmoys. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jul 1955. 17p graphs. Order from LC. Mi $2.40, ph $3.30. PB 119793

An integral relation is derived between the electron density distribution of a multilayer and the frequency dependence of the time in which a radio pulse traverses the layer. This integral equation is then solved for the electron distribution by means of the Mellin transform, given the transit time function. The lack of uniqueness of this solution is discussed. Certain characteristics of the multilayer, e.g. the minimum electron density, are given in terms of the Mellin transform of the transit time. The same procedure is applied to the problem of calculating the potential of a potential well from the transit time of a particle as a function of energy. Appendix: Motion of a particle in a potential well. NYU RR EM-82. AF CRC TN 55-795. Contract AF 19(122)-42.

Equivalence relations in diffraction theory, by S. N. Karp and W. Elwyn Williams. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Sep 1955. 16p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 119734

Certain equivalence relationships between different problems occurring in diffraction theory are established. The method used is essentially Schwartz principle of analytic continuation by reflection across a straight boundary. An explicit solution is also obtained by this method for a plane wave normally incident on a T-shaped structure. NYU RR EM-83. AF CRC TN 55-796. Contract AF 19(122)-42.

Fabrication of final design tubes and evaluation testing of ML-329 ceramic tetrode. Final progress report, period of 1 Jul 1951-31 Oct 1951, under Contract no. DA 36-039-sc-177, by C. V. Weden. Machlett Laboratories, Inc., Springdale, Conn. Oct 1951. 78p drawings (part fold), graphs. Order from LC. Mi $4.50, ph $12.30. PB 119776

Evaluation tests on ceramic tetrode tube at frequencies from 125 Mc to over 1000 Mc. An output average of 425 watts at 40% efficiency was measured at 500 Mc. Discusses changes in design of tube for use in pulsed service. Dept. of the Army project no. 3-19-02-021. Signal Corps project no. 27-312A-1.

Ferrite components for 8.7-mm wavelength, by A. I. Reynard. U. S. Naval Research Laboratory. Aug 1955. 10p photos, diagrs, graphs. Order from OTS. 50 cents. PB 111813

An 8.7-mm ferrite isolator and a gyrator have been designed and constructed. The isolator is capable of about 33-db isolation at an average VSWR of 1.07 and an average insertion loss of 0.8 db over the range of 8.58-to 8.80-mm wavelength. The design and procedure and critical dimensions are given. An electronic switch using a gyrator is described. NRL R 4592.

Height errors in a rawin system, by R. Leviton. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Devices Laboratory, Cambridge, Mass. Dec 1954. 27p tables. Order from LC. Mi $2.70, ph $4.80. PB 119774

The two types of height errors which exist in a rawin system, namely the error in the height of a pressure surface and the radiosonde position error, are analyzed. The various instrumental errors responsible for these height errors are examined. The magnitude of the height errors as obtained from the present-day rawinsonde is compared to that which would result from use of the remitter-type radiosonde and hypsometer currently being developed. The comparisons show that these new developments would not appreciably affect the pressure-height error, but would greatly reduce the position error, with a corresponding increase in wind data accuracy. Tables and examples illustrating the height errors are given. AF CRC TN 54-26. AF GRD SG 60.

Investigation of atmospheric radio noise. Scientific report no. 9 for the period 1 Jul-30 Sep 1955 under Contract no. AF 19(604)-876, by A. W. Sullivan, S. P. Hersperger, R. F. Brown and J.D. Wells. Florida. Engineering and Industrial Experiment Station. Dept. of Electrical Engineering, Gainesville, Fla. Oct 1955. 88p photo, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 119807

Efforts leading toward the design of a noise meter to measure the defining parameters of the logarithmic-normal probability distribution have resulted in a logarithmic amplifier possessing a dynamic range of 100 db. The amplifier is shown to be capable of measuring the mean logarithmic amplitude of the noise distribution. The complete radioteletype system employing four independent information channels is described. A discussion of the system and the methods of determining the cor-

relation between the performance of the system and measures of atmospheric noise intensity is presented. Studies of the waveform of the ground wave of an atmospheric as a function of distance are presented. For 1st-8th reports see PB 113559, 113764, 116122-116123, 116501, 116979, 117733 and 119364. AF CRC TN 55-773.

Millimeter wavelength components, by Rufus G. Fellers and Julius A. Kaiser. U. S. Naval Research Laboratory. Mar 1956. 27p photos, diagrs, graphs, table. Order from OTS. 75 cents. PB 111968

The development and characteristics of a series of waveguide components and test equipment covering the portion of the millimeter wavelength range from four millimeters to about one centimeter are described. Included are connectors, standing-wave indicators, wavemeters, attenuators, directional couplers, switches, hybrid junctions, adjustable shorts, crystal mounts, power meters, power supplies, terminations, bends, horns, tees, and tapers. NRL R 4704.

On the radiation of electromagnetic waves from a circular waveguide with an infinite flange (On the question of the diffraction of plane-cylindrical electromagnetic waves), by N. V. Zernov. Translated by Morris D. Friedman. Feb 1951. 15p. Order from LC. Mi $2.40, ph $3.30. PB 119456

A method is explained for solving the problem of the diffraction of circularly-symmetric electromagnetic waves relative to a circular orifice in a perfectly conducting plane. The boundary problem is reduced to an infinite system of linear algebraic equations solvable by iteration. It is shown that to compute the field approximately, only one or two equations need be used. The relation is established between the method explained and the variational principle of solving the same boundary problem. The problem considered is also reduced to an integral equation of the second kind. Technical translation no. 6 under Contract AF 19(604)-1476. Translated from Zh. Tekh. Fiz., vol. 21, no. 9, 1951, pp. 1066-1075. AF CRC TN 55-570.

Piezoelectric crystal studies and measurements. First quarterly progress report, 1 Apr-30 June 1950. Supplementary volume: Loading of quartz resonators by condensed water vapor, by Samuel S. Humphrey. Wesleyan University, Middletown, Conn. Jun 1950. 50p diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 119601

Basic experimental data are given for the change in motional resistance and resonant frequency of a BT cut quartz plate as varying amounts of water are condensed on its surfaces. The onset of these changes which are attendant upon loading is very abrupt. A change of one hundred cycles in a 1.56 mc. crystal and an addition of 20 ohms to its 4 ohm resistance occurs for a deposit of two micrograms per square centimeter over the surfaces of the two inch square crystal plate. After these abrupt changes the effects of added deposits are more gradual. Dept. of the Army project no. 3-99-11-022. Signal Corps project no. 37-142B. SIG Contract no. DA 36-039-sc-73, Report no. 1 suppl.

Progress report for Apr-Jun 1955. National Research Council of Canada. Radio and Electrical Engineering Division. Jul 1955. 32p photos, graphs. Order from LC. Mi $3, ph $6.30. Limited supply available free from National Research Council of Canada. Radio and Electrical Engineering Division, Ottawa, Canada. PB 119833

1. Antennas - Research - Canada 2. Tubes, Electron - Research - Canada 3. Atmosphere, Upper - Research - Canada 4. Electromedical research - Canada 5. Navigational aids - Canada 6. Engineering, Electrical - Research - Canada 7. Musical instruments, Electronic - Research - Canada 8. Noise, Solar - Research - Canada 9. Dielectric research - Canada 10. NRCC ERA [illegible]8.

Regulated power supplies with silicon junction reference, by D. G. Scorgie. U. S. Naval Research Laboratory. Aug 1955. 13p diagrs, graphs. Order from OTS. 50 cents. PB 111814

The particular requirement which motivated the design of this power supply was to provide 700 ma at about 6 volts dc for heating the filament of a vacuum tube. Since it is possible to envision many other applications, this discussion goes beyond the immediate requirement. Specifications are considered for applications where extreme accuracy (i.e. 0.1%) is necessary, and where accuracy of 1% or so will suffice but must be maintaintained with wide variation of temperature, supply voltage, and supply frequency. NRL R 4589.

Research investigations on the ruggedization of electron tubes. Final report under Contract no. W36-039-sc-36845, by H. D. Doolittle and W. E. Coykendall, Jr. Machlett Laboratories, Inc., Springdale, Conn. May 1950. 152p photos, drawings, graphs, table. Order from LC. Mi $7.50, ph $24.30. PB 119775

The object of this project was (1) to investigate the structural designs of rugged transmitting tubes in general, including materials and fabrication techniques, and (2) to make a tube to withstand 1000 G shocks of 5 millisecond duration. The model tube was to be capable of delivering at least 200 watts output at 125 mc, 60% efficiency. Development was to center around a tetrode type, but keeping basic designs such that they would be easily adaptable to triode or high voltage rectifier tubes. Dept. of the Army project: 3-19-01-021. Signal Corps project: 302A-1. SIG Contract W36-039-sc-36845, Final report.

Selected questions on the mathematical theory of electric and magnetic phenomena. Part 4: Wave fields, by G. A. Grinberg. Translated from the Russian by Morris D. Friedman under Contract AF 19(604)-1476. Order separate parts described below from LC, giving PB number of each part ordered.

Chap. XXI: Electromagnetic waves in inhomogenous (laminar) media. 1948. 40p. Mi $3, ph $6.30. PB 119458

Technical translation no. 7.
1. Waves, Electromagnetic - Propagation - Mathematical analysis - Russia 2. AF CRC TN 55-571.

Chap. XXII: Diffraction from a perfectly conducting wedge. 1948. 21p. Mi $2.70, ph $4.80. PB 119457

Technical translation no. 8.
1. Waves, Electromagnetic - Diffraction - Mathematical analysis - Russia 2. AF CRC TN 55-572.

Chap. XXIII: On radiowave propagation over the earth taking into account sphericity and atmospheric inhomogenity. 1948. 29p. Mi $2.70, ph $4.80. PB 119459

Technical translation no. 9.
1. Radio waves - Propagation - Mathematical analysis - Russia 2. AF CRC TN 55-573.

Semiconductor research. Quarterly reports no. 11 and 12, Jul-Dec 1955. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Dec 1955. 160p drawings, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 119805

Contents: Effects of pressure on the electrical properties of semiconductors, by G. Donald Long. - Thin germanium films prepared from the hydride, by Thomas James Matcovich. - Expansion of potassium and sodium chloride crystals due to X-ray irradiation of weak intensities, by Lan-Ying Lin. - Impurity band conduction in mercury doped vacuum, by P. H. Miller, Jr.

Some factors affecting phase and gain alignment in matched channel receivers, by Harold D. Webb. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Radio Direction Finding Section, Urbana, Ill. Feb 1955. 75p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 119982

In order to find criteria that could be used to determine the necessary precision of match for various circuit components or parameters, some simple types of circuits were analyzed mathematically in order to find expressions for percent of ellipsing, expressed as 100 times the ratio of the minor axis of the ellipse to the major axis, and for bearing indication, both in terms of circuit parameters. The results of the work are given in the body of the paper, with the detailed analyses in appendices. The various expressions derived are expressed in a manner that is believed to be useful in deciding tolerance limits for the design of matched channel receiving systems. Technical report no. 21 under Contract no. N6ori-71, Task XV, ONR project no. 076-161.

Study of the generation and detection of electromagnetic waves in the millimeter wave region. Scientific report no. 1 for the period Jul 1-Aug 31, 1955 under Contract no. AF 19(604)-1115, by J. H. Rohrbaugh. New York University. Washington Square College of Arts and Science. Physics Dept. Sep 1955. 58p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $9.30. PB 119794

Improvements have been made in the liquid refractometer and in the handling of data secured with it. These are described in considerable detail. Non-integral harmonics are observed from a K-band magnetron. The wavelengths of two of these (one is half integral) have been measured with a resolving power of approximately 1000. The in-guide bolometers being made and used have been improved further. Some calculations are also presented on the theoretical treatment of a two dimensional monatomic crystal resonance problem as an illustrative preliminary to a similar treatment of the three dimensional diatomic crystal. For 1st-3d reports see PB 116645, 116990, 117767. AF CRC TN 55-779.

Vehicular antenna research. Final report for the period 16 Jul 1952-31 May 1955 under Contract no. DA 36-039-sc-42548, by R. Webster. Ohio State University Research Foundation. Antenna Laboratory, Columbus, Ohio. Jun 1955. 27p drawings, graph. Order from LC. Mi $2.70, ph $4.80. PB 119759

This final summary report was written to serve as a bibliography to the interim progress reports and technical reports describing the detailed work. The more important problems investigated are discussed briefly. Recommendations are made for further research and development based on findings obtained to date. Dept. of the Army project 3-99-12-022. Signal Corps project 132-B. OSURF Proj 522, Report no. 17.

FOOD AND KINDRED PRODUCTS

Color in foods. Symposium sponsored by the Quartermaster Food and Container Institute for the Armed Forces Quartermaster Research and Development Command, U. S. Army Quartermaster Corps, Oriental Institute, University of Chicago, Nov 3-4, 1953. National Research Council.

Advisory Board on Quartermaster Research and Development. Committee on Foods. Nov 1954. 192p photos, diagrs, graphs, tables. Order from Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill. PB 120022

Contents: I. Opening remarks. Welcoming address, by John D. Peterman. - Introduction, by Donald K. Tressler. - II. Color and its relationship to food investigations. Measurement and specification of color, by B. A. Brice. - Color in relation to food preference, by Howard G. Schutz. - Colorimetry and foodstuffs in Britain, by G. J. Chamberlin. - III. Color measurement in relation to commodities and consumer interest. Color measurement of different commodities, by Gordon Mackinney. - Color dimensions of interest to the consumer, by Amihud Kramer. - Application of color indices to the tomato color measurement problem, by S. G. Younkin. - IV. Instruments for the study of color. Color measurements with tomatoes, by Norman W. Desrosier. - Potential application of the rapid scanning spectrophotometer for the objective evaluation of food color, by R. Pomerantz. - Comparison of color-measuring instruments, by C. O. Chichester. - V. Measurement of color and color differences in relation to quality. Color inspection--California Department of Agriculture, by S. R. Whipple. - Color changes during storage of foods, by G. E. Livingston and C. R. Fellers. - Color measurement in strawberry preserves, by E. E. Meschter. - Color differences in the quality evaluation of processed fruits and vegetables, by Oliver J. Worthington. - Color measurement in other products, by J. B. Moster and A. N. Prater. - Effect of heat treatment on some plant carotenoids, by Alan Joyce. - Pigment changes in tomatoes ripened at 90°F, by F. J. Francis.

Establishing optimum conditions for storage and handling of semiperishable subsistence items, a conference sponsored by the Research and Development Division, Office of the Quartermaster General, Washington, D. C., 3 Dec 1953. Edited by Harry E. Goresline, Norbert J. Leinen, and Emil M. Mrak. U. S. Office of the Quartermaster General. Research and Development Division. Mar 1955. 143p photos, diagrs, maps (1 fold). Order from Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill. PB 120021

Contents: I. Introduction. Purpose of the conference, by D. K. Tressler. - Past and current efforts to increase the storage life of subsistence, by Emil Mrak. - II. Rate and extent of deterioration of packaged rations during storage and transportation. Stability studies on rations at the QMFCI, by J H. Mitchell, Jr. - Ration storage requirements, by J.G. Woodroof. - Advantages of cold storing rations, by H. C. Diehl. - Handling of semiperishable subsistence, by Harry E. Goresline. - Transportation problems--occurrence of high temperatures in standing and moving boxcars, by W. L. Porter. - Dried and dehydrated fruits are semiperishable, by Wilbur Pentzer. - III. Effect of atmospheric changes on packaged rations. Control of condensation on cold items, by Carl Kayan. - Condensation effects of temperature-humidity changes, by E. K. Heaton. - IV. Economics of cold storage of field rations compared with dry storage of rations. Disadvantages of forced feeding of operational rations, by W. C. Fischer. - Cost of cold storage and dry storage of field rations, by J. G. Woodroof. - Advantages of cold storage of emergency type rations, by Vallee O. Appel.

Stability of dehydrated eggs. Symposium sponsored by the Quartermaster Food and Container Institute for the Armed Forces Quartermaster Research and Development Command, U. S. Army Quartermaster Corps, Oriental Institute, University of Chicago, Feb 12-13, 1953. Edited by Martin S. Peterson and Harry E. Goresline. National Research Council. Advisory Board on Quartermaster Research and Development. Committee on Foods. Sep 1954. 105p photos, graphs, tables. Order from Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill. PB 119926

Contents: I. Evaluation of the acidified and the glucose-free types. Pertinency of the problem to the armed forces, by Donald K. Tressler. - Methods of pH determination and control in production of acidified eggs, by Harold Salwin and J. H. Mitchell, Jr. - Experimental comparisons of the quality and stability of acidified yeast-fermented and glucose-oxidase desugared whole egg powders as evaluated by chemical, physical, and sensory tests, by Leo Kline, Hans Lineweaver, and Helen L Hanson. - Comparative stability of acidified and glucose-free eggs, by J. H. Mitchell, Jr. - Sponge-cake method for determining the functional properties of dehydrated eggs, by Marion C. Bollman. - Comparison of glucose-free and acidified whole egg powders by sensory tests, by Helen L. Hanson. - Use of consumer preference methods for evaluating dried eggs during storage, by Norman F. Girardot and David R. Peryam. - Discussion. - II. Salmonella problems. Importance of salmonella research in dehydrated eggs, by G. M. Dack. - Thermal pasteurization for control of salmonella in dehydrated eggs, by Harry E. Goresline. - Incidence and types of salmonella found in commercial processing of dehydrated egg products, by Anne F. Byrne and Morton M. Rayman. - Methodology for isolating salmonella from dried egg products, by John C. Ayres. - Heat resistance of salmonella species in liquid whole eggs, by Abe Anellis, Morton M. Rayman, and Julia Lubas. - Pasteurization of liquid whole egg by cathode ray irradiation, by Robert P. Joslin and Bernard E. Proctor. - Discussion.

Surveys of progress on military subsistence problems. Series I. Food stability. 1. Contributions of browning research to ration item stability, a conference on the status of browning reaction research and a review of its contributions to stabi-

lized packaged rations held 1 Feb 1952 at the Quartermaster Food and Container Institute for the Armed Forces (Chicago, Ill.) Research and Development Division, Office of the Quartermaster General. Edited by Jack H. Mitchell, Jr. and Martin S. Peterson. U. S. Quartermaster Food and Container Institute, Chicago, Ill. Aug 1952. 56p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 119925

Contents: I. Opening session of the nonenzymatic browning conference. Introduction, by Donald K. Tressler. - Reaction between proteins and reducing sugars in the "dry" state, by Colin H. Lea. - II. Current investigations. Non-enzymatic browning in dried fruits and vegetables, by Gordon Mackinney. - Work of the Northwestern University group using model systems, by Charles D. Hurd. - Control of non-enzymatic browning in potatoes, by W. E. Pyke. - Chemistry of browning, by Cyrus O. Guss. - Browning program at Michigan State College, by John C. Speck, Jr. - Fundamental nature of the browning reaction, by Melville L. Wolfrom. - Color formation in d-xylose-glycine mixtures at 65°C. in nitrogen, with varying percentages of water, by C. S. Rooney. - III. Discussion. - IV. Review of browning reaction studies in relation to product application, by Harold S. Olcott.

U. S. Army panel discussion on radiation preservation of foods, U. S. Dept. of Commerce, April 17, 1956. Apr 1956. 22p. Order from OTS. 50 cents. PB 121103

Contents: Introductory comments, by alph G. H. Siu. - Nature of process; collaborating agencies, by Reuben Pomerantz. - Current state of the art, by Truman F. Cook. - Effect of radiation sterilization and preservation on the wholesomeness of foods, by H. F. Kraybill. - Future potentialities, by William D. Jackson.

