U. S. Government

RESEARCH REPORTS

March 15, 1957
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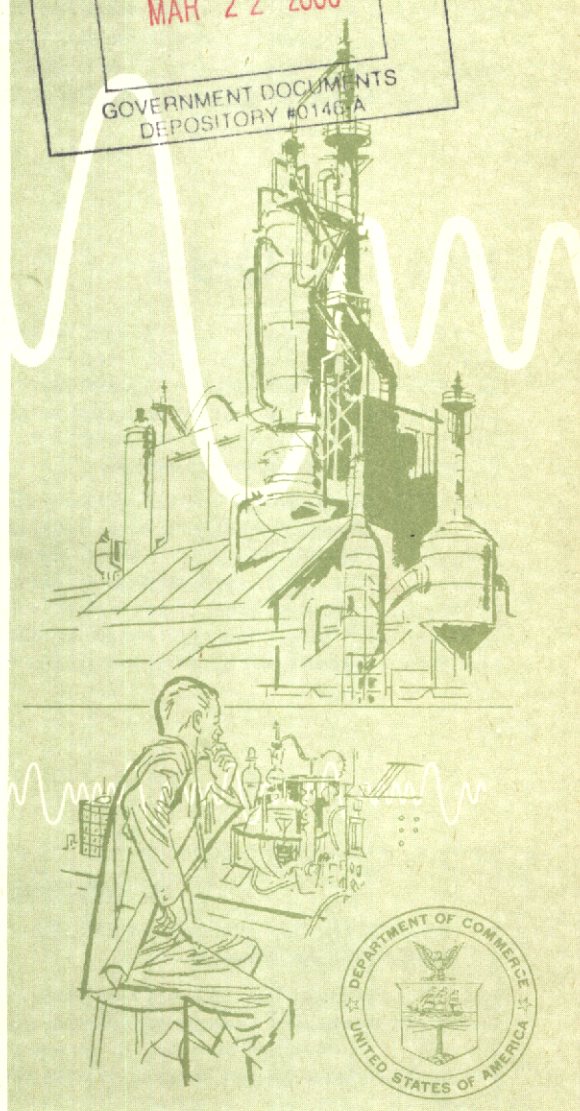

U. S. DEPARTMENT OF COMMERCE

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OFFICE OF TECHNICAL SERVICES
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U. S. Government RESEARCH REPORTS

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 27, No. 3 March 15, 1957

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Printed Reports Available from OTS Announced in This Issue

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APPAREL

Development of non-critical substitutes for wolverine fur, by Louis R. Mizell, Daniel Frishman, and Robert Saxon. U. S. Army. Quartermaster Research and Development Command. Textile, Clothing and Footwear Division, Quartermaster Research and Development Center, Natick, Mass. Sep 1956. 207p photos, drawings, diagrs, graph, tables. Order from OTS. $3.50. PB 121772

Wolverine fur has long been considered the most satisfactory material for ruffs which are attached to parka hoods to protect the wearer against the cold winds of the Arctic. The purpose of this investigation was to develop substitutes for wolverine fur which would be more plentiful, and preferably more economical, without sacrificing any of the desirable properties of this scarce and costly fur. The construction and performance of wolverine and other natural furs were examined. The performance of a large number of synthetic ruffs was compared with that of natural furs in the laboratory, in cold chambers, and under actual Arctic conditions. The most desirable type of synthetic ruff, as determined in this study, comprises a blend of polyethylene and nylon fibers, about 3 mils in diameter and 3 inches long, spaced about 900 to the square inch, interspersed with 1.7 mil, one inch long nylon fibers spaced about 8000 to the square inch. Project 7-79-10-001B. QMC TSR 92.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Coordination reactions of compounds having an acetylenic triple bond. Final report under Contract Nonr-270(00). California Institute of Technology. Gates and Crellin Laboratories of Chemistry, Pasadena, Calif. Dec 1955. 24p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 124314

Contents: I. Coordination of alkynes with silver ion, by George K. Helmkamp, F. L. Carter and T. H. Applewhite. - II. Solid complexes of silver perchlorate with alkenes, by Alan E. Comyns. - III. Solid complexes of silver salts with 2-butyne, 2-pentyne and 3-hexyne, by Alan E. Comyns. - IV. Coordination of cuprous halides with dialkyl acetylenes, by Forrest L. Carter.