INSTRUMENTS

Aerothermopressor, a device for improving the performance of a gas turbine power plant, by Ascher H. Shapiro, Kenneth R. Wadleigh, Bruce D. Gavril and Arthur A. Fowle. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Gas Turbine Laboratory. Mar 1955. 132p drawings, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 120034

The purpose of this paper is to present both an introduction and a progress report on a novel aerothermodynamic device which performs the function of a compressor but which requires only an extremely simple mechanical structure having no moving parts. Basically, the Aerothermopressor is a duct within which atomized water evaporates into a high-speed stream of high-temperature gas, thereby inducing a rise in isentropic stagnation pressure of the gas stream. One of the most attractive applications of the Aerothermopressor is as an auxiliary for improving the performance of a gas turbine plant. MIT DIC R 5-6985. Contract N5 ori-07878.

Analogue computation of quotients and functions containing quotients using magnetic cores, by D. H. Schaefer. U. S. Naval Research Laboratory. Feb 1956. 13p diagrs, graphs. Order from OTS. 50 cents. PB 111969

The fact that a magnetic core requires a given number of volt seconds to be driven from saturation in one direction to saturation in the other direction has been utilized to build a dividing circuit. This circuit, employing switching transistors and a single high remanance magnetic core, provides an output voltage whose average value is the quotient, with the correct sign, of two input voltages. A preliminary model of the divider gives accuracies of ±2.5% of full-scale readings for a quotient range of one hundred to one and input variation of both numerator and denominator of better than ten to one. By varying the waveforms of the inputs, a much more general computing element whose output is proportional to various functions containing quotients can be obtained. NRL R 4702.

Corrections for the oscillating disk viscometer, by Joseph Kestin and Hung-En Wang. Brown University. Division of Engineering, Providence, R. I. Dec 1955. 68p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120013

The report contains an improved theory of the oscillating disk viscometer. In particular it contains an expression which takes into account the influence of edge effects in addition to the effects due to wire damping, unequal spacing and to the presence of an extension rod. The physical assumption for the edge correction is tested against the experimental data due to Kestin and Pilarczyk, and the dependence of the edge correction factor is determined. Project R 357-40-12. AF OSR TN 55-467. Contract AF 18(600)-891, Technical report no. 5.

Design for non-sticking plug and ring gages and locators, by Lawrence E. Doyle, Bernard R. Better and Bei Tse Chao. Illinois. Engineering Experiment Station. Jan 1956. 28p photos, drawings, diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 119771

Also available from University of Illinois, Urbana, Ill. 45 cents. University of Illinois. Bulletin, vol. 53, no. 38.
1. Plugs - Design 2. Gages, Ring - Design 3. ILU EES B 433.

Development of smoke penetration meters, by H.W. Knudson and Locke White. U. S. Naval Research

Laboratory. Sep 1954. 74p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 119781

Meters were developed to determine the penetration of filters by smokes, both in the laboratory and in production. The method is rapid, extremely sensitive, and highly reproducible, and the meters agree very well among themselves. NRL P 2642.

Diaphragm-type strain gage to record pressure-time traces, by Pasquale J. Falivene and Daniel Waxler. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Jul 1955. 42p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 119944

The method utilizes a diaphragm-type strain gage, an auxiliary power supply, calibration units, an oscilloscope, and a camera. The pressure as a function of time for the ignition cartridge appears on the oscilloscope and is permanently recorded by the camera. Ordnance project WD OAC 47001420-19-99105. PA TR 2199.

Ferromagnetic core logical circuitry and its application to digital computers, by Andrew J. Lincoln. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1955. 59p diagrs. Order from OTS. $1.50. PB 111954

This report traces the chronological development of magnetic core logical circuitry and its application to digital computers. After an introductory discussion of early-type magnetic core delay lines, the relative advantages, disadvantages and principles of operation of various types of magnetic core shift registers are presented. The body of the report includes results of the survey and the appendix includes acknowledgements and a bibliography. Dept. of the Army project no. 5B0306002. Ordnance research and development project no. TB3-0007. APG BRL M 911.

Floating-point coding for the NAREC, by L. E. Davis. U. S. Naval Research Laboratory. Aug 1955. 30p diagr, tables. Order from OTS. 75 cents. PB 111816

The fixed-binary point design of the NAREC requires that problem variables be multiplied by appropriate scaling factors before being entered into the machine. The use of constant scaling factors throughout a computation sometimes leads to an unacceptable loss of significance in the results. To handle these situations, a floating-point system has been developed which permits programming to be done without consideration of scaling problems. NRL R 4579.

Flowmeters for service with fuming nitric acid (U), by Raymond D. J. Feasey. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Aug 1955. 28p drawings, table. Order from LC. Mi $2.70, ph $4.80. PB 119783

This report discusses and illustrates various methods of measuring fluid flow. Special emphasis is given to those meters deemed practical for use with fuming nitric acid. With this in mind a number of commercially available meters are described and compared. Four commercial meters and an experimental meter designed at C&RL are recommended for further study. Project 4-17-06-001. CC CRL R 464.

Hydraulic servo control valves. Part I. Summary of the present state of the art of electro-hydraulic servo valves, by R. E. Boyar, B. A. Johnson, and L. Schmid. Cook Electric Co. Cook Research Laboratories, Skokie, Ill. Apr 1955. 65p drawings, diagrs, graph, tables. Order from LC. Mi $3.90, ph $10.80. PB 119799

A summary of the present state of the art of electro-hydraulic servo valves suitable for aircraft and missile application is presented. This information was obtained from direct visits to both the valve manufacturers and the valve users, namely: the missile and aircraft manufacturers. The valve manufacturers were contacted to obtain detailed design and performance data on the valves; the valve users were contacted to determine the system and valve requirements and to determine how adequately the valves presently being used meet these requirements. A brief description of the principle of operation of servo valves, in addition to a discussion of the various types, is also presented to provide a background for interpreting the data. Project no. 1385. AF WADC TR 55-29, Part I. Contract AF 33(616)-2447.

Mechanical computer for micrometeorological research, by R. J. Taylor and E. K. Webb. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Meteorological Physics. 1955. 16p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 119812

A description is given of a mechanical computer, built in the general form of a differential analyzer, for computing the vertical turbulent fluxes of total heat, water vapor, and momentum, and certain other quantities from photographically recorded traces of the fine structure of wind variables, temperature, and humidity in the lowest layers of the atmosphere. Technical paper no. 6. Appendix I: Simple automatic curve follower, by H. Borg. AUS CSIR MP TP 6.

Pelletized lithium hydroxide hopper to remove carbon dioxide from submarine atmospheres, by William E. McConnaughey and Foster J. Woods. U. S. Naval Research Laboratory. Oct 1951. 16p photos, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 119778

Data have been collected which will permit the design of a service-type lithium hydroxide (LiOH) hopper for carbon dioxide (CO_2) removal from submarine atmospheres. Tests on an experimental unit indicate that two such hoppers, each using about 21.6 pounds of pelletized LiOH, will maintain the atmosphere in an 80-man submarine at an average CO_2 concentration of 1 to 1-$\frac{1}{2}$ percent for 4 hours without recharging. Blower requirements have been established as 75 to 85 cfm at 2-$\frac{1}{2}$ inches of water static pressure. NRL R 3868.

Portable reader for DT-60 dosimeters, by J. C. Schaffert. U. S. Naval Research Laboratory. Jan 1956. 12p photos, diagrs. Order from OTS. 50 cents. PB 111887

A portable, self-powered computer-indicator (reader) for DT-60/PD phosphate glass dosimeters has been designed, constructed, and demonstrated. The reader indicates on a meter the total gamma-ray dose (in roentgens) accumulated by a DT-60 dosimeter. Operation by means of self-contained batteries is provided; the reader is also operable from an external source of either six volts dc or 115 volts ac. Total weight of the reader is twenty pounds, nine pounds of which is in the battery supply. The housing of the reader measures 7-1/2 by 8 by 11 inches over-all. NRL R 4680.

Precision depth recorder MK IV-A, by Bernard Luskin and Archie C. Roberts. Columbia University. Lamont Geological Observatory, Palisades, N. Y. Mar 1955. 70p photos, drawings, diagrs (part fold). Order from LC. Mi $3.90, ph $10.80. PB 119784

This report consists of an instruction manual prepared by the authors for use with the Precision Depth Recorder MK IV-A equipment. The design of the equipment is based on principles of expediency. Every effort was made to use commercially available equipment where possible and limit the construction to the necessary interconnecting and control appratus. CUN LGO TR 7. Contract N6-onr-271, T. O. 24.

Pulsed-light reader for the DT-60 glass dosimeter, by Justin C. Schaffert. U. S. Naval Research Laboratory. Mar 1956. 15p photos, diagrs, graphs. Order from OTS. 50 cents. PB 111977

To demonstrate the economies of weight and power requirement that can be achieved, a reader has been designed to produce a reading due to a single impulsive ultraviolet excitation of a DT-60 dosimeter. A storage capacitor, charged to a voltage proportional to the peak intensity of dosimeter fluorescence, is used to unbalance a vacuum-tube bridge circuit; a meter reading bridge unbalance is calibrated directly in roentgens dosage. The pulsed-light reader measures 8-1/2 by 8-1/2 by 10 inches over-all and weighs 14 pounds. Power is supplied by five type-D flashlight batteries. Total battery drain is approximately 0.3 watt. NRL R 4706.

Video-presentation analyzer, 50 KC to 10 MC, by F. T. Griffin. U. S. Naval Research Laboratory. Mar 1956. 30p photos, diagrs, graphs. Order from OTS. 75 cents. PB 111852

After a brief discussion on the merits and limitations of tuned-circuit type analyzers as contrasted with superheterodyne types, a quasi-instantaneous video analyzer which was developed principally for the rapid analysis of modulation spectra is described. The instrument presents the frequency analysis of a complex voltage visually, with an alternative provision for instrumental analysis by manual control. Appendix A. Application of analyzer in study of noise. - Appendix B. Application of analyzer to rectangular waves. NRL R 4664.

MACHINERY

Cutting action of rotary bits in oil shale, by Charles K. Rose and Stephen Utter. U. S. Bureau of Mines. Nov 1955. 27p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119555

This paper presents some research studies of the rotary drilling of oil shale at the Bureau of Mines Oil-Shale Mine, Rifle, Colo. The experimental procedures and the rotary drill test equipment are described. Theories of rock drillability, rotary bit cutting action, and bit design are presented and discussed. The actions of various bit designs are analyzed and compared with the observed results of actual drilling tests. A cost estimate is made for drilling Colorado oil shale. BM RI 5174.

Zur bewertung der lagerwerkstoffe; herleitung des gütewertes und untersuchung der massgeblichen einflussgrössen (On the evaluation of bearing materials; derivation of the quality index and investigation of the definitive influence factors), by H. Stephan. Translated by F. A. Raven. Nov 1955. 22p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 119740

For the determination of the boundary loading of a friction bearing, the concept of a quality index for the bearing material is introduced. The validity of the equation set up for the quality index could be proved by numerous basic data. It is shown that the quality index is fundamentally a function of the operating conditions and bearing dimensions; it can be used also to determine the lubricating condition of the friction bearing. Translated from Zeitschrift des Vereines Deutscher Ingenieure, vol. 96, no. 11/12, 15 Apr 1954, pp. 341-346. NAVSHIPS T 597. STS 226.

Zur bewertung der lagerwerkestoffe. Zusammenstellung von werkstoffkennwerten (Evaluation of bearing materials. Compilation of material characteristics), by H. Stephan. Translated by F. Rizzo. Dec 1954. 15p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120139

Evaluation factors are compiled, together with some of the important characteristics, for a number of bearing materials. In each individual case the tabulation takes into account: Sn, Sb and Pb base bearing materials, Pb base and Mg base, Al base, Cu and Pb base, Cu–Sn–Pb, Ag and Cd base, Zn and Al base, and finally materials of Fe base as well as sintered metal and artificial materials. Translated from Zeitschrift des Vereines Deutscher Ingenieure, vol. 96, no. 14, p. 403-409. NAVSHIPS T 569.

MEDICAL RESEARCH AND PRACTICE

Annual report, 1 Jan 1953-31 Dec 1954. Supplement: Lymphocytes in the normal epidermis of the rat. Wake Forest College, Bowman-Gray School of Medicine, Winston-Salem, N. C. 1955. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 119160

Plates described are not included. For 1953 report see PB 116239.
1. Skin - Physiology 2. Lymphocytes - Research 3. Lymphocytes - Migration 4. Contract Nonr-1092.

Capillary vascularization in puppies born at a simulated altitude of 20,000 feet, by Ernest L. Becker, Rosemarie G. Cooper, and George D. Hataway. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1955. 4p table. Order from LC. Mi $1.80, ph $1.80. PB 119478

Seven puppies born at an altitude of 20,000 feet were studied histologically for changes in capillary area. Significant increases in the ratio of capillary area to tissue area were found in the brain, heart, and gastrocnemius. Other organs were examined, but were so engorged with blood that normal architecture and quantitative data were unobtainable. The possible significance of this increased ratio as an important step in acclimatization is discussed. AF SAM R 55-53.

Effect of corticotropin on cellularity and mitosis in the rat bone marrow, spleen, and thymus, by Galen P. Robbins, John A. D. Cooper and Howard L. Alt. Northwestern University. Medical School. Dept. of Medicine and Biochemistry, Chicago, Ill. May 1955. 6p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 119476

Corticotropin gel in doses of 10 units per kg. was administered daily to tube-fed adult rats and determinations made of the cellularity and mitosis in the bone marrow, spleen, and thymus after 3, 10, and 20 days. The desoxyribonucleic acid phosphorus content of these organs was used as a measure of cellularity and the rate of incorporation of P^{32} into the DNAP as an index of mitosis. AF SAM R 55-34.

Effect of tryptophan deficiency on bones and teeth of rats as influenced by age and duration of deficiency. Fourth and final report for the period 1 Aug 1954-28 Feb 1955 under Contract Nonr-228-(05), NR 180-020, by Lucien A. Bavetta and Sol Bernick. University of Southern California, Los Angeles, Calif. Feb 1955. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 119831

This project was initiated to study the effects of tryptophan deficiency and to correlate these histological findings with histochemical studies.

Experimental streptococcal infections. Final report for the period Oct 1, 1946-Feb 28, 1955 under Contract no. N6 ori-164(07), T. O. VII, by Noble P. Sherwood. Kansas. University. Dept. of Bacteriology, Lawrence, Kan. Feb 1955. 47p tables. Order from LC. Mi $3.30, ph $7.80. PB 119832

1. Streptococcus infections - Research 2. Streptococcus infections - Physiological aspects.

Field evaluation of plastic custom-molded ear defenders, by Carl B. Stilson and Ernest Nalle, Jr. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1955. 4p tables. Order from LC. Mi $1.80, ph $1.80. PB 119575

Acoustic protection provided by custom-molded earplugs and by standard item (MSA) ear defenders was evaluated by audiometric tests given flight-line personnel. The potential protection afforded by the MSA ear defender, at frequencies ranging from 250 to 8000 c.p.s., was two to three times greater than that given by the custom-molded earplug. AF SAM R 55-63.

Head impact investigation. Final report under Contract N6 ori-119, T. O. VIII, by Norman E. Wahl and A. A. Whiting. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Dec 1948. 132f photos, fold drawings, graphs, tables (part fold). Order from LC. Mi $6.90, enl pr $22.80. PB120032

The objectives of this project were the collection of data on accelerations, impact blows, and the determination of protective characteristics of panels and structural configurations. A plastic head form filled with a gelatinous material was developed to have strength characteristics similar to those of a human head. A shock cord actuated catapult apparatus was developed to project the head forms into

test panels. Impact tests were conducted at different velocities and a time-displacement record made of the panel motion. Computations based on this record indicated impact velocity, initial head deceleration, initial impulse, maximum panel deflection, and average deceleration of the head form. CAL OG-537-D-9.

Noise and the community. Proceedings of the second meeting of the Armed Forces - National Research Council, Committee on Hearing and Bio-Acoustics, a joint meeting with the National Advisory Committee for Aeronautics, Special Subcommittee on Aircraft Noise, 25-26 Oct 1954, at the Armour Research Foundation, Chicago, Illinois, by Hallowell Davis and Donald H. Eldredge. Armed Forces - National Research Council. Committee on Hearing and Bio-Acoustics. Oct 1954. 39p tables. Order from LC. Mi $3, ph $6.30. PB 119827

1. Airplanes - Noise 2. Noise - Psychological effect 3. Sound - Propagation 4. Contract Nonr-1151(01), NR 140-069 5. CHABA no. 4.

Quarterly report Jul-Sep 1955. Massachusetts Institute of Technology. Acoustics Laboratory. Sep 1955. 38p diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 119806

1. Acoustic research 2. Contract AF 19(604)-626 3. AF CRC TN 55-952.

Some effects of short high-level sounds upon auditory threshold, by James P. Jerger, Charles Lightfoot and Raymond Carhart. Northwestern University. Audiology Laboratory, Evanston, Ill. Apr 1955. 9p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 119485

The threshold shift for 3000 and 4000-c.p.s. pure tones was measured at intervals of 60, 140, 500, 1,025 and 3,025 msec. following the termination of a 2-second, 111-db blast of either a 2000-c.p.s. pure tone or thermal noise. Results suggest that threshold shifts measured at intervals greater than 400 msec. following termination of the blast hold more promise as indices of noise susceptibility than threshold shifts measured at intervals less than 400 msec. AF SAM Proj 21-1203-0001, Report no. 9

Summaries of research reported on during calendar year 1955. U. S. Medical Research Laboratory. Naval Submarine Base, New London, Conn. 1955. 18p. Order from LC. Mi $2.40, ph $3.30. PB 119808

1. Medical research - Bibliography.

METALS AND METAL PRODUCTS

Activation energy for high temperature creep of high purity aluminum, by H. I-Lieh Huang, O. D. Sherby, and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Feb 1955. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119842

The activation energy for creep of high purity aluminum in the range from 430°K to 470°K was redetermined by a new technique involving abrupt changes in temperature. Over strains from about 0.01 to about 0.40 and over stresses from 580 to 3,540 psi, the activation energy for creep was found to be 32,200 ± 1,770 calories per mole. 40th technical report under Contract N7 onr-295, T. O. II, NR 031-048. UC IER Series 22, Issue no. 40.

Application of ion exchange resins in the cyanidation of a gold and silver ore, by S. J. Hussey. U. S. Bureau of Mines. Jan 1949. 35p diagr, tables. Order from LC. Mi $3, ph $6.30. PB 119604

1. Resins, Ion-exchange - Uses 2. Cyanide process 3. Gold ore - Cyanidation 4. Silver ore - Cyanidation 5. Amberlite IR-4B (Trade name) 6. Amberlite IR-100 (Trade name) 7. Deacidite (Trade name) 8. Zeo Karb H (Trade name) 9. BM RI 4374.

Effect of structure on creep at high temperatures, by O. D. Sherby, T. A. Trozera and J. E. Dorn. California. University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Feb 1955. 30p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119841

Structural changes attending creep at high temperatures and high stresses are dependent on the preceding creep stress history. Results of aluminum solid solution alloys indicate that initial plastic straining upon application of a constant stress decreases the creep resistance whereas the straining during creep increases the creep resistance. Neglecting transients that were observed upon change of stress, high temperature creep at low stresses obeys a mechanical equation of state. 39th technical report under Contract N7 onr-295, T. O. II, NR 031-048. UC IER Series 22, Issue no. 39.