Fluorobenzene: Thermodynamic properties in the solid, liquid and vapor states; a revised vibrational assignment, by D. W. Scott, J. P. McCullough, W. D. Good, J. F. Messerly, R. E. Pennington, T. C. Kincheloe, I. A. Hassenlopp, D. R. Douslin and Guy Waddington. U. S. Bureau of Mines. Petroleum Experiment Station. Thermodynamics Laboratory, Bartlesville, Okla. May 1956. 30p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 122943

AD 86592. Contribution 58.
1. Fluorobenzene - Thermodynamic properties 2. Contract CSO 630-55-47 3. AF OSR TN 56-170.

Research on boron polymers, by William L. Ruigh, Arthur D. Olin, Nathan G. Steinberg and Peter A. Van Der Meulen. Rutgers University. School of Chemistry, New Brunswick, N. J. Sep 1956. 36p photos, tables. Order from OTS. $1. PB 121718

Tri-B-β-chloroborazole has been prepared from β-chlorovinylboron dichloride and ammonia. It is unstable and in the presence of polar solvents forms either cyclic or long chain polymers. Large samples of 100 grams or more of Tri-B-b-butylborazole, hexabutylborazole, and tri-N-methyl- tri-B-n-butylborazole were prepared for evaluation.
AD 110403. Project 7340. Covers period of work from Dec 1955 through June 1956 under Contract AF 33(616)-2057. For Parts 1-3 see PB 111689, 111892 and 121374. AF WADC TR 55-26, Part 4.

Summary report of Office of Naval Research, Dept. of the Navy fellowship no. 1 & ext. (from May 1, 1951 through Jul 31, 1955) under Contract Nonr-044(02) (NR 032-401), by W. J. Kirkpatrick. Mellon Institute of Industrial Research, Pittsburgh, Pa. Aug 1955. 49p diagrs, tables. Order from OTS. $1.25. PB 121058

A study of transformation mechanisms and related phenomena to produce diamond, graphite and other carbon type materials. Based on a hydrocarbon approach to the structure of these carbons a number of true hydrocarbons are investigated and synthesized. Historical analysis of past investigations were also conducted. Carbon forming mechanisms are explored. Mellon Institute fellowship no. 350, serial no. 3137.

Synthesis and properties of cyclooctatetraene and functional derivatives, by Arthur C. Cope. Massachusetts Institute of Technology. Dept. of Chemistry, Cambridge, Mass. Sep 1954. 17p. Order from LC. Mi $2.40, ph $3.30. PB 123747

AD 70110. Period of contract Sep 2, 1947 - Sep 30, 1954.
1. Cyclooctatetraene - Derivatives 2. Cyclooctatetraene - Reactions 4. Contract N5 ori 07822, NR 356-096, Final report.

Plastics and Plasticizers

Development of 5"/54 cartridge case closing plugs. Progress report IV: Development of phenolic rubber foams as a substitute for cork, by I. Silver and A. Fisher. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1951. 35p photos, diagr, tables (part fold). Order from LC. Mi $3, ph $6.30. PB 123922

Phenolic-rubber foams were developed at NOL and fabricated into 6"/47 plugs which were successfully rammed at 0°, 90° and 120°F. Preliminary firing tests in a 40 mm. gun indicate a degree of fragmentation comparable to natural cork plugs. Unclassified 2 May 1956. NAVORD 1795.