Electrical resistance study of the effects of oxygen on the allotropic transformation of titanium, by Leland A. DePue and E. J. Chapin. U. S. Naval Research Laboratory. Feb 1956. 26p photos, diagrs, graphs, tables. Order from OTS. 75 cents. PB 111741

The limits of the $\alpha + \beta$ region of the titanium-oxygen system in the range to 2 wt % (5.75 atomic %) oxygen were established by measurements of electrical resistance vs. temperature for eight oxygen alloys prepared from high-purity materials. NRL R 4638.

Emission spectrographic analyses of titanium metals and alloys, by E. M. DuBois, Arno Tuteur, and J. L. Mahan. Spectrochemical Laboratories, Inc., Pittsburgh, Pa. Aug 1955. 100p diagrs, graphs, tables. Order from OTS. $2.50. PB 121106

A quantometric point to plane technique has been developed which is capable of giving accurate results, with reasonable speed, on solid samples of titanium alloys. A vapor injection solution technique has been developed which will give excellent precision, accuracy and speed. Duplicate wet-chemical analyses have been performed on all samples submitted, for each of the elements studied, and these results have been used to determine the accuracies of the various quantometric procedures. Contract AF 33(616)-2315. AF WADC TR 55-108.

Major factors in the cathodic protection of steel in sea water, by L. J. Waldron, E. E. Nelson, and M. H. Peterson. U. S. Naval Research Laboratory. Aug 1955. 21p graphs, tables. Order from OTS. 75 cents. PB 111807

The work, both at NRL and at other laboratories, indicates that the major factors influencing current distribution in cathodic protection are water resistivity and polarization. Relatively high water resistivity tends to give nonuniform distribution of current while high polarization produces uniform distribution. Mathematical solutions have been derived for the simplest cases and aid in understanding the factors involved. For most shapes of practical interest one must depend upon experience and empirical methods. NRL R 4505.

Manganese from steel-plant slags by a lime-clinkering and carbonate-leaching process. Part II: Pilot-plant development, by R. August Heindl, J. A. Ruppert, M. L. Skow and J. E. Conley. U. S. Bureau of Mines. Sep 1955. 87p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 119780

A proposed process for recovering manganese from open-hearth steel-plant slags is indicated by a flow diagram. Mixtures of flush slags and limestone were fired at temperatures up to 2,440° F. in an oxidizing atmosphere. Reductions of these clinkers with hydrogen at 1,300° F. and above formed manganous oxide along with variable amounts of ferrous oxide and iron. The manganese was extracted from the reduced clinkers by leaching at about 80° F. with ammonium carbonate solutions containing 26 to 28 percent ammonia and 18 to 25 percent carbon dioxide. The product from the distillation of the extract liquor is a crystalline material consisting essentially of manganese carbonate, which on calculation at 2,012° F. yields a sintered oxide containing approximately 66 percent Mn corresponding to 92 percent Mn_3O_4 in a typical sample. Part I issued as Report of investigations 5124. BM RI 5142.

Notch ductility of austenitic nodular irons, by R. E. Morey and H. F. Bishop. U. S. Naval Research Laboratory. Mar 1956. 24p photos, tables. Order from OTS. 75 cents. PB 121014

The notch ductility characteristics of two types of austenitic nodular irons were investigated by means of the drop-weight test. Irons containing less than 0.6 percent chromium (Class B) have extremely low nil ductility transition temperatures and are recommended for low temperature application involving severe service conditions. The irons containing 1.6 to 2.25 percent chromium (Class A) were found to have erratic notch ductility characteristics. NRL R 4718.

Notch ductility of commercial malleable irons, by H. F. Bishop, G. A. Sandoz, N. C. Howells, and W. S. Pellini. U. S. Naval Research Laboratory. Mar 1956. 26p photos, diagr, graph, tables. Order from OTS. 75 cents. PB 111999

The effect of temperature on the notch ductility of commercial malleable irons was investigated for conditions entailing the presence of ultra-sharp notches. The drop-weight test was used to establish the nil ductility transition temperature and the explosion crack-starter test was utilized to establish the relative level of resistance to fracture initiation and propagation at temperatures above the nil ductility transition. Charpy V tests were conducted to determine the general significance of the low-level transition curves of this material. NRL R 4713.

Performance of materials tested in water at high temperature, by C. J. Lancaster. U. S. Naval Engineering Experiment Station, Annapolis, Md. Mar 1952. 12p photos, tables. Order from OTS. 50 cents. PB 111962

Results of two consecutive 30-day dynamic corrossion tests are reported for 12 materials. The samples were subjected to a static bending stress while being rotated at a peripheral velocity of 11 ft/sec in oxygenated water at 500°F. The appearances and weight losses were determined after each 30-day run. NAV EES 4A(16)966870.

Properties of oxidation resistant scales formed on molybdenum-base alloys at elevated temperatures, by M. Gleiser, W. L. Larsen, R. Speiser and J. W. Spretnak. Ohio State University. Dept. of Metallurgy, Columbus, Ohio. Feb 1955.

49p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 119850

Due to the limitations of externally applied claddings for protecting molybdenum-base alloys from oxidation at elevated temperatures, a program of developing protective self-regenerative scales on molybdenum-base alloys was conducted. Results of oxidation tests show that molybdate scales will form on molybdenum-nickel and molybdenum-cobalt alloys and are protective. Both nickel and cobalt molybdates spall upon thermal cycling. Spalling can be suppressed by the addition of certain third components which stabilize the molybdate crystal structure. The nature and suppression of spalling are discussed. Contract N6 onr-22528, NR 039-005. OSURF Proj 467, Technical report no. 3.

Research consisting of spectrographic analysis of samples and development of spectrographic methods for the determination of impurities in pure silicon. First quarterly progress report for the period May-Jul 1955 under Contract no. AF 19-(604)-1416, by James M. Morris. Metal Hydrides, Inc., Beverly, Mass. Aug 1955. 9p table. Order from LC. Mi $1.80, ph $1.80. PB 119576

The first quarter has been largely devoted to the preparation of silicon dioxide standards. An investigation was undertaken of methods for the conversion of hyper-pure silicon to high purity silicon dioxide. The most satisfactory oxide was formed following a sodium carbonate fusion. Silicon dioxide obtained by this method was used for the preparation of two groups of impurity standards and these were submitted to the Radiochemistry Section for activation analysis. AF CRC TN 55-761.

Results of axial-load fatigue tests on electropolished 2024-T3 and 7075-T6 aluminum-alloy-sheet specimens with central holes, by Charles B. Landers and Herbert F. Hardrath. U. S. National Advisory Committee for Aeronautics. Mar 1956. 47p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119871

Results are presented of axial-load fatigue tests at stress ratios of 0 and -1.0 on electropolished 2024-T3 (24S-T3) and 7075-T6 (75S-T6) aluminum-alloy-sheet specimens with central holes. The specimen widths and hole diameters were varied in order to provide data suitable for a study of notch-size effect. The data are compared with previously published results of tests on unnotched electropolished specimens and on unpolished specimens containing central holes. NACA TN 3631.

Study of effects of alloying elements on the weldability of titanium sheet, by Herbert M. Meyer and William Rostoker. Armour Research Foundation, Chicago, Ill. May 1954. 107p photos, graphs, tables. Order from OTS. $2.75. PB 111885

The reactions of three basic categories of titanium alloys to heliarc welding have been studied. The report covers work performed during the period 15 June 1952 to 15 July 1953. Studies included the influence of preheat-and postheat-treatments on the mechanical properties of welded specimens. Mechanical properties included bend ductility, tensile strength and elongation, and hardness. Microstructures were examined extensively with a view to recording their relationships to weld behavior. A large number of alloys proved extremely brittle in the as-welded state. In almost every case, a large measure of ductility could be restored by postheat-treatment. Preheat-treatment did not generally improve the ductility of the as-welded state. No single postheat-treatment procedure was found applicable to all alloys. A number of commercial alloys was examined. In particular, the RC-130A alloy was studied in some detail, and brittle welds could be rendered ductile by postheat-treatment. AF WADC TR 53-230. Contract AF 33-(616)-206.

Survey and bibliography on the determination of thermal conductivity of metals at elevated temperatures, by Richard D. Seibel. U. S. Arsenal, Watertown, Mass. Aug 1954. 67p graphs, tables. Order from OTS. $1.75. PB 111756

Several methods of measuring the thermal conductivity of metals are available to the investigator. Many of these methods measure the temperature drop when heat flows in one dimension in a solid body. Various techniques which yield absolute or comparative values are described. Dept. of the Army project no. 593-08-024. O. O. project no. TB 4-161. WAL R 821/9.

Testing of metal boss seals, by Harry P. Kupiec. Aircraft Equipment Testing Co., Baltimore, Md. Apr 1955. 67p photos, drawings, diagrs. Order from LC. Mi $3.90, ph $10.80. PB 119818

The metal boss seal was conceived by Wright Air Development Center to meet the requirements of hydraulic and pneumatic systems with operating pressures up to 5,000 psi, and temperatures as low as -100°F. and as high as 600°F. The application of the metal boss seal involves the use of deformable metal ring in conjunction with standard AN hydraulic fittings. This seal is being considered as a replacement for the current standard AN 6290 synthetic rubber gasket. Project no. 1371. AF WADC TR 55-163. Contract AF 33(600)-26548.

Transformation of the TiO phase, by Chih-Chung Wang and Nicholas J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy. n.d. 4p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 119198

X-ray study of the transformation of the TiO phase at about 925°C. Contract N5ori-07881.

METEOROLOGY AND CLIMATOLOGY

Autocorrelations and energy spectra of atmospheric turbulence, by E. K. Webb. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Meteorological Physics. 1955. 25p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119811

Technical report no. 5.
1. Atmosphere - Turbulence - Theory - Australia 2. Atmosphere - Turbulence - Meteorological aspects - Australia 3. AUS CSIR MP TP no. 5.

Cloud physics research. Technical note no. 2: Buoyancy acceleration and precipitation formation in tropical cumuli, by Bernice Ackerman. Chicago. University. Dept. of Meteorology, Chicago, Ill. Aug 1955. 43p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 119763

Observations made in and around tropical cumuli in the vicinity of Puerto Rico during the winter of 1953-1954 and the month of Oct 1954 were used to determine the presence of precipitation and to obtain estimates of cloud buoyancy. The relationship between cloud buoyancy and the development of rain, as well as the importance of environmental conditions in the precipitation process, are discussed. In addition, an evaluation of the effects of treating clouds with a water spray is made through the use of the buoyancy-precipitation relationships observed in untreated clouds. Contract AF 19(604)-618, Technical note no. 2. AF CRC TN 55-858.

Evaluation of terms in the vorticity equation. Preliminary results for 500 mb, by Jerome Spar, Edwin L. Fisher, Ernest Paroczay, and Roy E. Peterson. New York University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Feb 1955. 37p diagr, graphs, maps, tables. Order from LC. Mi $3, ph $6.30. PB 119683

The terms in the vorticity equation are evaluated at the 500 mb level by a trajectory method for a case of cyclogenesis in the eastern United States. Contract no. Nonr-285(09), Progress report no. 1.

4-D analysis and forecasting procedures for optimum flight planning. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Jan 1956. 56p diagrs, maps. Order from LC. Mi $3.60, ph $9.30. PB 119995

1. Weather forecasting 2. Flight path - Calculation 3. AWS M 105-49.

Near-infrared transmission through synthetic atmospheres, by John Nelson Howard, Darrell L. Burch and Dudley Williams. Ohio State University Research Foundation, Columbus, Ohio. Nov 1955. 258p photos, diagrs, graphs, tables. Order from OTS. $5.50. PB 121048

This report presents a laboratory study of the total absorption of the near-infrared absorption bands of H_2O and CO_2 under simulated atmospheric conditions. This study utilized a 22-meter, multiple-traversal absorption cell, in which the geometrical path length of the cell and the partial pressure of the absorbing gas could be separately varied, and varying pressure of nitrogen and oxygen, which do not absorb appreciably in the near-infrared, could be added to the absorption cell. Temperature was not varied in this study. Low resolution spectra of these bands are presented, as are tables of the measured total absorptions for the various values of absorber concentration W, absorber partial pressure, p, and total pressure P. For other reports under Contract AF 19(604)-516 see PB 118826, 119108, and 119113. AF CRC TR 55-213. AF GRD P 40.

Sky noise measurements. Final report under Contract AF 19(604)-41, for the period Sep 26, 1951 to Mar 31, 1955, by J. Allen Hynek. Ohio State University Research Foundation, Columbus, Ohio. Jul 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 119777

For 9th-13th reports see PB 114492, 115053, 115553, 116387, 117323.
1. Stars - Scintillation 2. Noise, Atmospheric - Measurement 3. OSURF Proj 480, Final report 4. AF CRC TR 55-171.

Survey of the literature of the ionosphere, by Laurence A. Manning. Stanford University. Radio Propagation Laboratory, Stanford, Calif. Jul 1955. 654p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $99.35. PB 119834

Abstracts are presented of the principal published papers dealing with study of the ionosphere by radio methods; the period covered by the survey is roughly 1928 through 1954. Two systems of indexing are provided by means of which papers on given subjects can be found. A number of chapters are presented introducing and summarizing certain basic aspects of ionospheric research. Finally, recommendations are made pointing out further studies that should be undertaken. Final report under Contract no. AF 19(604)-686. AF CRC TR 55-169.

Vapor transfer by forced convection from a smooth, plane boundary, by J. E. Cermak and P. N. Lin. Colorado Agricultural and Mechanical College. Dept. of Civil Engineering, Fort Collins, Colo. Jan 1955. 131p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 119994

Investigation was limited to the particular case of evaporation from a smooth, plane boundary in which forced convection by fluid flow parallel to the boundary was the main cause of transport. Major objectives of the study were to determine (1) the forms for dimensionless parameters best relating the important variables involved, (2) the effect of dry approach length upon evaporation rates, and (3) the effect of lateral diffusion. Data collected are compared with results obtained using the mass transfer theory of Sutton. Use of an analogy between momentum transfer and mass transfer as given by Reynolds and modified by Karman also furnishes an equation which is compared with the data. CER no. 55JEC1. Report no. 9. Contract N9 onr-82401, NR 063-071.

MINERALS AND MINERAL PRODUCTS

Electromechanical properties of barium titanate prepared by a fusion method, by Edwin J. Brajer. Brush Laboratories Co., Cleveland, Ohio. Nov 1954. 25p photos, drawing, diagrs, graph, tables. Order from OTS. 75 cents. PB 111811

A fusion method and a sintering method for the preparation of barium titanate were investigated in an effort to improve the uniformity and reproducibility of barium titanate ceramics in regard to electromechanical properties. It is shown that ceramics prepared by either method have similar electromechanical and dielectric properties. Contract Nonr-1055(00), Technical report no. 1.

Minutes of symposium on ceramic cutting tools. U. S. Arsenal, Watertown, Mass. Rodman Laboratory. Feb 1955. 127p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.25. PB 111757

Contents: Processing ceramics, by F. H. Norton. - Properties and uses of ceramics tools, by E. Ryshkewitch. - Notes on ceramic tools, by W. M. Wheildon. - Molybdenum boride cutting tool, by E. DiCesare. - Preparing ceramic tool material, by B. Bovarnick. - Machining studies, by W. B. Kennedy. WAL RPL 23/2.

New approach to the rheological properties of sand-water and clay-water mixtures. Pennsylvania State University. College of Mineral Industries, University Park, Pa. Mar 1955. 252p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $39.35. PB 120031

Contents: Introductory remarks: Statement of the problems, by W. A. Weyl. - First section: Atomistic approach to the solubility of simple compounds and to the constitution of aqueous solutions, by W. A. Weyl. - Second section: Atomistic approach to the surface energy of solids and an explanation of the surface forces of clay, by W. A. Weyl. - Third section: Fundamentals concerning the interaction of solids with water, by W. A. Weyl. - Fourth section: Rheology of sand-water and clay-water mixtures, by W. C. Ormsby and W. A. Weyl. Contract no. N6 onr-269, T. O. 8. ONR TR 61.

Piezoelectric titanate ceramics with low temperature coefficients, by Don A. Berlincourt. Brush Laboratories Co., Cleveland, Ohio. Nov 1954. 36p graphs, tables. Order from OTS. $1. PB 111812

Properties of barium titanate compositions containing substantial amounts of calcium titanate are reviewed. These compositions have improved temperature dependence of resonant frequency, electromechanical coupling, and dielectric constant as well as higher mechanical Q. The piezoelectric, dielectric and elastic properties of these compounds are reviewed, and typical aging data are shown. Contract Nonr-1055(00), Technical report no. 2.

ORDNANCE AND ACCESSORIES

Confidence intervals for CEP estimates for small samples, by Robert J. Monroe and Theodore S. George. U. S. Air Force. Air Research and Development Command. Air Force Missile Test Center. Operations Analysis Office, Patrick Air Force Base, Fla. Dec 1955. 6p graphs. Order from LC. Mi $1.80, ph $1.80. PB 119735

This paper calculates confidence intervals for the CEP of a circular normal distribution, valid for small samples as well as large. The CEP is taken about the mean point of impact (MPI). Operations analysis memorandum 55-1. AF MTC TN 55-75.

Development of methods for the evaluation of high-strength ferritic electrodes, by S. M. Silverstein and R. P. Sopher. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. 36p photos, drawings, graphs (2 col.), tables. Order from LC. Mi $3, ph $6.30. PB 119803

Sixty-three explosion-bulge test plates were prepared with three commercial grades of low-hydrogen-type ferritic electrodes and one commercial class of austenitic-type electrode. The welds were deposited in double-vee butt joints in 1-inch armor plate conforming to Military Specification MIL-A-12560(ORD). The test plates were explosion tested over a range of temperatures (215 F to -100 F) to determine the performance transition from a ductile to a brittle fracture. Color in graphs will not reproduce. O. O. project number: TB4-31A. Phase report covering period from Mar 15, 1954 to Oct 31, 1954 under Contract DA 33-019-ORD-1132.

For summary report covering period from Dec 15, 1952 - Nov 30, 1954 see PB 121025. WAL R 642/160-14.

Development of steel castings for artillery components, by C. F. Frey. U. S. Arsenal, Watertown, Mass. Sep 1955. 26p drawings, diagrs, tables. Order from OTS. 75 cents. PB 111967

The following four castings: a high-pressure cylinder head for the 120-mm gun, a top cover, a bottom cover assembly, and a block manifold, for the 280-mm gun were cast experimentally and were proven to be sound by sectioning and examining by macroscopic tests. After obtaining the best techniques for sound castings, the components were recast and subjected to heat treatment prior to chemical and physical testing. All castings met the physical requirements. WAL RPL 11/1.

Measurement of detonation velocity by microwave resonator techniques, by E. F. Pound. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Mar 1955. 23p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 119712

This report describes the use of microwave electromagnetic radiation as a tool to measure the detonation velocity of explosives. Three types of electromagnetic wave guides were used: First, the explosive charge was covered with aluminum foil to form a metallic wave guide, second, the explosive charge was used as a dielectric wave guide, and third, a coaxial cable, as the active part of the doppler system, was placed in or on the explosive charge. The relative merits of each method are discussed in the report. UU ISRP TR 44. Contract N7 onr-45107.

Static exciter regulator for ordnance tank generator. Final report, by G. H. Fry, Jr. and E. L. Phillipi. General Electric Co., Schenectady, N. Y. May 1955. 64p photos, diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 119789

The objective of this project was to develop and manufacture a breadboard sample of a static voltage regulator for ordnance generators, and to demonstrate the practicability of this type regulator for use on ordnance vehicles. Report R 55GL 194. Contract DA-20-089-36939.

Study of mechanism of explosive initiation in small arms primers. Wayne University. Wayne Engineering Research Institute, Detroit, Mich. Jun 1955. 183p drawings, graphs (1 fold), tables. Order from LC. Mi $8.40, ph $28.80. PB 119795

The experimental work on primer sensitivity has included detailed investigations of response to stimuli obtained under a variety of conditions. It has been found that sensitivity is affected by a number of factors, many of them unknown, and as a result sensitivity data is not as reproducible as desired. The present program was initiated for the purpose of studying the inconsistency in sensitivity which is noticed with a given lot of primers when tested only a few weeks apart. The principal considerations were involved in a program of heat testing. The literature search during the first portion of the program resulted in the assemblage of a broad bibliography which is brought up-to-date as an appendix to this report. Final report under Contract no. DAI-20-018-507-ORD-(P)-27 for period Aug 15, 1954 to Jun 30, 1955. WERI Project 200-92.

PERSONNEL APTITUDE TESTING

Adjustment to recruit training: Study of the effects of recruit preparatory training, by Charles N. Cofer. Indiana. University. Institute of Educational Research, Bloomington, Ind. Dec 1954. 197p tables. Order from LC. Mi $8.70, ph $30.30. PB 119844

The problem of this investigation was to study the effects on recruit adjustment of prior training received in the Recruit Preparatory Unit (RPT) at the Naval Training Center, Bainbridge, Md. For purposes of this study, the psychiatric and mental health conceptions of adjustment were replaced by a definition which emphasized (1) adequacy of performance of recruit duties and (2) attitudinal and motivational factors in relationship to the Navy, recruit training and civilian plans and level of aspiration. A set of 14 rating scales for performances during recruit training was developed to assess adjustment in the first sense, and an 80 item questionnaire was constructed for the study of adjustment in the second sense. The questionnaire likewise included certain items relative to the importance to recruit training of ability to read. NAVPERS TB 54-22. Contract Nonr-908(01).

Analysis of tests of proficiency for guided missile personnel. American Institute for Research, Inc., Pittsburgh, Pa. Contract N7onr-37008, NR 154-079. Guided Missile personnel research. Report no. 5. Order seperate parts described below from LC, giving PB number of each part ordered.

I: Multiple-choice tests, by Robert Glaser, Jack Hahn and John C. Phillips. Aug 1954. 25p graphs, tables. Mi $2.70, ph $4.80. PB 119821

The results of the study are discussed in terms of the following: 1. The test performance of the trainees. 2. Test reliability. 3. The intercorrelations of the tests. 4. The relationship of the tests with school grades (validity). 5. Item difficulty. 6. Item internal consistency

and item revision. 7. An analysis of the intra-test subject matter categories. 8. The relationship between the number of words in an item and item difficulty. This report also presents operational recommendations for the immediate use of the multiple-choice tests and recommendations for future research and development. NAVPERS TB 55-16, Part I.

II: Trouble-shooting board, by Robert Glaser and John C. Phillips. Aug 1954. 36p diagr, tables. Mi $3, ph $6.30. PB 119820

The findings of the study are reported in terms of the following: 1. The evaluation of alternate procedures for scoring trouble-shooting efficiency. 2. The relationship between performance on the Trouble-Shooting Board and performance on multiple-choice tests. 3. The relationship between performance on the Trouble-Shooting Board and school grades (validity). 4. The reliability of the Trouble-Shooting Board. 5. The determination of problem difficulty. 6. The internal consistency of the trouble-shooting problem and recommendations for revision. This report also presents operational recommendations for immediate use of the Terrier Trouble-Shooting Board and recommendations for continued research and development. NAVPERS TB 55-16, Part II.

III: Patterns of trouble-shooting behavior, by Robert Glaser and John C. Phillips. Aug 1954. 31p diagrs, tables. Mi $3, ph $6.30. PB 119819

This report presents an investigation of trouble-shooting behavior in terms of the success and failure patterns that trainees exhibited in the course of solving problems on the Terrier Trouble-Shooting Board. The Trouble-Shooting Board is a recently developed technique for simulating trouble-shooting problems. Such systematic study of trouble-shooting behavior can provide important practical contributions to trouble-shooting procedure and training. NAVPERS TB 55-16, Part III.

Generals of the Air Force: Rosters of United States Air Force general officers, permanent and temporary, on active duty 1 Nov 1952, by graduates and nongraduates of the Air Corps Tactical School and/or the Command and General Staff School, by C. A. McMahan and Stephen W. Fotis. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Dec 1952. 48p drawing, graph, table. Order from LC. Mi $3.30, ph $7.80. PB 119680

1. U. S. Air Force - Generals - Rosters 2. Personnel, Flying - Statistics 3. U. S. Command and General Staff School - Graduates 4. U. S. Air Corps Tactical School - Graduates 5. AF HRRI RM 7.

Job anticipation procedures applied to the K-1 system, by Robert B. Miller, John D. Folley, Jr. and Philip R. Smith. American Institute for Research, Inc., Pittsburgh, Pa. Jul 1953. 18p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 119681

Project no. 507-008-0001.
1. Job analysis 2. Personnel - Training 3. Personnel, Maintenance - Training 4. K-1 system (Electronics equipment) 5. Job anticipation 6. Contract no. AF 33(038)-12921 7. AF HRRC TR 53-20.

Officer personnel research program, by Albert S. Glickman. American Institute for Research, Inc., Pittsburgh, Pa. Mar 1955. 25p. Order from LC. Mi $2.70, ph $4.80. PB 120040

Summarizes and lists publications issued under the Officer Personnel Research Program by the Personnel Analysis Division, Bureau of Naval Personnel, and by the American Institute for Research where the final phases of the work were conducted after Aug 1954. Final status report under Contract Nonr-890(01) from 1 Jun 1952 to 31 Mar 1955.

Relationships among aptitude, achievement and educational experience variables. Evaluation and improvement of training in functional military literacy, by N. A. Fattu. Indiana. University. Institute of Educational Research, Bloomington, Ind. Jul 1954. 7p. Order from LC. Mi $1.80, ph $1.80. PB 119597

Relationships among aptitude, achievement and educational experience variables. Evaluation and improvement of training in functional military literacy. Contract no. Nonr-908(01), Project NR 154-125.

PHOTOGRAPHIC AND OPTICAL GOODS

Guide to Pacific landforms and vegetation for use in photographic interpretation. U. S. Naval Photographic Interpretation Center, Anacostia, D. C. Oct 1950. 121p photos, diagrs, map. Order from LC. Mi $6.30, ph $19.80. PB 119993

Reprint of NAVAER 10-35-560, formerly OPNAV 16-VP 107, dated May 1945. NPC-PIC-36 (10-50) 2M. Photographic Interpretation Center Report no. 7.
1. Photography, Aerial - Interpretation 2. Photography, Aerial - Land forms 3. Land forms - Analysis 4. Vegetation - Photographic analysis 5. NAVAER 10-35-560.

High resolution electron diffraction camera for the study of surfaces in an ultra high vacuum, by Benjamin M. Siegel. Cornell University. Dept. of

Physics, Ithaca, N. Y. Dec 1955. 52p photos, drawings, diagrs (1 fold). Order from LC. Mi $3.60, ph $9.30. PB 119801

A special electron diffraction camera has been designed and built which will make it possible for the first time to examine "clean" surfaces in an ultra-high vacuum by high resolution electron diffraction. In this camera the electron beam and specimen are contained in a glass vacuum system which is baked-out and evacuated to a pressure of the order of 1×10^{-10} mm Hg. High resolution electron optics consisting of magnetic lenses are assembled around the outside of the glass column. The diffraction pattern comes to focus on a fluorescent screen inside the vacuum system and is recorded by photographing the pattern. Theoretical and experimental investigation of the atomic phenomena occurring on and near the surfaces of solids. Technical report no. 4 under Contract AF 18(600)-674. Project no. R-355-30-4. AF OSR TN 55-480.

Influence of optical geometry and absorption coefficient on diffuse reflectance values, by Åke S:son Stenius. 1955. 6p photo, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 119570

Reprinted from Journal of the Optical Society of America, vol. 45, no. 9, p. 727-732, Sep 1955.
1. Reflection - Measurements - Sweden 2. Geometry, Optical - Sweden 3. Diffusion theory - Sweden 4. Svensak Träforskningsinstitutet. Träkemi och Pappersteknik. Meddelande 188.

Refraction of light traversing a conical shock wave. Part 1: Constant density, application to shadowgraphs, by Raymond Sedney and Nathan Gerber. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1955. 24p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 119756

By means of geometrical optics the refraction of light traversing a cone is investigated. This study will aid in the interpretation and treatment of information from shadowgraphs and interferograms used in the investigation of the axially symmetric airflow about sharp-nosed projectiles in supersonic flight. In Part I, after the necessary formulas are derived, applications to shadowgraphs are made. (Applications to interferometry will be considered in Part II.) Dept. of the Army project no. 5B03-03-001. Ordnance research and development project no. TB3-010B. APG BRL R 946.

PHYSICS

General

Approximate determination of the frequencies of ring stiffened cylindrical shells, by H. H. Bleich. Columbia University. Dept. of Civil Engineering and Engineering Mechanics. Mar 1955. 39p drawings, diagrs, tables. Order from LC. Mi $3, ph $6.30. PB 120002

This paper presents an approximate method for the determination of the frequencies of free vibrations of thin cylindrical shells stiffened by circular stiffening rings. The vital point of this paper is the fact that within a certain range of frequencies a simple but very good approximation for the shape of the modes exists. CU-14-55 ONR-266(08)-CE. For Report no. 13 see PB 120003. AFSWP 874. Contract Nonr-266(08), Technical report no. 14.

Behavior of solid ultrasonic delay lines. Final engineering report on ultrasonic propagation in solid materials, no. 4, from Apr 4, 1955 to Jun 30, 1955 under Contract no. AF 19(604)-1095. Andersen Laboratories, Inc., West Hartford, Conn. 1955. 8p diagrs, graph, tables. Order from OTS. 50 cents. PB 111809

This final report contains an analysis of the many factors which determine the performance of delay lines. There is also a review of the work done over the contract term concerning delay line configurations designed, both fixed and variable, beam photographs, and an MTI cancellation unit developed in this laboratory. For 1st-3d interim reports see PB 116609, 116981, 115096. AF CRC TR 55-159.

Computational theory of linear programming. Part I: The "bounded variables" problem, by A. Charnes and C. E. Lemke. Carnegie Institute of Technology. Graduate School of Industrial Administration. Jan 1954. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 120207

O.N.R. research memorandum no. 10.
1. Linear systems - Computing methods 2. Mathematics - Statistical theory 3. ONR RM 10.

Constraints in covariant field theories II, by James L. Anderson. Maryland. University. Physics Dept., College Park, Md. n.d. 23p. Order from LC. Mi $2.70, ph $4.80. PB 119761

An analysis of the difficulties which occur when one attempts to quantize a theory such as electrodynamics or the general theory of relativity. Physics Dept. Technical report no. 13. Contract Nonr-594(00), NR 017-610.

Gezelzmässigkeiten der turbulenten strömung in glatten rohren (Regularity of turbulent flow in smooth pipes), by J. Nikuradse. Translated by F. W. Bowditch and W. G. Agnew. Aug 1949. 115f photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6, enl pr $19.80. PB 119726

The translation of this technical article was undertaken for the purpose of comparing values of turbu-

lent velocities appearing herein with those determined by means of a constant temperature hot wire anemometer at the Project SQUID Combustion Laboratory, Purdue University. Since Nikuradse has been extensively quoted in treatises on turbulent flow, and since his turbulence data have been previously used in combustion studies, it was felt that this article would provide the best possible comparison for the present hot wire anemometer studies. Technical memorandum no. PUR-11. Translated from Forschung auf dem Gebiete des Ingenieurwesens, Edition B, vol. 3, forschungsheft 356, Sep-Oct 1932. Contract N6ori-104, T. O. 1, NR 220-042.

Heat capacity lag of gaseous mixtures, by Thomas D. Rossing, Robert C. Amme and Sam Legvold. U. S. National Advisory Committee for Aeronautics. Mar 1956. 35p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119855

A study was made of the vibrational energy lag in heavy organic gases. Results of measurements of sonic dispersion made with an acoustic interferometer in a number of heavy gases are presented and certain fundamental properties of the vibrational excitation process in these gases are discussed. NACA TN 3558.

Heat transfer in laminar boundary layers at high Prandtl number, by G. W. Morgan and W. H. Warner. Brown University. Division of Applied Mathematics, Providence, R. I. Feb 1955. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 119849

The problem of computing the heat transfer through laminar boundary layers by analytical methods is generally a difficult one due to the complicated nature of the governing differential equations. The situation is considerably simplified if we restrict our attention to fluids (especially those with constant properties) with large Prandtl number. GDAM TR 118. GDAM A 11-118. Contract N7 onr-35801, T. O. I, NR 064-406.

Hydromagnetic waves of finite amplitude in a homogeneous magnetic field, by Donald E. Skabelund. Utah. University. Dept. of Physics, Salt Lake City, Utah. Feb 1955. 28p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 119822

This report investigates the most general conditions under which there exist wave solutions of finite amplitude to the hydromagnetic equations for an ideal, incompressible, perfectly conducting, and unbounded fluid in a homogeneous magnetic field, subject to the condition that there be no interaction between waves travelling in opposite directions. The entire problem is shown to be equivalent to finding all superpositions of Alfven waves. Technical report no. 14 under Contract Nonr-1288(00) on "Earth's magnetism and magnetohydrodynamics."

Interval estimation of proportion defective in sampling inspection by variables, by George J. Resnikoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Mar 1955. 62p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120051

1. Sampling (Statistics) - Variables 2. Mathematical equations and solutions 3. Contract N6 onr-25126, NR 042-002 4. SU AMSL TR 21.

On uniqueness in the theory of plasticity, by D. C. Drucker. Brown University. Division of Applied Mathematics, Providence, R. I. Feb 1955. 18p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 119839

The fundamental definitions of work-hardening and perfect plasticity have far reaching implications with respect to uniqueness of solution for elastic-plastic bodies. Satisfaction of the basic postulate, that in a cycle work cannot be extracted from the material and the system of forces acting upon it, guarantees an existing solution to be stable but not necessarily unique. Uniqueness follows for the usual linear relation between the increments or rates of stress and strain and also for combinations of such linear forms. Uniqueness is assured for incrementally non-linear stress-strain relations by simple and reasonable restrictions. Conversely, lack of uniqueness results for an elastic-perfectly plastic body when, for example, the maximum shearing stress criterion of yield is employed with the Mises flow rule. GDAM TR 116. GDAM A 11-116. Contract N7 onr-35801, T. O. I, NR 064-406.

Sound transmission from a tube with flow, by G. F. Carrier. Harvard University, Cambridge, Mass. Feb 1955. 13p graphs. Order from LC. Mi $2.40, ph $3.30. PB 119837

The increasing technological importance of thermo-acoustic phenomena in combustion chambers and other apparatus leads naturally to the need of understanding the transmission and reflection of acoustic waves at the inlet and exit sections of tubes through which a gas is flowing at moderate Mach number. In this paper, this question is treated for the inviscid perfect gas. Contract N5 ori-07666.

Study of the mechanism of boiling heat transfer, by Max Edmund Ellion. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Mar 1954. 88p photos, drawings, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 119573

The conventional laboratory equipment for studying boiling heat transfer was modified so that it could be operated in a stable manner with subcooled liquids in the regions of nucleate, partial film, and complete film boiling. The equipment retained the simplicity of electrical heating and was used to study boiling in distilled water which was flowing at various velocities, pressures, and temperatures in an annulus. The results of this investigation and a description of the apparatus are presented together with an approximate method for calculating the heat transfer in the complete film boiling region. High-speed motion pictures that were taken of the degassed water boiling on the electrically-heated tube showed the types of vapor formation in the three boiling regions. The mechanism of transition from nucleate to partial film and finally to complete film boiling as the wall temperature was increased is discussed. CIT JPL M 20-88. Contract no. DA-04-495-ORD-18.

Systematic evaluation of Michell's integral, by Georg P. Weinblum. U. S. David W. Taylor Model Basin, Washington, D. C. Jun 1955. 63p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 119611

Part I of the present report deals with some basic geometrical properties of hulls and in Part II it is shown how Michell's integral can be evaluated for simplified ship forms. Appendix II is a collection of tables. DWTMB R 886.

Theory of permanents. Part III: Evaluation of special permanents with applications to enumeration theory, by Charles L. Carroll, Jr. and Jack Levine. North Carolina State College. Dept. of Engineering Research, Raleigh, N. C. Mar 1955. 217p diagrs. Order from LC. Mi $9.60, ph $33.30. PB 119758

General principles are stated which may be used to set up enumeration problems in terms of permanents. A generalization of MacMahon's identity is obtained. Solutions to some well-known problems in enumeration theory are set up as permanents and evaluated. Contract Nonr-870(00).

Turbulent dispersion of dynamic particles, by Vi-Cheng Liu. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Oct 1955. 24p photos, drawings, diagrs, graphs, tables. Order from OTS. 75 cents. PB 111958

The object of the research is to study both theoretically and experimentally (1) the dispersion of airborne particulates and (2) the penetration of these particulates into structures as a function of atmospheric turbulence and wind velocity and direction. Scientific report no. 2 under Contract no. AF 19-(604)-792. Project 2160-8-T. AF CRC TN 55-891.

Vibrations of ring-stiffened cylindrical shells, by Panagiotis C. Gondikas. Columbia University. Dept. of Civil Engineering and Engineering Mechanics. Mar 1955. 58p drawings, diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120003

This paper is concerned with the determination of the frequencies of free vibrations of an infinitely long, thin cylindrical shell with equidistant stiffening rings. The treatment is restricted to those modes in which the stiffening rings, as well as the shell segments between them, perform identical motions, such that the displacements are space-periodic in the direction of the axis of the cylinder. CU-13-55 ONR-266(08)-CE. AFSWP 873. Contract Nonr-266(08), Technical report no. 13.

Nuclear

Diffusion cloud chamber study of very slow mesons. II: Beta decay of the muon, by C. P. Sargent, M. Rinehart, L. M. Lederman and K. C. Rogers. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Mar 1955. 26p photo, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120053

For part I see PB 118855.
1. Atomic power - Research 2. Mesotrons - Research 3. Muons - Decay spectrum 4. Cloud chambers - Uses 5. Contract N6 ori-110, T. O. I 6. Nevis 7 7. CU-80 8. R-101.

Final report for the period Jun 1, 1946-Feb 28, 1955 under Contract no. N6 ori-177, T. O. I, NR 022-018. Washington University. Dept. of Physics, St. Louis, Mo. Feb 1955. 28p. Order from LC. Mi $2.70, ph $4.80. PB 120048

A bibliography covering all research activities of the University conducted under this contract.

Quarterly progress report no. 19 for the period Oct 1-Dec 31, 1955 under Contract no. AF 33-(038)-20681, Task no. 37506. Texas. University, Austin, Tex. Dec 1955. 20p graphs. Order from LC. Mi $2.40, ph $3.30. PB 119754

Contents: Cockcroft-Walton apparatus, by E. W. Bennett. - Coulomb excitation of heavy nuclei, by J. C. Grosskreutz. - Coulomb effect for the d(O^{16} O^{17})p stripping reaction, by E. V. Ivash. - N^{16} formation in $BaC^{14}O_3$ bombardment by deuterons, by E. L. Hudspeth. - Positron annihilation studies, by W. E. Millett. - Low temperature studies, by W. E. Millett. - Numerical variational method in two dimensions, by W. W. Clendenin.