Investigation of the preparation of acrylon rubber modifications utilizing copolymer and terpolymer systems, by B. David Halpern and Wolf Karo. Monomer-Polymer, Inc., Leominster, Mass. Jun 1956. 83p tables. Order from OTS. $2.25. PB 121441

In order to improve acrylate-acrylonitrile rubber formulations which exhibit good heat stability and fuel resistance, modifications of this system were investigated using trifluoroethyl acrylate as the major component. Copolymerization of acrylamides with trifluoroethyl acrylate gave elastomers with a number of favorable properties but with high brittle points. Attempts to improve the brittle points resulted in polymers with lower heat stability and higher volume swell. A study of trifluoroethyl acrylate-acrylonitrile copolymers was also made. Project no. 7340. Covers work done from May 1, 1954 to May 1, 1955 under Contract AF 33(616)-2461. AF WADC TR 55-206.

Performance of glass-fabric sandwich and honeycomb cores at elevated temperatures, by Vance C. Setterholm and Edward W. Kuenzi. U. S. Forest Products Laboratory, Madison, Wis. Sep 1956. 23p photos, graphs, tables. Order from OTS. 75 cents. PB 121697

This report presents the results of flatwise compression and flexure tests of heat-resistant glass-fabric honeycomb cores and sandwich after short and long periods of exposure to temperatures ranging from 75° to 700°F. Increases in test temperature produced reductions in shear strength and compressive strength of cores treated with phenolic, silicone, or heat-resistant polyester resin. Cores treated with phenolic resin were strongest

at all temperatures. Cores treated with silicone resin suffered the least reduction in strength due to increases in test temperature, but these cores were much weaker at all temperatures than cores treated with the other resins. AD 97290. Project 7340. Cover work from Feb 1953 to Oct 1955. AF WADC TR 56-119.

Plastic materials for vision devices. Formal report no. 1 under Contract no. DA-20-089-ORD-36437, by Edwin A. Swire. Armour Research Foundation, Chicago, Ill. May 1954. 38p photos, graphs. Order from CTS. $1. PB 121027

The object of the investigation described has been to find a polymer with abrasion resistance superior to that of methyl polymethacrylate and approaching that of glass. Abrasion data obtained with falling carborundum and measured by variations in surface gloss have shown that such commercial plastics as methyl alpha-chloropolyacrylate and allyl diglycol carbonate, such elastomers as methyl polyacrylate and cross-linked polyesters, and coatings of silicon monoxide satisfy these requirements. It has been proposed that model periscopes be produced for test purposes with these materials. For final report see PB 121028. ARF Proj C 054, Report no. 1.

Paints, Varnishes and Lacquers

Camouflage of submarines to avoid detection by aircraft. Preliminary report, by E. O. Hulburt and Charles Bittinger. U. S. Naval Research Laboratory. Mar 1937. 18p photos, drawings, diagr. Order from LC. Mi $2.40, ph $3.30. PB 120473

Unclassified 12 May 1955.
1. Paints, Camouflage 2. Submarines - Camouflage 3. Camouflage - Detection 4. NRL H 1350.

"Convert-a-cote" dye treatment for producing opacity in scribing coatings. U. S. Air Force. Military Air Transport Service. Air Photographic and Charting Service. Cartography Division, Aeronautical Chart and Information Center, St. Louis, Mo. Feb 1955. 6p. Order from OTS. 50 cents. PB 121729

Coated plastic scribing sheets can be successfully changed from an original color, or from translucent, to opaque black, or a choice of various colors, by treating with suitable dyes. This dye treatment can be accomplished either before or after scribing. The process has potentially important and revolutionary applications. A formula and technique for producing opaque black by this means has been developed, and is adaptable to immediate exploitation. AF ACIC TR 66.