Rearrangement collisions, by Bernard A. Lippmann. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, 1, N. Y. Dec 1955. 21p. Order from LC. Mi $2.70, ph $4.80. PB 119999

This report discusses the quantum mechanical theory of rearrangement collisions. In particular, we consider: a) the transformation of the state vector from the original basis to the basis of the rearranged system; b) the conditions for the equivalence of the "post" and "prior" interactions when computing matrix elements; and, c) the extension of Schwinger's variational principle to rearrangement collisions. PIB 384. PIB R 454-55. Contract AF 18(600)-1505. AF OSR TN 55-468.

Search for the β-decay of the pion, by S. Lokanathan and J. Steinberger. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Mar 1955. 25p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120052

CU-81-55-ONR-110-1-Physics.
1. Atomic power - Research 2. Mesotrons - Decay schemes 3. Nevis 8 4. R-102 5. CU-81.

PHYSIOLOGY

Symposium on physiological psychology held at U. S. School of Aviation Medicine, U. S. Naval Air Station, Pensacola, Fla. on Mar 10-11, 1955. U. S. Office of Naval Research. Mar 1955. 309p photos, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $46.85. PB 120054

ONR Symposium report ACR-1. Contents: Physiological basis of taste, by L. M. Beidler. - Correlation of physiological and behavioral studies of taste sensitivity, by C. Pfaffman. - Discussion on taste. - Nature of stimuli for cutaneous sense, by D. R. Kenshalo and J. P. Nafe. - Utilization of cutaneous reception for communications, by F. A. Geldard. - Sensitivity changes during adaptation to illumination, by R. M. Boynton. - Chemistry of retinal pigments, by J. C. Peskin. - Electrical activity of the human eye, by L. A. Riggs. - Organization of neural activity in the eye, by H. K. Hartline and F. Ratliff. - Stimulus determinants of speed in classifying visual patterns, by P. M. Fitts. - Perception of motion in space, by J. J. Gibson and O. W. Smith. - Visual and stereoscopic acuity for moving objects, by E. J. Ludvigh. - Some quantitative aspects of an opponent colors theory, by L. Hurvich and D. Jameson. - Discussion on vision. - Introductory remarks, by E. B. Newman. - Nature of auditory stimuli and their attenuation, by J. Zwislocki. - Vibration patterns similar to those observed in the basilar membrane, by G. v. Bekesy. - Sound conduction in the ear, by E. G. Wever. - Cortical transmission of auditory stimuli, by N. B. Gross. - Ear in communications, by G. C. Tolhurst. - Neural mechanisms of hearing, by W. D. Neff. - Auditory flutter fusion in patients with cortical ablations, by W. C. Halstead. - Auditory cortex, by H. W. Ades. - Cortical networks, by G. H. Bishop. - Somatic responses: Some relations to stimuli, by R. C. Davis.

PSYCHOLOGY

Analysis of tracking behavior in terms of lead-lag errors, by W. D. Garvey and L. L. Mitnick. U. S. Naval Research Laboratory. Feb 1956. 12p diagrs, graphs, tables. Order from OTS. 50 cents. PB 111978

Using a compensatory tracking task with either a constant rate or a constant acceleration course input, an attempt was made to draw an analogy between the human operator's performance and the mathematically simplest mechanism which might be substituted to perform the operator's task. NRL R 4707.

Development of group measures of level of aspiration: An exploratory study, by Henry N. Ricciuti and Douglas G. Schultz. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Personnel Research Laboratory, Lackland Air Force Base, Tex. Dec 1953. 30p tables. Order from OTS. 75 cents. PB 121032

The purpose of the research reported here was to determine whether it is feasible to develop group testing techniques, analogous to the individual techniques, which are suitable for obtaining level of aspiration measures. It was felt that if satisfactory group techniques could be developed, it would be possible to work with a greater number of cases in future level of aspiration studies. At the same time a more practical testing procedure could be anticipated if subsequent validation of the aspiration measures against various criteria proved successful. Abridged report. AF HRRC RB 53-51.

Effects of two methods of changing a frustrating agent on reduction of hostility, by Murray Horwitz, Morton Goldman, and Francis J. Lee. Illinois. University. College of Education. Bureau of Educational Research. 1954. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 119595

1. Reaction (Psychology) 2. Psychology, Social 3. Hostility - Research 4. Contract N6 ori-07144.

Factors producing defensive behavior within groups. Annual technical report, by J. R. Gibb. Colorado. University. Human Relations Laboratory, Boulder, Colo. Feb 1955. 23p table. Order from LC. Mi $2.70, ph $4.80. PB 119835

Work on the project has been divided into four major phases: A. The formulation of a body of theory dealing with defensive behavior. (Section III). B. Laboratory studies of the behavior of small groups under the influence of the induction of forces designed to produce variation in defensive

behavior. (Section II, B). C. Field studies of groups subjected to training procedures designed to reduce defensive behavior. (Section II, D). D. The production of instruments designed to measure defensive behavior and correlates of defense. (Section II, C). Contract Nonr-1147(03), NR 170-226.

Generalization effects in successive discrimination learning as measured by response similarity, by Herbert Gerjuoy and Harold P. Bechtoldt. Iowa State University. Dept. of Psychology, Iowa City, Iowa. Mar 1955. 106p diagr, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 119755

The several studies summarized in this report constitute a phase of a continuing investigation of generalization effects in complex learning tasks. This report is the culmination of 24 months of research, including 15 months under Contract Nonr 1261(00). During this period more than 500 subjects were used individually in one and two hour experimental sessions. Final report under Contract Nonr-1261-(00), Project NR 154-154.

Group behavior studies. II: Relation of sociometric choices to personality patterns, by William C. Schutz. Tufts College, Medford, Mass. Feb 1954. 24p tables. Order from LC. Mi $2.70, ph $4.80. PB 119824

The concepts of (1) "compatibility," (2) "focal person", (3) "personalness," (4) "dependence," are described, followed by a specification of their meanings in terms of indicators divided through the investigation herein reported. Contract Nonr-494-(03), NR 145-088.

Leadership acts. Annual summary report for the period 15 Feb 1954-15 Feb 1955 under Contract N6 ori-17, T. O. III, NR 171-123, by John K. Hemphill and Pauline N. Pepinsky. Ohio State University Research Foundation, Columbus, Ohio. Feb 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 119829

A general summary of the laboratory experiments conducted in testing certain hypotheses derived from a tentative theory of leadership. OSURF Proj 268, Report no. 6.

Main and interactive effects of several variables on reaction time, by I. E. Farber and Kenneth W. Spence. Iowa State University. Dept. of Psychology, Iowa City, Iowa. Mar 1955. 26p tables. Order from LC. Mi $2.70, ph $4.80. PB 120047

The results showed significant positive relations between speed of response and stimulus intensity, practice, and task complexity. Men were faster than women. No main effects were found for manifest anxiety or for experimentally-induced stress. There was a highly significant interaction between sex and task complexity and a marginally significant interaction involving sex, task complexity, and stress. Technical report no. 3 under Contract N9 onr-93802, project NR 154-107 on "Studies of influence of motivation on performance in learning".

Research in cohesive and disruptive tendencies in coalition-type groups. Minnesota. University, Minneapolis, Minn. Contract N8 onr-66216. Order separate parts described below from LC, giving PB number of each part ordered.

Technical report no. 2: Exploratory study of the French cabinets of the first legislature of the fourth republic, by Robert Holt. n.d. 16p table. Mi $2.40, ph $3.30. PB 119563

1. Coalitions (Political) - Research 2. France - Politics and government - 1947-1951.

Technical report no. 3: Analysis of the problem of stability and cohesive membership in coalitions, by Robert T. Holt. n.d. 16p. Mi $2.40, ph $3.30. PB 119561

1. Coalitions (Political) - Research 2. Group behavior.

Technical report no. 5: Concept of effective group opinion: Estimates of group opinion as related to the opinions of high influence members, by Ben Willerman. n.d. 5p tables. Mi $1.80, ph $1.80. PB 119562

1. Coalitions (Political) - Research 2. Group behavior.

Social perception and group effectiveness. Annual technical report under Contract no. N6 ori-07135, project NR 170-106, by Fred E. Fiedler. Illinois. University. Dept. of Psychology, Group Effectiveness Research Laboratory, Urbana, Ill. Feb 1955. 15p table. Order from LC. Mi $2.40, ph $3.30. PB 119730

This project is concerned with two major problems: (a) the identification of psychological variables which differentiate between effective and ineffective teams, and (b) the development of principles and methods by which maximally effective teams can be assembled. Research is based on the working hypothesis that interpersonal relations among group members will affect the productivity of the group. The nature of these interpersonal relations from standard sociometric questionnaires, and from interpersonal perception tests is inferred. The latter reflect the extent to which a person perceives various other individuals as similar to, or different from, each other.

Some psychological factors governing the impairment of verbal retention by cerebral depressants,

by Robert B. Payne. U. S. Air Force, School of Aviation Medicine, Randolph Field, Texas. Jul 1955. 10p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 119477

Directional hypotheses concerning (a) the general effects of certain cerebral depressants upon retention of a serial order verbal habit, (b) the general effects of overlearning and motivational feedback upon retention, and (c) the interaction of drug effects with training and motivation effects were tested in a factorial experiment involving 96 subjects. Interaction hypotheses were well substantiated in the sense that the adverse effects of drugs upon retention were inverse functions of the degree of training and the intensity of motivation. AF SAM R 55-52.

Technical report under Contract no. Nonr-660(00), NR 170-176. Chicago. University. Human Dynamics Laboratory. Feb 1955. 3p. Order from LC. Mi $1.80, ph $1.80. PB 119689

1. Group behavior.

Use of interest measures with Naval enlisted personnel, by Kenneth E. Clark. Minnesota. University. Dept. of Psychology, Minneapolis, Minn. Feb 1955. 65p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 119828

1. Personnel, Naval - Vocational interests - Measurement 2. Contract N6 ori-21203, NR 151-248.

STRUCTURAL ENGINEERING

Behavior of reinforced concrete shear walls under static load, by Gerard D. Galletly. Massachusetts Institute of Technology. Dept. of Civil and Sanitary Engineering, Cambridge, Mass. Aug 1952. 119p photos, diagrs, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 119998

This report describes the final phase of a research program conducted to determine experimentally and analytically the behavior of reinforced concrete shear walls subjected to static loads. Test results for fifteen specimens are reported including: cracking load and crack pattern, ultimate load, and load-deflection curves for the uncracked and cracked ranges. A detailed description is given of the lattice analogy procedure, a method by which the shear panel and frame may be analyzed. AFSWP 112. Contract DA 49-129-Eng-158.

Behavior of wall panels under static and dynamic loads. Massachusetts Institute of Technology. Dept. of Civil and Sanitary Engineering, Cambridge, Mass. Contract DA 49-129-Eng-158. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, by John M. Cord. Aug 1952. 69p photos, diagrs, graphs, tables. Mi $3.90, ph $10.80. PB 119997

1. Walls, Brick - Load tests 2. Walls, Asbestos cement - Load tests 3. Walls, Metal - Load tests 4. Loads, Structural - Dynamic tests 5. Loads, Structural - Static tests 6. AFSWP 111.

Part II, by John M. Cord, Jack Kinstlinger, John S. Archer and Robert J. Hansen. Jan 1954. 156p photos, diagrs, graphs, tables. Mi $7.50, ph $24.30. PB 119996

These reports present a description of the experimental techniques, the test results, and the conclusions from a series of laboratory tests performed on beams and panels made of several materials commonly used as wall panels, including brick masonry, reinforced brick masonry, brick masonry with reinforced gunite, concrete block, partition tile, asbestos-cement siding, and metal siding. A discussion of a method of interpretation of the test results for the purpose of design of wall panels or the analysis of the response of wall panels to the blast from an atomic weapon is presented in the concluding chapter. AFSWP 113.

L'essai de fatigue progressive (Fatigue testing under progressive loading, a new technique for testing), by E. Marcel Prot. Translated by Edward J. Ward. Sep 1952. 20p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 119814

A method of accelerated fatigue testing is described. Specimens are tested under cyclic stress increasing with time; the increase continuing until failure occurs. The failure stresses are plotted against the square root of the rate of increase of load. It is proposed that a straight line drawn through the plotted points will intersect the ordinate of zero rate of increase at the endurance limit. Translated from Revue de Metallurgie, 1948. AF WADC TR 52-148.

Over het knikvraagstuk in het plastische gebied ij staven en platen (On the buckling of bars and plates in the plastic range). Part II, by J. P. Benthem. Translated by J. Vanier. Mar 1956. 79p drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120117

A review is made of existing literature concerning comparison with experiment of various theoretical formulas for buckling of plates in the plastic region. The significance and relative merits of

various theories are discussed. Translated from Nationaal Luchtvaartlaboratorium, Amsterdam. Rapport S. 423, Jan 1954. Part I issued as its Rapport S. 407, 1952. NACA TM 1392.

Vinterbygge en kostnadsstudie (Building construction in winter, a cost study), by Bertil Näslund. Sweden. Statens Kommittee för Byggnadsforskning. Jun 1955. 227p diagrs, graphs, tables. (Text in Swedish and English). Order from LC. Mi $9.90, ph $34.80. PB 119847

The purpose of this treatise is to evolve a method based on results of practical investigations for calculating the increase in costs caused by special measures to be taken in connection with building construction in the winter so as to take account of the various factors influencing the costs, such as the type of house, the materials used in the load-bearing structure of the house, the building volume, and the date of start of house construction. The investigation is confined to multi-family concrete and masonry houses. In Swedish, with summary in English. Statens Nämnd för Byggnadsforskning. Handlingar nr. 26.

TEXTILES AND TEXTILE PRODUCTS

Evaluation of experimental wool and synthetic blends in Air Force velour overcoat material, by Ormond J. Roberts and C. A. Willis. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1953. 43p graphs, tables. Order from OTS. $1.25. PB 111884

A group of 30 blends of wool and synthetic fibers were evaluated to determine the effects of variation of fiber and composition on certain fabric properties. The synthetic fibers included Orlon, Dacron, Acrilan, A quality Viscose, and Dynel. The percentage of synthetic fiber was varied from 10 to 60%. One sample was fabricated of 100% wool for use as a control. AF WADC TR 53-444.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Airline aircraft requirements as determined by malfunction and periodic maintenance characteristics, by John Cocke, Frank D. Mason, William Mendenhall, III, and Jack Silber. U. S. Air Force. Air Research and Development Command. Air Force Missile Test Center. Operations Analysis Office, Patrick Air Force Base, Fla. Oct 1955. 37p diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 119736

The Air Force Missile Test Center, among its support missions, is required to provide transportation for personnel and mail to instrumentation sites situated along an island chain extending from Patrick Air Force Base to St. Lucia and over the Atlantic Ocean to Ascension Island. To accomplish this, an airline is to be set up to cover these routes. The problem arises of determining the number of aircraft necessary to operate this airline at an acceptable level of effectiveness. This problem has been solved for an airline with a required flight schedule as a function of the effectiveness of the maintenance facility available. Operations analysis report 55-1. AF MTC TR 55-8.

Emergency escape procedures, a report of joint studies with the Military Air Transport Service and the Civil Aeronautics Administration on the C-124 and supplementary data, by Barry G. King, Ralph Ostrich and Mary C. Richardson. U. S. Civil Aeronautics Administration. Office of Aviation Safety. Medical Division, Washington, D. C. Aug 1954. 96p drawings, diagrs, graph, tables. Order from OTS. $2.50. PB 121105

USAF ARDC Proj 504 025-0009. RDB Technical objective PO-6(102/13). Formerly listed as PB 118467 in USGRR, vol. 24, page 245.
1. Airplanes - Escape - Procedures 2. AAF CRC TR 54-56.

Gust-load and airspeed data from one type of two-engine airplane on six civil airline routes from 1947 to 1955, by Walter G. Walker. U. S. National Advisory Committee for Aeronautics. Feb 1956. 25p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N W., Washington 25, D. C. PB 119867

V-G data covering 70,000 hours were obtained from six different operations of a two-engine civil transport airplane and are analyzed to determine the severity and frequency of occurrence of the airspeeds, gust loads, and gusts. The results show sizable variations in the gusts, gust loads, and operating speeds among the present operations but, in general, these results are similar to those from past operations of the same type of airplane. NACA TN 3621.

Longitudinal and directional frequency response characteristics of the F-86D airplane, by Frederick O. Smetana. U. S. Air Force. Air Research and Development Command. Air Force Flight Test Center. Edwards Air Force Base, Calif. Dec 1955. 322p graphs. Order from LC. Mi $11.10, ph $49.85. PB 119788

1. F-86D (Airplane) 2. Airplanes - Stability, Dynamic - Tests 3. Mach number - Effect 4. AF FTC TN 55-29.

Method for obtaining statistical data on airplane vertical velocity at ground contact from measurements of center-of-gravity acceleration, by Robert C. Dreher. U. S. National Advisory Committee for Aeronautics. Feb 1956. 21p photo, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119853

1. Airplanes - Speed - Measurements 2. Loads, Landing - Mathematical analysis 3. NACA TN 3541.

Statistical measurements of contact conditions of 478 transport-airplane landings during routine daytime operations, by Norman S. Silsby. U. S. National Advisory Committee for Aeronautics. 1955. 17p photos, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 119884

Supersedes NACA TN 3194 (PB 114397).
1. Loads, Landing - Impact 2. Airplanes, Transport - Landing 3. Landing approach - Photographic interpretation 4. NACA 1214 5. NACA TN 3194, Revised.

Instruments

Analytical study of modifications to the autopilot of a fighter airplane in order to reduce the response to side gusts, by Charles W. Mathews and James J. Adams. U. S. National Advisory Committee for Aeronautics. Mar 1956. 35p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120113

1. Controls, Automatic - Operation - Theory 2. Controls, Automatic - Gust effects 3. NACA TN 3635.

Effect of pneumatic de-icers and ice formations on aerodynamic characteristics of an airfoil, by Dean T. Bowden. U. S. National Advisory Committee for Aeronautics. Feb 1956. 59p photos, diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119856

1. Airfoils - Ice formation 2. Airfoils - Aerodynamics - Effect of ice 3. De-icing equipment - Aerodynamic effects 4. Ice - Aerodynamic effects 5. NACA TN 3564.

Preliminary investigation of a family of diffusers designed for near sonic inlet velocities, by Richard Scherrer and Warren E. Anderson. U. S. National Advisory Committee for Aeronautics. Feb 1956. 43p photo, drawing, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119878

1. Diffusers, Subsonic 2. Boundary layer - Aerodynamics 3. NACA TN 3668.

Engines and Propellers

Analysis of helicopter blades, by A. A. Nikolsky and E. Seckel. Princeton University. Aeronautical Engineering Laboratory. Jan 1947. 273p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $42.35. PB 119817

The purpose of this report is to give all the theory and derivations necessary for the structural analysis of helicopter rotor blades in steady forward flight. These data can easily be made applicable to accelerated flight. Four different types of blade attachment of the rotor hub are considered: a) Feathered, articulated blades equipped with mechanical damping devices. b) Feathered blades, center-hinged, rigid in the plane of rotation (see-saw type). c) Single blade. d) Feathered blades with completely rigid attachment. PU AEL R 100.