Method for the evaluation of the polishing abrasion resistance of non-specular finishes, by Robert L. Benemelis and John M. Leonard. U. S. Naval Research Laboratory. Oct 1943. 9p photo, table. Order from LC. Mi $1.80, ph $1.80. PB 120578

1. Paints, Camouflage - Tests 2. Finishing agents - Tests 3. Polishing materials - Tests 4. NRL P 2177.

Some paint compositions applicable to camouflage of fleet aircraft, by Allen L. Alexander and Peter King. U. S. Naval Research Laboratory. Feb 1940. 28p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123314

Samples of colors included. Color will not reproduce
1. Paints, Camouflage 2. Camouflage - Optical aspects 3. Aircraft - Camouflage 4. NRL P 1593.

Vapor deposited coatings. Final report, by L. McD. Schetky, H. S. Spacil and J. Wulff. Massachusetts Institute of Technology. Dept. of Metallurgy. Metals Processing Division, Cambridge, Mass. Aug 1955. 64p photos, diagrs, graphs, tables. Order from OTS. $1.75. PB 121725

In one phase of the present work, the process of vapor deposition of molybdenum was improved by the use of helium as a carrier gas for molybdenum halide vapor, and by deposition of molybdenum on the interior of graphite tubing. A test consisting of transverse compression of a ring of vapor-deposited molybdenum was developed to determine the mechanical properties of the metal. Concurrently, the problem of obtaining fundamental information about the vapor-deposition process was considered. A satisfactory method of measuring the composition of a gas stream containing corrosive metal halide vapors was developed. A device based on this method was built, and could be applied to a vapor-deposition system. Also, the mechanism of the hydrogen reduction occuring during vapor deposition was treated theoretically, leading to useful, general results. A third phase of this work was the study of the deleterious effects of dissolved oxygen on the mechanical properties of molybdenum metal. From this and other data, a tentative Mo-O_2 phase diagram was constructed. Dept. of the Army project 593-08-024. O. O. project TB 4-161B. DIC project no. 6950. WAL 731/349-40. Contract DA 19-020-ORD-837.

Inorganic Chemicals

Boron hydrides and related compounds, by William H. Schechter, Roy M. Adams and C. B. Jackson. Callery Chemical Co. Jan 1951. 127p graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 124518

A compilation of chemical and physical data on the boron hydrides and related compounds. The report is divided into the following sections: I. The boron hydrides and their derivatives, their physical and chemical properties and structure; II. Borohydrides, including metal borohydrides; III. Related hydrides,

binary and ternary; IV. Boron-nitrogen hydrides; V. Handling of boron hydride compounds, techniques, hazards and safety precautions, storage and shipping. Unclassified Jan 7, 1957. Contract NOa(s)-10992.

Effect of time and temperature upon the growth of particles of sodium uranate slurries in molten caustic soda, by J. R. Findlay, J. N. Gregory and G. Weldrick. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 9p photos, graph, table. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 36 cents. PB 123625

S. O. code no. 91-3-2-53. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Sodium uranates - Preparation - Gt. Brit. 3. AERE C/R 1884.

Field sampling and estimation of nitrogen dioxide (U), by Albert Diener, James J. Harris, William C. Johnson and Abraham Koblin. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Mar 1956. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122593

An improved method for field sampling nitrogen dioxide is described. Utilizing 15% aqueous potassium iodide as the absorbent, nitrogen dioxide is efficiently scrubbed in a bubbler at 1-1./min. flow rate. The reagents, α-naphthylamine and sulfanilic acid, are added directly to the bubbler contents to produce the characteristic red-purple color. Interim report. Project 4-08-04-011-01. CC CRL R 548.

Fundamental studies of the lead-oxygen system. First annual summary report for period 1 Aug 1954-31 Jul 1955 under Contract Nonr-1513(00), by E. J. Ritchie. Eagle-Picher Research Laboratories, Joplin, Mo. Aug 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 123135

The major activity during the year just ended has been concerned with the attempts to correlate the published data on the crystal structure of yellow lead monoxide, with our own X-ray diffraction data, specific gravity data, thermal expansion diffraction data and data on color changes with temperature. Continuation of work performed under Contract Nonr512(00).

Heat of formation and entropy of titanium tetrachloride, by Walter F. Krieve, Alfred J. Darnell, Gerald W. Elverum, Jr., Milton Farber and David M. Mason. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Jan 1954. 17p photo, diagr, graphs, tables. Order from OTS. 50 cents. PB 121734

Direct chlorination of titanium metal appears to be one method of determining the heat of formation of $TiCl_4$. A nonflow type of constant-volume, adiabatic colorimeter bomb constructed of nickel was used, and the spontaneity of the reaction between chlorine gas and titanium metal in the form of a sponge was utilized to measure the heat of formation of $TiCl_4$. The solubility of Cl_2 in liquid $TiCl_4$ was determined in order to provide data for making small volumetric corrections for the amount of Cl_2 dissolved in the liquid phase and small thermal corrections for the heat of solution of Cl_2 in $TiCl_4$. Contract DA 04-495-Ord 18. CIT JPL 20-219.

On the crystal structure of the rare gases, by R. U. Ayres and R. H. Tredgold. Maryland. University. Physics Dept., College Park, Md. May 1956. 6p. Order from LC. Mi $1.80, ph $1.80. PB 122423

AD 87513. Technical report 39.
1. Gases, Rarefied - Crystal structure 2. Contract AF 18(600)-1015 3. AF OSR TN 56-200 4. UM TR 39.

Reaction between uranium trioxide and molten caustic soda, by J. R. Findlay, J. N. Gregory and G. Weldrick. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 10p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123600

S. O. code no. 91-3-2-35.
1. Atomic power - Research - Gt. Brit. 2. Sodium uranates - Analysis - Gt. Brit. 3. Uranium trioxide - Reactions with sodium carbonate - Gt. Brit. 4. AERE C/M 265.

Water recovery in lighter-than-air-craft; study of the properties of granular silica gel, by J. Elston Ahlberg. U. S. Naval Research Laboratory. Sep 1936. 56p photos, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122710

1. Silica gels - Adsorption 2. NRL P 1304.

Ordnance Chemicals

Specifications for tetracene, by R. T. Guthrie. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1951. 27p photos, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 123924

Tetracene was reported as a new compound in 1910, by the German chemists Hoffmann and Roth. On the basis of an elemental analysis and various chemical reactions, Hoffmann and others identified the compound as 4-guanyl-1-nitrosoamino-guanyl-1-tetrazene. The preparation of a government specification for tetracene is desirable in view of the use of tetracene in the primer program. The information in this report has been assembled to serve as the basis for such a specification. Unclassified 2 May 1956. NAVORD 2225.

Analytical Chemistry

Analysis of heavy water, by F. J. Bryant. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 19p diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents. PB 123624

S. O. code no. 91-3-2-66.
1. Atomic power - Research - Gt. Brit. 2. Water, Heavy - Analysis - Gt. Brit. 3. AERE C/R 1927.

Analysis of mixtures of Sr^{89} and Sr^{90}, by H. A. C. McKay, E. W. A. Pike and G. N. Walton. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 3p graph. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 23 cents. PB 123599

Date of manuscript: Feb 1948. S. O. code no. 91-3-2-25.
1. Atomic power - Research - Gt. Brit. 2. Strontium, Radioactive - Analysis - Gt. Brit. 3. AERE C/R 174.

Analytical methods for fission product: Tin and antimony, by G. B. Cook. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 7p drawing. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123603

Date of manuscript: Nov 1949. S. O. code no. 91-3-2-27.
1. Atomic power - Research - Gt. Brit. 2. Fission products - Separation - Gt. Brit. 3. Tin - Fission - Gt. Brit. 4. Antimony - Fission - Gt. Brit. 5. AERE C/R 24.