Charts for estimating rotor-blade flapping motion of high-performance helicopters, by Robert J. Tapscott and Alfred Gessow. U. S. National Advisory Committee for Aeronautics. Mar 1956. 19p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119864

1. Helicopters - Rotors - Flapping coefficients 2. NACA TN 3616.

Charts for estimating tail-rotor contribution to helicopter directional stability and control in low-speed flight, by Kenneth B. Amer and Alfred Gessow. U. S. National Advisory Committee for Aeronautics. 1955. 23p photos, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 119885

Supersedes NACA TN 3156 (PB 114263).
1. Helicopters - Stability, Directional - Effect of tail rotor 2. Helicopters - Rotors - Theory 3. Helicopters - Hovering 4. NACA 1216 5. NACA TN 3156, Revised.

Protective shot peening of propellers. Part 1: Residual peening stresses, by Ronald F. Brodrick. Lessels and Associates, Inc., Boston, Mass. Jun 1955. 438p photos, diagrs, graphs, tables. Order from OTS. $5. PB 111802

The object of the investigation was to determine any benefits of shot peening as a means of protecting aircraft propeller blades against the reduction of fatigue strength arising from surface damage. This report covers the investigation of the residual stresses induced by each of a variety of shot peening conditions on (1) AISI 4340 steel of three different heat-treatments, (2) Aluminum alloy 76S-TS, and (3) Titanium alloy Ti 150A. Part 2 of this report will cover fatigue tests on materials which have been shot peened and subjected to simulated propeller damage. Project no. 3346. Covers work performed from 1 Feb 1954 to 30 Apr 1955 under Contract AF 33(616)-2324. AF WADC TR 55-56, Part 1.

Zur gasdynamik des drehenden schaufelsterns (On the gas dynamics of a rotating impeller), by A. Busemann. Translated by Mary L. Mahler. Mar 1956. 16p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120116

Translated from Zeitschrift für angewandte mathematik und mechanik, vol. 18, issue 1, p. 31-38, Feb 1938.
1. Flow, Compressible - Theory - Germany
2. Gases - Dynamics - Germany 3. Propellers - Aerodynamics - Germany 4. NACA TM 1385.

Aerodynamics

Ausbildung eines wirbels an der kante einer platte (Formation of a vortex at the edge of a plate), by Leo Anton. Translated by Mary L. Mahler. Mar 1956. 36p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120119

Translated from Ingenieur-Archiv, vol. X, 1939, p. 411-427.
1. Vortex motion - Theory - Germany 2. Flow, Fluid - Theory - Germany 3. NACA TM 1398.

Effect of leading-edge geometry on boundary-layer transition at Mach 3.1, by Paul F. Brinich. U. S. National Advisory Committee for Aeronautics. Mar 1956. 44p drawings, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119874

1. Mach number - Effect 2. Boundary layer - Transition point - Effect of leading edge 3. NACA TN 3659.

Investigation of the use of the thermal decomposition of nitrous oxide to produce hypersonic flow of a gas closely resembling air, by Alexander P. Sabol and John S. Evans. U. S. National Advisory Committee for Aeronautics. Mar 1956. 36p drawings, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120108

1. Nitrogen oxides - Decomposition 2. Nitrogen oxide gas - Production 3. Flow, Hypersonic 4. Wind tunnels, Supersonic - Flow 5. NACA TN 3624.

Laminare strömung um einen axial angeströmten rotierenden drehkörper (Laminar flow about a rotating body of revolution in an axial airstream), by H. Schlichting. Translated by Mary L. Mahler. Feb 1956. 43p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119882

Translated from Ingenieur-Archiv, vol. XXI, no. 4, 1953, p. 227-244. Abstract of this report was read at the 8th International Mechanics Congress, Istanbul, Aug 27, 1952.
1. Flow, Laminar - Theory - Germany 2. Bodies of revolution - Aerodynamics - Germany 3. Boundary layer, Laminar - Flow - Germany 4. NACA TM 1415.

Minimum wave drag for arbitrary arrangements of wings and bodies, by Robert T. Jones. U. S. National Advisory Committee for Aeronautics. Feb 1956. 11p diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119854

1. Flow, Supersonic - Theory 2. Airplanes - Drag 3. NACA TN 3530.

Some effects of bluntness on boundary-layer transition and heat transfer at supersonic speeds, by W. E. Moeckel. U. S. National Advisory Committee for Aeronautics. Mar 1956. 43p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119870

1. Boundary layer - Transition point 2. Flow, Supersonic - Heat transference 3. Fuselages - Shape - Effects 4. NACA TN 3653.

Tabulation of the f_λ functions which occur in the aerodynamic theory of oscillating wings in supersonic flow, by Vera Huckel. U. S. National Advisory Committee for Aeronautics. Feb 1956. 59p table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119860

1. Flow, Supersonic - Theory 2. Aerodynamics - Theory 3. Tables, Mathematical 4. NACA TN 3606.

Design of a miniature solid-propellant rocket, by Robert H. Heitkotter. U. S. National Advisory Committee for Aeronautics. Mar 1956. 13p photo, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120106

1. Rocket motors - Design 2. Rockets - Propellants - Compositions 3. NACA TN 3620.

Mixing of a two-dimensional turbulent jet. Theoretical studies of the mixing process of a jet impinging into a stream of large mass, by T. P. Torda and W. A. Gustafson. Illinois. University. Aeronautical Engineering Dept., Urbana, Ill. Aug 1954. 69p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 119770

The analysis and the numerical work concerning the mixing of the incompressible, two-dimensional turbulent jet is presented. The effects of the free stream velocity and the upstream boundary layers are included in the analysis, and graphical results are given for three velocity ratios of the primary to the secondary jet. ILU EES M-TR-11. Contract AF 33(038)-21251.

Partial navigation courses for a guided missile attacking a constant velocity target, by Hillel Spitz. U. S. Naval Research Laboratory. Mar 1946. 35p graphs. Order from LC. Mi $3, ph $6.30. PB 119797

A kinematic study of partial navigation courses for a guided missile attacking a constant velocity target, is made in this report. A method of estimating the transverse acceleration of the missile following such a course is given. The application of the method is illustrated for a particular set of values of the various parameters. Graphical pictures of several courses are given together with curves of corresponding missile acceleration against proximity to target. The report treats only courses for which the "navigational correction constant" is 2. Other courses are at present being analysed by machine integration. NRL R 2790.

Rocket research report. U. S. Naval Research Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

No. XV: Counter-type precision phase source, by Nolan R. Best. Sep 1954. 11p photos, diagrs (1 fold). Mi $2.40, ph $3.30. PB 119772

A highly useful apparatus for the generation of signals of variable-but-known phase has been designed and constructed. Its operation is extremely dependable and the unit requires a minimum of adjustment as demonstrated by both field and laboratory use over a period of 15 months. Phase can be varied continuously over any number of cycles desired. This unit is operated at two kc, but the principle is applicable to a wide range of frequencies. Accuracy exceeds the calibration accuracy of 0.1^{o}. For Report no. 3 see PB 102004. NRL R 4418.

No. XVIII: Photography from the Viking 11 rocket at altitudes ranging up to 158 miles, by R. C. Baumann and L. Winkler. Feb 1955. 33p photos, diagrs, table. Mi $3, ph $6.30. PB 119796

On May 24, 1954, Viking 11 was launched at White Sands Proving Ground, New Mexico. The research equipment in the rocket included an aircraft camera, which took thirty-nine pictures at altitudes varying from sixty-five miles on the ascent, through the peak of 158.4 miles, to 33.3 miles on the descending portion of the trajectory. Great care in focusing the camera lens produced photographs with excellent definition. NRL R 4489.

No. XX: Flight measurements of aerodynamic heating and boundary-layer transition on the Viking 10 nose cone, by R. B. Snodgrass. June 16, 1955. 68p photos, diagr, graphs, tables. Mi $3.90, ph $10.80. PB 119809

The first of a series of free-flight investigations of aerodynamic heating was begun with the launching of the tenth Viking rocket at White Sands Proving Ground, New Mexico on May 7, 1954. Viking 10 carried a special stainless steel nose cone instrumented to record local transient skin temperatures at twenty-two points. The resultant data covered a Mach number range of 1.20 to 5.28 and a Reynolds number range of 56×10^{3} to 10.45×10^{6}. The primary purpose of the experiment was to obtain flight measurements of supersonic convective heat-transfer coefficients and to detect transition of the boundary layer from turbulent to laminar flow. NRL R 4531.

Supersonic wind-tunnel measurements of surface pressures on a small rocket to be used for upper-air research, by Marvin W. Sweeney, Jr. Massachusetts Institute of Technology. Naval Supersonic Laboratory. Sep 1955. 79p photos, drawings, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 119800

It is desired to obtain high-altitude ambient pressure from a simple, inexpensive sounding rocket. It is shown in this report that this is possible by combining a nose-pitot pressure and a body-surface pressure. Wind-tunnel data is presented to aid in determining the feasibility of such a method. An expression is developed for sensitivity, utilizing wind-tunnel experimental data to supplement aero-

dynamic theory for bodies of revolution. AF CRC TR 55-288. MIT NSL WTR 80. Contract AF 19-(604)-1208.

Marine Transportation

Bibliography on shells and shell-like structures, by William A. Nash. U. S. David W. Taylor Model Basin, Washington, D. C. Nov 1954. 74p. Order from OTS. $2. PB 111964

Approximately 1450 papers and books pertinent to experimental and theoretical work on shells and shell-like structures are listed in this compilation, believed to be current through December 1953. References are included to both theoretical and experimental investigations and to highly mathematical as well as to rough engineering approximations. The type of shells treated, as represented in the subject index, include cylindrical, conical, elipsoidal, and spherical shapes. References are also included on roof and dome structures. Excluded are those papers concerned mainly with the metallurgy and properties of material employed in shells. A library of the listed references is now being assembled at the Model Basin in the form of microfilms. Those already available at this writing have been identified by a number which appears in brackets after the listing of the article itself. It is expected that ultimately all of the items in the bibliography will be available. DWTMB 863.

Bulletin, vol. 9, no. 1. U. S. Beach Erosion Board. Jan 1955. 23p drawings, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119533

Contents: Simplified method of determining durations and frequencies of waves greater or less than a specified height, by Thorndike Saville, Jr. - Comparison of deep water wave forecasts by the Pierson-Neumann, the Darbyshire, and the Sverdrup-Munk-Bretschneider methods with recorded waves for Point Arguello, California for 26-29 October '50, by Robert F. Dearduff. - Status of sand by-passing plant at Salina Cruz Harbor Isthmus of Teherantepec, Mexico. - Progress reports on research sponsored by the Beach Erosion Board. - Beach erosion studies.

Compendium on the hazards of water transportation and the manufacture, handling, storage, and stowage of ammonium nitrate and ammonium nitrate fertilizers. National Research Council. Advisory Committee on the Hazards of Ammonium Nitrate Transportation. Dec 1953. 262p diagr, graphs, tables. Order from LC. Mi $11.10, ph $39.30. PB 119969

Final report to U. S. Coast Guard under Contract no. Tcg. 38325. Dr. Francis C. Frary, Chairman. Contents: Part I. Ammonium nitrate problem and this compendium. - Part II. Advisory committee findings and conclusions. - Part III. Fires and explosions. - Part IV. Needed safety regulations. - Part V. Report of Bureau of Explosives. - Part VI. Technical literature review - abstracts. - Appendix A: Bibliography. - Appendix B: Good practice in handling ammonium nitrate.

Hydrodynamic impact loads in smooth water for a prismatic float having an angle of dead rise of 10°, by Philip M. Edge, Jr. U. S. National Advisory Committee for Aeronautics. Jan 1956. 20p graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119377

1. Hydrodynamics - Theory 2. Seaplanes - Hulls - Dead rise 3. Seaplanes - Hulls - Impact pressure 4. NACA TN 3608.

Microorganism content of surface water of marine areas adjacent to North America and possessions of the United States, by John P. Barlow, George Moskovits, and Richard J. Baldauf. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. n.d. 21p. Order from LC. Mi $2.70, ph $4.80. PB 119481

1. Microorganisms, Marine - Ecology - Bibliography 2. Microorganisms, Marine - Distribution - Bibliography 3. Microorganisms, Marine - North America - Bibliography 4. AF SAM R 55-72.

On the variation of the Coriolis parameter and its simulation in models of the ocean circulation, by Alan J. Faller and William S. von Arx. Woods Hole Oceanographic Institution, Woods Hole, Mass. Mar 1955. 17p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120037

Unpublished manuscript.
1. Coriolis parameter - Effects on ocean currents 2. Currents, Ocean - Mathematical analysis 3. Currents, Ocean - Models 4. Contract Nonr-769(00), NR 083-069 5. WHOI Ref 55-13.

MISCELLANEOUS

Abstracts of published papers and list of translations, vol. 3, no. 12, abstracts 539-588. Australia. Commonwealth Scientific and Industrial Research Organization. Dec 1955. 41p. Order from LC. Mi $3.30, ph $7.80. PB 119617

1. Scientific research - Bibliography 2. Industrial research - Bibliography.

Botanical studies on Ice-island T-3, by Nicholas Polunin. Yale University. Osborn Botanical

Laboratory, New Haven, Conn. Dec 1955. 54p maps, diagrs. Order from LC. Mi $3.60, ph $9.30. PB 119773

Final report under Contract no. AF 19(604)-1144. 1. Botany - North Pole 2. Ice island, T-3 3. Contract AF 19(604)-1144 4. AF CRC TR 55-295.

Report of NRL progress. U. S. Naval Research Laboratory. Apr 1956. 58p. Order from OTS. $1.25. PB 121095

Contents: Some recent advances in radio astronomy at NRL, by A. E. Lilley. - Improved device for studying fracture propagation in structural materials, by M. W. Brossman. - Microwave turnstile circulator--a simple nonreciprocal four-port network, by P. J. Allen. - Thermodynamic properties of silver-gold alloys, by J. L. White - Scientific program: Problems accepted. - Problem notes: Application research: Psychological research on information display design and use. - Astronomy and astrophysics: Celestial radiation measurements at 2.22 centimeters wavelength.... First prototype of upper-atmosphere research rocket, Aerobee-Hi, launched in second of a series of test firings. . . . .Free-atmosphere turbulence data measured between 10,000 and 60,000 feet. - Chemistry: Test, evaluation, and analysis of a foam pump for fire fighting applications. - Mathematics: Theorem proved for steady plane adiabatic flow of an ideal gas.-- Mechanics: Magnetic tape recording system for pressure time records of underwater explosions. . . . Some recent developments of self-recording gages for measuring the intensity of mechanical shock. . . .Shock level in packages during drop tests. . . ."Jetron" developed for use in laboratory investigations in ballistics. . . .Significant progress on the shipboard deicer. - Metallurgy and ceramics: Investigation of modified 12-percent chromium steel for intermediate temperature applications. . . . Temperature dependence of resistivity in the nickel-palladium system. . . .Creep of aluminum single crystals. . . .Investigation of metallurgical and mechanical effects in the development of hot tearing. . . .Notch ductility of austenitic nodular irons . . . .Analytical methods for determining micro amounts of ferrous iron in the presence of large amounts of ferric iron. - Nuclear and atomic physics: An investigation of the effect of field of view on the measured transmission of light through turbid water. . . .NRL nuclear research reactor about 80 percent complete. - Radio: Rate measurement of marine chronometers, gimbal mounted chronometer watches, and non-gimbal navigating watches under controlled climatic conditions--rate-pressure and rate-temperature trends. . . .Evaluation-azimuth servo system for radio astronomy star tracking. . . .General investigation of electromagnetic wave propagation characteristics of ferrite materials at microwave frequencies. - Solid-state physics: Thermoluminescence of titanium-activated lithium silicates. . . .Cryomagnetic studies of the positive exchange interaction in chromic chloride. - Published reports. - Papers by NRL staff members. - Patents.

"Tsentral'naia arktika" (The central arctic), by V. Kh. Buinitskii. Translated by Machael M. Dane and David Kraus. Nov 1955. 41p. Order from LC. Mi $3.30, ph $7.80. PB 119467

A discussion of the physical-geographic conditions of that area largely in clear non-technical terms. Translated from transcript of a public lecture published by Vsesoiuznoe Obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii. Leningrad, 1949, 32pp. Contract AF 19(604)-1364.

ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

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Biology and Medicine

Semiannual report to the Atomic Energy Commission, by Leon O. Jacobson. Argonne Cancer Research Hospital, Chicago, Ill. Sep 1955. Contract AT-(11-1)-69. 110p. Order from OTS. 55 cents. ACRH-4

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The fluoresometer, by Stanton B. Smith and Hugh G. Neil. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Jan 1946. Decl. Dec 1955. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. Y-407

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The production and consumption of HCl in the acid process for carnotite, by K. B. Brown and G. H. Clewett. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Feb 1950. Decl. Dec 1955. Contract W-7405-eng-26. Order from LC. Mi $3, ph $6.30. Y-462

Recovery from carnotite acid leach liquors, by C. F. Coleman and G. H. Clewett. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Aug 1949. Decl. Dec 1955. Contract W-7405 eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. Y-463

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Oak Ridge, Tenn. Sep 1949. Decl. Dec 1955. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. Y-478

Preparation of pure zirconium oxide. Progress report, by W. M. Leaders and others. Carbide and Carbon Chemicals Co., Oak Ridge, Tenn. Feb 1950. Decl. Nov 1955. Contract W-7405-eng-26. 31p. Order from OTS. 25 cents. Y-559

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Chemical determination of phthalate ion, by L. G. Overholser and W. R. Grimes. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. Apr 1950. Decl. Dec 1955. Contract W-7405-eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. Y-602

Engineering

Heat transfer coefficient for hydrogen flowing through a tube at low temperatures, by H. W. Woolley and F. G. Brickwedde. National Bureau of Standards, Washington, D. C. (194?). Decl. Dec 1955. 8p. Order from LC. Mi $1.80, ph $1.80. A-381

The design of valves for use with hex, by Homer F. Priest. Columbia Univ., New York. Div. of War Research. Jan 1943. Decl. Dec 1955. Contract OEMsr-412. 23p. Order from LC. Mi $2.70, ph $4.80. A-538

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Memo on heat conductivity in laminated fuel structures, by Henry Hurwitz, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1946. Decl. Dec 1955. 17p. Order from LC. Mi $2.40, ph $3.30. A-4254

Summary report of the gasket development program. Job 15, by E. W. Ruhl. Vitro Corp. of America, N. Y. Aug 1951. Decl. with deletions Dec 1955. Contract W-31-109-eng-52. 66p. Order from LC. Mi $3.90, ph $10.80. AECD-3812

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Development of scram-latch components for Mark I naval reactor, by D. R. Forry, E. L. Walls, R. L. Merrill, G. A. Waldie, and R. M. Conklin. Battelle Memorial Inst., Columbus, Ohio. Oct 1951. Decl. Dec 1955. Contract W-7405-eng-92. 33p. Order from OTS. 25 cents. BMI-700

Hydrodynamic test of cross flow reactor component, by T. V. Sheeman, R. T. Schomer, J. Weisman, and W. Regan. Brookhaven National Lab., Upton, N. Y. (1952?). Decl. Dec 1955. 37p. Order from LC. Mi $3, ph $6.30. BMI-1602

Neutron economy and critical size calculations, by F. T. Miles. Brookhaven National Lab., Upton, N. Y. Jan 1953. Decl. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. BNL-2383

General engineering design features of the pile for a light water cooled P-9 power plant, by L. A. Ohlinger. Chicago. Univ., Metallurgical Lab. Jul 1943. Decl. Dec 1955. 33p. Order from LC. Mi $3.60, ph $9.30. CE-805

Thermal syphon in homogeneous pile, by George F. Quinn. Chicago. Univ. Metallurgical Lab. Dec 1943. Decl. Dec 1955. 17p. Order from LC. Mi $2.40, ph $3.30. CE-1074

Design of semi-works, light-water-cooled heterogeneous P-9 pile. Terminal report. Chicago. Univ. Metallurgical Lab. Dec 1943. Decl. Dec 1955. Contract W-7401-eng-37. 45p. Order from LC. Mi $6.30, ph $19.80. CE-1132

Engineering investigation of P-9 homogeneous pile. Terminal report, by J. H. Chapin and F. R. Ward. Chicago. Univ. Metallurgical Lab. Jan 1944. Decl. Dec 1955. Contract W-7401-eng-37. 29p. Order from LC. Mi $5.40, ph $15.30. CE-1149

Design of regulating rod for high flux reactor, by D. Nicoll. Oak Ridge National Lab., Tenn. Mar 1949. Decl. Dec 1955. Contract W-7405-eng-26. 45p. Order from LC. Mi $3.30, ph $7.80. CF-49-4-123

Materials testing reactor design report tank sections "A" and "E", by J. P. Gill. Oak Ridge National Lab., Tenn. Nov 1949. Decl. Dec 1955. Contract W-7405-eng-26. Order from LC. Mi $2.40, ph $3.30. CF-49-11-217

ORNL research reactor design data, by W. E. Sholl, Jr. Oak Ridge National Lab., Oak Ridge, Tenn. Aug 1951. Decl. Dec 1955. Contract W-7405-eng-26. 32p. Order from OTS. 25 cents. CF-51-8-216

A study of the effect of cooling water temperature on heat transfer by natural convection in first cycle waste tanks WM-100, WM-101, and WM-102, by W. L. Carter. Oak Ridge National Lab., Tenn. Mar 1952. Decl. Dec 1955. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.70, ph $4.80. CF-52-3-34

Design of orifices for sampling process gas from the dissolver off-gas system in the Idaho Chemical Processing Plant (Bldg. CPP 604), by William L. Carter. Oak Ridge National Lab., Tenn. Mar 1952. Decl. Dec 1955. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-52-3-155

The ORR as an engineering test facility, by Alvin M. Weinberg. Oak Ridge National Lab., Tenn. Apr 1953. Decl. Dec 1955. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-53-4-48

Fluid flow through a spherical vessel containing distributed heat sources, by David H. Fax. Oak Ridge National Lab., Oak Ridge, Tenn. Sep 1953. Decl. Dec 1955. Contract W-7405-eng-26. 21p. Order from OTS. 25 cents. CF-53-9-75

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Heating and thermal stress in HRT pressure vessel during a shutdown, by P. M. Wood. Oak Ridge National Lab., Tenn. Jul 1954. Decl. Jan 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-54-7-158

A study of possible blast effects from HRT pressure vessel rupture, by Phillip M. Wood. Oak Ridge National Lab., Oak Ridge, Tenn. Dec 1954. Decl. Dec 1955. Contract W-7405-eng-26. 35p. Order from OTS. 30 cents. CF-54-12-100

Heat transfer from HEX, by W. B. Harrison. Clinton National Lab., Oak Ridge, Tenn. Apr 1948. Decl. Dec 1955. Contract W-35-058-eng-71. 14p. Order from LC. Mi $3, ph $6.30. CNL-39

Pile heat exchanger calculations, by Gale Young. Chicago. Univ. Metallurgical Lab. Feb 1945. Decl. Dec 1955. Contract W-7401-eng-37. 10p. Order from LC. Mi $2.40, ph $3.30. CP-2701

Effect of routing upon temperature of cooling stream, by Albert S. Cahn, Jr. Chicago. Univ. Metallurgical Lab. Feb 1946. Decl. Dec 1955. Contract W-7401-eng-37. 14p. Order from LC. Mi $2.40, ph $3.30. CP-3435

Steam bubble size and rate of rise through water at its normal boiling point, by J. T. Weills. Chicago. Univ. Metallurgical Lab. Sep 1943. Decl. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. CT-910

Estimates regarding gas flow and heat transfer in a high temperature oxide file, by A. F. Robertson, L. W. Fromm, and H. E. Kittredge. Chicago. Univ. Metallurgical Lab. Mar 1946. Decl. Dec 1955. Contract W-7401-eng-37. 29p. Order from LC. Mi $2.70, ph $4.80. CT-3460

Mixer-settler development. Characteristics of the pump-mix impeller, by D. S. Webster and C. L. Williamson. E. I. du Pont de Nemours & Co. Oct 1955. Contract AT(07-2)-1. 24p. Order from OTS. 20 cents. DP-137

Design proposal for one binocular and one monocular periscope for Hanford Works, by G. R. Rede. General Electric Co. General Engineering and Consulting Lab., Schenectady, N. Y. Feb 1949. Decl. Nov 1955. 78p. Order from LC. Mi $4.50, ph $12.30. EAH-87

Construction test; high density concrete shielding, by L. L. Rice. Hanford Works, Richland, Wash. Nov 1950. Decl. Dec 1955. Contract W-31-109-eng-52. 31p. Order from LC. Mi $3, ph $6.30. HW-19563

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Investigation of sulfamic acid tank valve failures, by N. Endow. Hanford Works, Richland, Wash. Nov 1952. Decl. Dec 1955. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-26323

Fuel assembly heat evolution in transfer coffin, by D. T. Bray and W. L. Morris. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Mar 1952. Decl. Jan 1956. 11p. Order from LC. Mi $1.80, ph $1.80. IDO-16008

Thermal stress in MTR beryllium reflector at increased power levels, by C. F. Leyse. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Apr 1953. Decl. Jan 1956. Contract AT-(10-1)-205. 9p. Order from LC. Mi $1.80, ph $1.80. IDO-16092

Use of the line recorder as a helium leak detector, by N. H. Pease. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Sep 1947. Decl. Dec 1955. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. K-39

Taylor double filled tube systems, by A. H. Fowler. Carbide and Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Feb 1948. Decl. Nov 1955. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. K-137

A line recorder for nitrogen—helium analysis, by W. C. Taylor. K-25 Plant. Carbide and Carbon Chemicals Div., Oak Ridge, Tenn. Jan 1951. Decl. Jan 1956. Contract W-7405-eng-26. 11p. Order from OTS. 15 cents. K-720

Problems and costs encountered in the handling of irradiated fuels, by L. O. Sullivan. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1955. Contract W-31-109-eng-52. 35p. Order from OTS. 25 cents. KAPL-1443

Magnetic induction flowmeter development. Final project status report. Job 24-B4. Vitro Corp. of America, New York, N. Y. Jul 1953. Decl. Dec 1955. Contract AT(30-1)-850. 71p. Order from OTS. 45 cents. KLX-1391

Pile technology lecture 46. Heat transfer mechanisms for energy removal from piles, by R. M. Boarts. Clinton Labs., Oak Ridge, Tenn. (194?). Decl. Dec 1955. 30p. Order from LC. Mi $3, ph $6.30. M-4128

Process solution transfer—testing of steam and air jets, by M. D. Peterson. Clinton Labs., Oak Ridge, Tenn. Jan 1945. Decl. Nov 1955. 93p. Order from LC. Mi $5.40, ph $15.30. M-4168

Radiation and heat resistant vacuum seals, by N. S. Rasor and J. M. Nuding. North American Aviation, Inc., Downey, Calif. Dec 1951. Decl. Dec 1955. Contract AT-11-1-gen-8. 29p. Order from OTS. 25 cents. NAA-SR-158

The self-regulation by moderator boiling in stainless steel-UO_2-H_2O reactors. (15-H-1), by Louise Gartner and Robert Daane. Nuclear Development Corp. of America, White Plains, N. Y. Jun 1955. 54p. Order from LC. Mi $3.60, ph $9.30. NDA-16

Thermal stability of multiplate assemblies. Final report—Problem assignment no. TX12-5, by W. B. Allred, G. Ascoli, and H. C. Savage. Oak Ridge National Lab., Oak Ridge, Tenn. Jul 1948. Decl. Jan 1956. Contract W-7405-eng-26. 52p. Order from OTS. 35 cents. ORNL-113

Heat transfer and water flow in active sections with various plate spacings, by R. Van Winkle. Oak Ridge National Lab., Tenn. Feb 1949. Decl. Dec 1955. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. ORNL-550

Analysis of flow through a sphere. First report, by D. H. Fax, S. C. Traugott, and G. F. Wislicenus. Oak Ridge National Lab., Oak Ridge, Tenn. Feb 1952. Decl. Jan 1956. Contract W-7405-eng-26. 35p. Order from OTS. 35 cents. ORNL-1124

Sleeve bearing design data, by Harry Apkarian. General Electric Co. General Engineering Lab., Schenectady, N. Y. Mar 1952. Decl. Nov 1955. 25p. Order from LC. Mi $2.70, ph $4.80. R52GL51

R (U^{235}) recovery by scraping and vacuuming techniques, by J. M. Googin and M. C. Wiest. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. Dec 1947. Decl. Dec 1955. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. Y-87

An evaluation of the internal thermal flow meter for measuring UCl_4 vapor in the beta source unit, by Donald Ross, Frank Neill, J. W. Morfitt, and Raymond Murray. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Sep 1947. Decl. Dec 1955. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.40, ph $3.30. Y-228

Purification of graphite: Production equipment, by W. L. Ross. Y-12 Plant. Carbide and Carbon Chemicals Corp., Oak Ridge, Tenn. Nov 1948. Decl. Dec 1955. Contract W-7405-eng-26. 32p. Order from OTS. 25 cents. Y-314

Health and Safety

Tolerance values for thorium, by Karl Z. Morgan. Clinton Labs., Oak Ridge, Tenn. Nov 1945. Decl. with deletions Dec 1955. 9p. Order from LC. Mi $1.80, ph $1.80. AECD-3808

Urine assay procedure at the Mound Laboratory. Final report, by E. S. Spoerl. Mound Lab., Miamisburg, Ohio. Apr 1950. Decl. with deletions Dec 1955. Contract AT-33-1-gen-53. 31p. Order from LC. Mi $3, ph $6.30. AECD-3811

Radiological sciences department research and development activities quarterly progress report for October-December 1954, by H. M. Parker. Hanford Atomic Products Operation, Richland, Wash. Jan 1955. Decl. with deletions Dec 1955. Contract W-31-109-eng-52. 27p. Order from LC. Mi $2.70, ph $4.80. AECD-3817

Comments on the urine analysis results on Clinton Laboratories personnel as reported by Chicago, by S. G. English. Oak Ridge National Lab., Tenn. Jun 1945. Decl. Dec 1955. 7p. Order from LC. Mi $1.80, ph $1.80. CF-45-6-144

River water monitoring memo, by M. A. Buford. Oak Ridge National Lab., Tenn. Aug 1947. Decl. Nov 1955. 4p. Order from LC. Mi $1.80, ph $1.80. CF-47-8-240

Air activity studies conducted at Corryton, Tennessee and Gainesville, Florida, by D. M. Davis and F. J. Davis. Oak Ridge National Lab., Tenn. Oct 1951. Decl. Nov 1955. 10p. Order from LC. Mi $1.80, ph $1.80. CF-51-9-63

Studies on PU(IV) solutions in the presence and absence of citric acid, by Jack Schubert and David Revinson. Chicago. Univ. Metallurgical Lab. Jun 1946. Decl. Jan 1956. Contract W-7401-eng-37. 24p. Order from LC. Mi $2.70, ph $4.80. CH-3578

Biology Division quarterly report for November 1946 to January 1947, by Austin M. Brues, ed. Argonne National Lab., Lemont, Ill. Feb 1947. Decl. Dec 1955. Contract W-31-109-eng-38. 101p. Order from LC. Mi $5.40, ph $15.30. CH-3782

Report of health activities for month of July 1945. Chicago. Univ. Metallurgical Lab. and California. Univ., Berkeley. Radiation Lab. Aug 1945. Decl. Dec 1955. Contracts W-7401-eng-37 and W-7405-eng-48a. 17p. Order from LC. Mi $2.40, ph $3.30. CN-3190

The absorption and translocation of several fission elements by Russian thistles, by A. A. Selders. Hanford Works, Richland, Wash. Jun 1950. Decl. Dec 1955. Contract W-31-109-eng-52. 25p. Order from LC. Mi $2.70, ph $4.80. HW-18034

Application of plastic bags and sheeting for operation and maintenance across a contamination barrier, by Homer A. Moulthrop. Hanford Works, Richland, Wash. Oct 1952. Decl. Dec 1955. Contract W-31-109-eng-52. 74p. Order from LC. Mi $4.50, ph $12.30. HW-25108

Recapitulation of tolerable concentration of radioiodine on edible plants. Hanford Works, Richland, Wash. Aug 1952. Decl. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. HW-25239

Radiological sciences department research and development activities. Quarterly progress report April-June, 1955, by H. M. Parker. Hanford Atomic Products Operation, Richland, Wash. Jul 1955. Decl. Dec 1955. Contract W-31-109-eng-52. 31p. Order from LC. Mi $2.70, ph $4.80. HW-38198

General health safety rules, by Louis B. Silverman. Monsanto Chemical Co., Dayton, Ohio. Apr 1944. Decl. Nov 1955. Includes attachment: Health meter. Apr 1944. 11p. Order from LC. Mi $2.40, ph $3.30. M-4087

A study of the validity of U in urine determinations made by six different laboratories, by M. J. Wantman and D. V. Tiedeman. Rochester, N. Y. Univ. n.d. Decl. Dec 1955. Contract W-7401-eng-49. 14p. Order from LC. Mi $2.40, ph $3.30. M-4330

Report on the acute toxicity fractions of C_7F_{14} and C_8F_{16}, by C. J. Spiegl and Benjamin Amdur. Rochester, N. Y. Univ. Dec 1945. Decl. Dec 1955. 5p. Order from LC. Mi $1.80, ph $1.80. M-4337

The application of type 6 filter paper for the removal of airborne alpha emitting contamination, by R. Endebrock. Mound Lab., Miamisburg, Ohio. Apr 1947. Decl. Dec 1955. Contract AT-33-1-gen-53. 35p. Order from LC. Mi $3, ph $6.30. MLM-188

The effects of cell division inhibition on phosphorus metabolism of escherichia coli, by B. J. Katchman, E. S. Spoerl, and H. E. Smith. Mound Lab., Monsanto Chemical Co., Miamisburg, Ohio. May 1954. Contract AT-33-1-gen-53. 10p. Order from OTS. 15 cents. MLM-976

Technique for filling geiger counters at Chicago, by Harry Bryant and Mary Burke. Chicago. Univ. Metallurgical Lab. Mar 1944. Decl. Nov 1955. Contract W-7401-eng-37. 6p. Order from LC. Mi $1.80, ph $1.80. N-812

Energy deposition in tissue by neutrons of various energies and the $B^{10}(\gamma,\alpha)Li$ reaction, by M. A. Greenfield. North American Aviation Inc., Downey, Calif. Nov 1955. Contract AT-11-1-gen-8. 9p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-1458

Proceedings of bio-assay and analytical chemistry meeting October 6 and 7, 1955, by Reynold L. Hoover. National Lead Company of Ohio. Mar 1956. Contract AT(30-1)-1156. 156p. Order from OTS. 75 cents. NLCO-595

Radon measurements in warehouse and box cars containing high grade ore, by S. H. Anonsen. Mallinckrodt Chemical Works, St. Louis. Feb 1946. Decl. Dec 1955. Contract W-14-108-eng-8. 5p. Order from LC. Mi $1.80, ph $1.80. NYO-5163

Neutron scattering, by John Wilder Cure, III. Oak Ridge National Lab., Tenn. Jan 1956. Contract W-7405-eng-26. 39p. Order from LC. Mi $3, ph $6.30. ORNL-2013

Summary of the research progress meeting, by R. K. Wakerling. California. Univ., Berkeley. Radiation Lab. Aug 1946. Decl. Nov 1955. Contract W-7405-eng-48. 6p. Order from LC. Mi $1.80, ph $1.80. RL-28.5.117

Summary of the research progress meeting, by R. K. Wakerling. California. Univ., Berkeley. Radiation Lab. Sep 1946. Decl. Nov 1955. Contract W-7405-eng-48. 5p. Order from LC. Mi $1.80, ph $1.80. RL-28.5-120

Summary of the research progress meeting, by R. K. Wakerling. California. Univ., Berkeley. Radiation Lab. Oct 1946. Decl. Nov 1955. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. RL-28.5.121

Summary of the research progress meeting, by R. K. Wakerling. California. Univ., Berkeley. Radiation Lab. Apr 1947. Decl. Nov 1955. Contract W-7405-eng-48. 6p. Order from LC. Mi $1.80, ph $1.80. RL-28.5.135

Relative retention of strontium and calcium in bone tissue, by George V. Alexander, Ralph E. Nusbaum, and Norman S. MacDonald. California. Univ., Los Angeles. Atomic Energy Project. Jun 1955. Contract AT-04-1-gen-12. 21p. Order from LC. Mi $2.40, ph $3.30. UCLA-337

Endogenous histamine excretion in the rat as influenced by x-ray irradiation and compound 48/80, by James L. Leitch, Virginia Debley, and Thomas J. Haley. California. Univ., Los Angeles. Atomic Energy Project. Jan 1956. Contract AT-04-1-gen-12. 27p. Order from LC. Mi $2.70, ph $4.80. UCLA-359

The effect of certain lipid material on the ultracentrifugal properties of serum and egg lipoproteins, by Thomas L. Hayes and John E. Hewitt. California. Univ., Berkeley. Radiation Lab. Sep 1955. Contract W-7405-eng-48. 10p. Order from LC. Mi $1.80, ph $1.80. UCRL-3141

Medical and health physics quarterly report October, November, December 1955. Univ. of Calif. Rad. Lab., Berkeley, Calif. Jan 1956. Contract W-7405-eng-48. 61p. Order from OTS. 40 cents. UCRL-3268

The effect of polonium alpha particle irradiation upon reticuloendothelial function as measured with P^{32} labeled particulate chromic phosphate, by L. W. Tuttle and R. C. Baxter. Rochester, N. Y. Univ. Atomic Energy Project. Oct 1955. Contract W-7401-eng-49. 34p. Order from LC. Mi $3, ph $6.30. UR-295

Physical plant for a radioactive inhalation laboratory, by R. H. Wilson, W. F. Neuman, A. Rothstein, and J. K. Scott. Rochester, N. Y. Univ. Atomic Energy Project. Nov 1955. Contract W-7405-eng-49. 104p. Order from LC. Mi $5.70, ph $16.80. UR-302

Studies of flash burns: An investigation of the effectiveness of the "tail" of a simulated field pulse in the production of skin burns in pigs, by George Mixter, Jr. Rochester, N. Y. Univ. Atomic Energy Project. Jun 1955. Decl. Dec 1955. Contract W-7401-eng-49. 29p. Order from LC. Mi $2.70, ph $4.80. UR-399

Beryllium sensitization in pigs, by R. D. Armstrong, L. J. Leach, W. L. Downs, E. A. Maynard, H. C. Hodge, and R. C. Kesel. Rochester, N. Y. Univ. Atomic Energy Project. Dec 1955. Contract W-7401-eng-49. 7p. Order from LC. Mi $1.80, ph $1.80. UR-417

A comparison of the effects on bare porcine skin of radiant energy delivered in the forms of square and simulated field pulses, by T. P. Davis, J. R. Hinshaw, and H. E. Pearse. Rochester, N. Y. Univ. Atomic Energy Project. Nov 1955. Contract W-7401-eng-49. 14p. Order from LC. Mi $2.40, ph $3.30. UR-418

Influence of injection solution treatment on blood disappearance rates and tissue distribution of polonium^{210}, by Robert G. Thomas and J. N. Stannard. Rochester, N. Y. Univ. Atomic Energy Project. Dec 1955. Contract W-7401-eng-49. 19p. Order from LC. Mi $2.40, ph $3.30. UR-421

Studies on flash burns: The screening effect of fabric at a distance from animals, by H. W. Bales, R. E. Roth, and H. E. Pearse. Rochester, N. Y. Univ. Atomic Energy Project. Dec 1955. Contract W-7401-eng-49. 12p. Order from LC. Mi $2.40, ph $3.30. UR-422

Index of reports and publications by the University of Rochester Atomic Energy Project, by Henry A. Blair. Rochester, N. Y. Univ. Atomic Energy Project. Jul 1955. Contract W-7401-eng-49. 213p. Order from LC. Mi $9.60, ph $33.30. UR-423

The uptake of radiocolloids by macrophages in vitro. A kinetic analysis with radioactive colloidal gold, by Robert E. Gosselin. Rochester, N. Y. Univ. Atomic Energy Project. Jan 1956. Contract W-7401-eng-49. 40p. Order from LC. Mi $3, ph $6.30. UR-428

Filtration of SO_3 gas molecules by type 6 paper, by J. W. Thomas. Oak Ridge National Lab., Y-12 Area, Tenn. Nov 1950. Decl. Jan 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. Y-685

Instrumentation

A coincidence circuit for unequal, 0.1 microsecond pulses of low amplitude, by Carroll Mills. California. Univ., Berkeley. Radiation Lab. Mar 1947. Decl. Nov 1955. Contract W-7405-eng-48. 4p. Order from LC. Mi $1.80, ph $1.80. BP-63

A simplified electronic circuit for ultrasonic inspection, by J. D. Ross and R. W. Leep. E. I. du Pont de Nemours & Co. Jan 1956. Contract AT(07-2)-1. 16p. Order from OTS. 15 cents. DP-120

Optical instruments for the atomic industry, by J. M. Holeman. Hanford Works, Richland, Wash. n.d. Decl. Dec 1955. Contract W-31-109-eng-52. 24p. Order from LC. Mi $2.70, ph $4.80. HW-13134

Fast neutron sensitivity of the CP meter, by E. E. Baker, F. R. Gydesen, and G. H. Whipple, Jr. Hanford Works, Richland, Wash. Jun 1949. Decl. Dec 1955. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. HW-13658

Effect of temperature on beta-ray measurements, by A. J. Stevens. Hanford Works, Richland, Wash. Nov 1949. Decl. Dec 1955. Contract W-31-109-eng-52. 26p. Order from LC. Mi $2.70, ph $4.80. HW-15204

A method for the analysis of radionuclide mixtures using a gamma-beta scintillation spectrometer, by M. B. Leboeuf and R. E. Connally. Hanford Works, Richland, Wash. Feb 1953. Decl. Dec 1955. Contract W-31-109-eng-52. 37p. Order from LC. Mi $3, ph $6.30. HW-27090

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Purification of graphite, by G. T. Sermon. United Carbon Products Co., Inc., Bay City, Michigan. Jun 1948. Decl. Dec 1955. Contract AT-30-1-gen-127. 25p. Order from OTS. 25 cents. AECD-3912

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The identification and distribution of inclusions in derby and ingot uranium, by C. M. Schwartz and D. A. Vaughan. Battelle Memorial Inst., Columbus, Ohio. Aug 1953. Decl. Dec 1955. Contract AT(30-1)-gen-228. 25p. Order from OTS. 20 cents. BMI-272

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The effects of neutron bombardment on the electrical resistance of aluminum, beryllium and tuballoy uranium, I. Problem assignment no. 323 MLC 2302, by J. Royal. Chicago. Univ. Metallurgical Lab. Nov 1944. Decl. Jan 1956. 10p. Order from LC. Mi $1.80, ph $1.80. CC-2319

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Experiments on the evaporation of boron in vacuo. Progress report no. 1 on a phase of problem no. 132-ML-56-3, by D. D. Friel. Chicago. Univ. Metallurgical Lab. Mar 1944. Decl. Dec 1955. Contract W-7401-eng-37. 14p. Order from LC. Mi $2.40, ph $3.30. CP-1738

The thermal conductivity of uranium, by H. R. Kratz and C. H. Raeth. Chicago. Univ. Metallurgical Lab. Dec 1944. Decl. Jan 1956. Contract W-7401-eng-37. 14p. Order from LC. Mi $2.40, ph $3.30. CP-2315

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Technology research—metallurgy. Part II of report for month ending July 24, 1943. Ames Lab., Ames, Iowa. 22p. Order from LC. Mi $2.70, ph $4.80. CT-816

Temperature distribution in an aluminum sheath, by Karl Cohen and Irving Kaplan. Chicago. Univ. Metallurgical Lab. Aug 1943. Decl. Dec 1955. 20p. Order from LC. Mi $2.70, ph $4.80. CT-883

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Supersonic transmission measurements on various samples. Preliminary report, by F. A. Firestone and W. G. Langton. Michigan. Univ., Ann Arbor. Jul 1944. Decl. Dec 1955. 16p. Order from LC. Mi $2.40, ph $3.30. CT-1897

Corrosion research—tuballoy and alloys. Progress report no. 1 on problem no. 391-ML-54-4e, by J. E. Draley and G. C. English. Chicago. Univ. Metallurgical Lab. Jul 1944. Decl. Dec 1955. Contract W-7401-eng-37. 14p. Order from LC. Mi $2.40, ph $3.30. CT-1943

Air corrosion of thorium. Problem assignment no. 16, by J. G. Feibig. Ames Lab., Ames, Iowa. Mar 1945. Decl. Dec 1955. Contract W-7405-eng-82. 11p. Order from LC. Mi $2.40, ph $3.30. CT-2400

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The tuballoy-thorium binary system. Problem assignment no. 10, by O. N. Carlson and A. H. Daane. Ames Lab., Ames, Iowa. Apr 1945. Decl. Dec 1955. Contract W-7405-eng-82. 12p. Order from LC. Mi $2.40, ph $3.30. CT-2717

Progress report for month of Febraury 1945. Massachusetts Inst. of Tech., Cambridge. Mar 1945. Decl. Dec 1955. Contract W-7405-eng-175. 46p. Order from LC. Mi $3.30, ph $7.80. CT-2780

Note on attempts to prepare magnesium and calcium alloys of uranium, by D. H. Ahmann. Ames Lab., Ames, Iowa. Contract W-7405-eng-82. 4p. Order from LC. Mi $1.80, ph $1.80. CT-2959

The uranium-mercury system, by D. H. Ahmann, R. R. Baldwin, and A. S. Wilson. Ames Lab., Ames, Iowa. Oct 1945. Decl. Dec 1955. Contract W-7405-eng-82. 27p. Order from OTS. 25 cents. CT-2960

Purification of tuballoy by the thermal decomposition of tuballoy iodide. Final report on a part of P. A. no. MM 1.1, by M. Fine, A. Mendelson, and D. L. Schwartz. Chicago. Univ. Metallurgical Lab. May 1945. Decl. Dec 1955. Contract W-7401-eng-37. 13p. Order from LC. Mi $2.40, ph $3.30. CT-2965

The tuballoy-nickel phase diagram. Final report on Part I of P. A. no. 381-ML-54-3, by Frank Foote, J. R. Clark, M. Cieslicki, B. J. Nelson, and J. R. Lane. Chicago. Univ. Metallurgical Lab. May 1945. Decl. Dec 1955. Contract W-7401-eng-37. 22p. Order from LC. Mi $3, ph $6.30. CT-3013

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Progress report for November-December 1955, by R. H. Bailes, Research Dept. Dow Chemical Co. Western Div., Pittsburg, Calif. Jan 1956. Contract AT-30-1-gen-236. 28p. Order from LC. Mi $2.70, ph $4.80. DOW-138

Refractories for atomic power production, by A. H. Toepfer, L. C. Weger, M. P. Haydon, L. B. Trotter, and O. Willis. Bureau of Mines. Electrochemical Lab., Norris, Tenn. Jul 1947. Decl. Nov 1955. 14p. Order from LC. Mi $2.40, ph $3.30. ETL-1

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Refractories for atomic power production, by W. W. Galbreath, Jr. B. S. Riordan, W. D. Neely, J. L. Day, D. F. Allen, A. H. Toepfer, and J. M. Mochel. Bureau of Mines. Electrochemical Lab., Norris, Tenn. May 1948. Decl. Nov 1955. 11p. Order from LC. Mi $2.40, ph $3.30. ETL-11

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Standard operating procedure for thorium chip processing. Section 2.5.3.8, revised edition, by E. W. Mautz, O. R. Magoteaux, P. Kleinsmith, and W. B. Clymer. National Lead Co. of Ohio, Cincinnati, Ohio. Jan 1954. Decl. Dec 1955. Contract AT(30-1)-1156. 9p. Order from OTS. 15 cents. FMPC-164(Rev. 1)

An internal standard for the determination of the proportionality constant in preferred orientation studies, by Peter R. Morris. National Lead Co. of Ohio, Cincinnati. Aug 1953. Decl. Dec 1955. Contract AT(30-1)-1156. 8p. Order from LC. Mi $1.80, ph $1.80. FMPC-310

Machining of graphite for Brookhaven reactor, by C. R. Binner, Philip Miller, and K. W. Comsey. H. K. Ferguson Co., New York, N. Y. Jun 1949. Decl. Dec 1955. Contract AT-30-2-gen-16. 75p. Order from OTS. 45 cents. HKF-2

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Corrosion tests on tantalum, hastelloy C and duriron in 234-5 project solutions, by J. B. Work and W. W. Koenig. Hanford Works, Richland, Wash. Feb 1949. Decl. Dec 1955. Contract W-31-109-eng-52. 9p. Order from LC. Mi $2.40, ph $3.30. HW-12552

Austenitic welds-corrosion resistance and magnetic susceptibility, by W. W. Koenig and R. L. Heckman. Hanford Works, Richland, Wash. Mar 1949. Decl. Dec 1955. Contract W-31-109-eng-52. 3p. Order from LC. Mi $1.80, ph $1.80. HW-12637

The surface preparation of uranium for x-ray diffraction studies by the spectrometer technique, by J. H. Bach and J. B. Burnham, Jr. Hanford Works, Richland, Wash. Mar 1949. Decl. Dec 1955. 6p. Order from LC. Mi $1.80, ph $1.80. HW-12832

Life of Van Stone corrective measures, by C. W. Botsford and E. A. Eschbach. Hanford Works, Richland, Wash. Sep 1949. Decl. Dec 1955. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-14429

The development of plutonium electrodeposition methods. Interim report, by L. C. Schwendiman. Hanford Works, Richland, Wash. Mar 1950. Decl. Dec 1955. Contract W-31-109-eng-52. 31p. Order from LC. Mi $2.70, ph $4.80. HW-17096

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Dimensional stability of irradiated thorium, by J. B. Burnham and M. H. Bartz. Atomic Energy Div. Phillips Petroleum Co., Idaho Falls, Idaho. Apr 1954. Decl. Jan 1956. Contract AT(10-1)-205. 10p. Order from OTS. 15 cents. IDO-16162

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Quarterly summary research report for April, May and June 1950, by W. E. Dreeszen. Ames Lab., Ames, Iowa. Aug 1950. Decl. Jan 1956. Contract W-7405-eng-82. 37p. Order from LC. Mi $3, ph $6.30. ISC-113

Progress report in metallurgy for April 1, 1950 to September 30, 1950, by B. A. Rogers. Ames Lab., Ames, Iowa. Nov 1950. Decl. Jan 1956. Contract W-7405-eng-82. 41p. Order from LC. Mi $3, ph $6.30. ISC-128

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Phase studies of uranium-zirconium alloys, by David Peterson and H. A. Wilhelm. Ames Lab., Ames, Iowa. Dec 1950. Decl. Jan 1956. Contract W-7405-eng-82. 79p. Order from LC. Mi $4.50, ph $12.30. ISC-139

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Quarterly summary research report in metallurgy for April, May, June 1955, by Ames Laboratory Staff. Ames Lab., Ames, Iowa. Feb 1955. Contract W-7405-eng-82. 30p. Order from OTS. 25 cents. ISC-644

Corrosion of various metals in hydrofluoric-sulfuric acid solutions of synthetic Hanford waste, by H. A. Bernhardt, W. Davis, Jr., and J. R. Flanary. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Mar 1949. Decl. Dec 1955. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.40, ph $3.30. K-373

Measurements of thermal conductivity electrical resistivity and thermoelectric power of graphite, by W. W. Tyler and A. C. Wilson, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1952. Decl. Dec 1955. Contract W-31-109-eng-52. 54p. Order from LC. Mi $3, ph $6.30. KAPL-789

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Uranium alloy development, by A. U. Seybolt, C. S. Smith, and L. B. Stark. Los Alamos Scientific Lab., N. Mex. Nov 1943. Decl. Dec 1955. Contract W-7405-eng-36. 28p. Order from LC. Mi $2.70, ph $4.80. LA-42

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Production of uranium by electrolysis of fused salts, by M. Kolodney, H. L. Slatin, and A. S. Covert. Los Alamos Scientific Lab., N. Mex. Sep 1944. Decl. Dec 1955. Contract W-7405-eng-36. 18p. Order from LC. Mi $2.40, ph $3.30. LA-147

Capture and inelastic scattering in spheres of various metals, by A. O. Hanson, M. B. Fischer, S. L. Friedman, E. D. Klema, and J. H. Williams. Los Alamos Scientific Lab., N. Mex. May 1945. Decl. Dec 1955. 19p. Order from LC. Mi $2.40, ph $3.30. LA-276

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A method for the determination of traces of metals. III. Studies of the distillation of amalgams, by C. E. Bricker, N. H. Furman and Bruce McDuffie. Princeton Univ., N. J. Frick Chemical Lab. 1946. Revised Oct 1947. Decl. Dec 1955. 9p. Order from LC. Mi $1.80, ph $1.80. M-4241 (Pt. III)

Corrosion of thorium and related materials, by J. G. Feibig. Ames Lab., Ames, Iowa. (194?). Decl. Dec 1955. Contract W-7405-eng-82. Based on CC-2400 and CC-2715. 28p. Order from LC. Mi $2.70, ph $4.80. M-4585

Conductivity changes in dielectrics during 2.5 Mev x-radiation, by F. C. Armistead, J. C. Pennock, and L. W. Mead. Massachusetts Inst. of Tech., Cambridge. Aug 1949. Decl. Dec 1955. 30p. Order from LC. Mi $2.70, ph $4.80. MIT-1028

Effect of irradiation on the x-ray line shape of 2S aluminum from a Hanford water cooling tube, by J. L. Klein and W. B. Nowak. Massachusetts Inst. of Tech., Cambridge. May 1952. Decl. Dec 1955. Contract AT(30-1)-981. 24p. Order from OTS. 20 cents. MIT-1085

Corrosion testing of zirconium in water at temperatures below 600°F, by D. S. Kneppel. Massachusetts Inst. of Tech., Cambridge. Metallurgical Project. Apr 1955. Decl. Dec 1955. Contract AT(30-1)-981. 9p. Order from LC. Mi $1.80, ph $1.80. MIT-1090

A search for selective solvents of uranium nitrate from other nitrates, by William V. Ward. Massachusetts Inst. of Tech., Cambridge. Mineral Engineering Lab. Jan 1951. Decl. Dec 1955. Contract AT-30-1-gen-211. 37p. Order from LC. Mi $3, ph $6.30. MITG-244

Thermal conductivities of pressed powders. Final report, by B. Manowitz. Clinton Labs., Oak Ridge, Tenn. Sep 1946. Decl. Nov 1955. Contract W-35-058-eng-71. 15p. Order from LC. Mi $2.40, ph $3.30. MonT-164

Studies on nuclear reactors. 4. Theory of ionization and atomic displacement produced by fast particles in graphite. I. Preliminary considerations, by F. W. Brown. North American Aviation, Inc., Los Angeles. Feb 1948. Decl. Dec 1955. 29p. Order from LC. Mi $2.70, ph $4.80. NAA-SR-4

Studies of nuclear reactors. 10. Experimental method for the determination of resistivity change in graphite bombarded with deuterons and alpha particles, by C. R. Malmstrom. North American Aviation, Inc., Los Angeles. Mar 1948. Decl. Dec 1955. 15p. Order from LC. Mi $2.40, ph $3.30. NAA-SR-10

Technique of resistivity measurements on cyclotron bombarded graphite, by F. H. Gilmore, C. R. Malmstrom, and A. A. Jarrett. North American Aviation, Inc., Los Angeles, Calif. Apr 1949. Decl. Dec 1955. Contract AT-11-1-gen-8. 17p. Order from OTS. 20 cents. NAA-SR-13

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The electrical conductivity of irradiated graphite. Part I, by D. Bowen. North American Aviation, Inc., Los Angeles, Calif. Sep 1949. Decl. Dec 1955. Contract AT-11-1-gen-8. 13p. Order from OTS. 20 cents. NAA-SR-33

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Tensile strength of type EBP graphite at elevated temperatures and its relation to apparent density at room temperature, by A. F. Gorton and C. Malmstrom. North American Aviation, Inc., Los Angeles. Mar 1950. Decl. Dec 1955. 8p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-67

A new circuit for precision measurement of the Hall and magneto-resistive effects with results of observations on reactor irradiated graphite, by W. P. Eatherly and J. J. Donoghue. North American Aviation, Inc., Los Angeles. Apr 1950. Decl. Dec 1955. 33p. Order from LC. Mi $3, ph $6.30. NAA-SR-68

A program for the study of radiation effects on mechanical properties, by G. J. Dienes. North American Aviation, Inc., Downey, Calif. Jun 1950. Decl. Dec 1955. Contract AT-11-1-gen-8. 29p. Order from OTS. 25 cents. NAA-SR-71

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Radiation effects quarterly progress report for July-September 1953, by F. E. Faris, ed. North American Aviation, Inc., Downey, Calif. Apr 1944. Decl. Dec 1955. Contract AT-11-1-gen-8. 51p. Order from LC. Mi $3.30, ph $7.80. NAA-SR-286

Beryllium and beryllium oxide production and development. New York Operations Office. Special Materials Div., AEC. Nov 1949. Decl. Dec 1955. 222p. Order from LC. Mi $9.60, ph $33.30. NYO-110

An investigation into the powder metallurgy processing of zirconium di-hydride and zirconium powders prepared from zirconium crystal bar, by R. P. Angler and H. H. Hausner. Sylvania Electric Products Inc., Bayside, N. Y. Apr 1950. Decl. Dec 1955. Contract AT-30-1-gen-366. 29p. Order from LC. Mi $2.70, ph $4.80. NYO-1127

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Production of pure tuballoy metal by the hot filament method, by C. H. Prescott, Jr. and J. A. Holmes. California. Univ., Berkeley. Radiation Lab. Apr 1944. Decl. Dec 1955. 20p. Order from LC. Mi $2.70, ph $4.80. RL-4.6.260

Production of tuballoy metal by the hot filament method using TBr_4, by F. L. Reynolds and J. A. Holmes. California. Univ., Berkeley. Radiation Lab. Jun 1944. Decl. Dec 1955. 4p. Order from LC. Mi $1.80, ph $1.80. RL-4.6.265

Utilization of Florida leach zone material. Progress report for September 1952. Tennessee Valley Authority, Wilson Dam, Ala. Oct 1952. Decl. Nov 1955. 20p. Order from LC. Mi $2.40, ph $3.30. RMO-2706

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