Chemical analysis of manganese bronze, by Harold Ravner. U. S. Naval Research Laboratory. May 1944. 18p photo, drawing, tables. Order from LC. Mi $2.40, ph $3.30. PB 120582

1. Bronze, Manganese - Analysis 2. NRL M 2341.

Determination of niobium and molybdenum in uranium ternary alloys, by G. W. C. Milner, G. A. Barnett and A. Bacon. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 15p graph, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 50 cents. PB 119653

S. O. Code no. 91-3-2-41.
1. Atomic power - Research - Gt. Brit. 2. Niobium - Determination - Gt. Brit. 3. Molybdenum - Determination - Gt. Brit. 4. Uranium alloys - Analysis - Gt. Brit. 5. AERE C/R 1805.

Rapid electrochemical method for the determination of metal chelate stability constants, by R. W. Schmid and Charles N. Reilley. North Carolina. University. Department of Chemistry, Chapel Hill, N. C. 1956. 20p diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122451

AD 87529. UNC - Chem. no. 6-CNR.
1. Chelate compounds - Chemical stability 2. Metal ions - Reaction kinetics 3. Contract AF 18(600)-1160 4. AF OSR TN 56-213.

Spectrographic determination of lithium in aluminium metal, by F. T. Birks. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 7p drawings, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123604

Date of manuscript: April 1948. S. O. code no. 91-3-2-26.
1. Atomic power - Research - Gt. Brit. 2. Lithium - Determination - Gt. Brit. 3. Aluminum - Spectrographic analysis - Gt. Brit. 4. AERE C/R 196.

Volumetric analysis of thorium-tungsten solutions, by G. W. C. Milner and G. A. Barnett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 10p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123616

S. O. code no. 91-3-2-63. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Thorium - Volumetric analysis - Gt. Brit. 3. Tungsten - Volumetric analysis - Gt. Brit. 4. AERE C/R 1865.

Volumetric determination of uranium in aluminum-uranium alloys, by A. Bacon and G. W. C. Milner. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 21p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 59 cents. PB 123617

S. O. code no. 91-3-2-50. Unclassified.
1. Atomic power - Research - Gt. Brit.
2. Aluminum-uranium alloys - Volumetric analysis - Gt. Brit. 3. AERE C/R 1813.

Chemical Engineering and Equipment

Recovery of chlorine from GB plant produced brine using Hooker type S electrolytic chlorine cells. Shell Chemical Corporation, Denver, Colo. Nov 1955. 69p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 124080

Investigation of the feasibility of electrolyzing spent caustic solutions from the Chemical Corps GB plant at the Rocky Mountain Arsenal in order to reduce the amount of saline wastes discharged from the plant and to recover caustic for reuse. Three samples of GB plant brines were analyzed and impurities identified. A process was developed for treatment to prepare a brine that appears

suitable for feed to Hooker type S electrolytic chlorine cells. A design was prepared for facilities to process sufficient GB plant brine to operate a block of cells for a 120-day test run, and expenditures for such a test were estimated. Final report under Contract no. RM6-401-596. Patent no. 2,671,734.

Miscellaneous Chemicals

Kinetics of the steam-carbon reaction, by Jesse S. Binford, Jr. and Henry Eyring. Utah. University, Salt Lake City, Utah. Jan 1956. 26p graphs, tables. Order from OTS. 75 cents. PB 121131

A description is given of an apparatus for the study of high temperature (1500°C), low pressure (1 to 100 microns) heterogeneous processes in which one or more products is a gas. The water-gas reaction has been studied in the 900° to 1300°C temperature range. Several possible mechanisms are discussed, including a surface rearrangement of adsorption sites and pre-dissociation of water vapor. Technical note XVII. AF OSR TN 56-60. Contract AF 33-(038)-20839.

Paramagnetic resonance of free radicals, by George K. Fraenkel. Columbia University. Dept. of Chemistry, New York, N. Y. May 1956. 42p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122963

The elementary principles of paramagnetic resonance absorption spectroscopy are reviewed from the point of view of the detection, identification, and estimation of free radicals. AD 88024. CU-6-56-AF-1390-Chem. Presented at the conference on "Unstable Chemical Species" under the auspices of the New York Academy of Sciences, May 15-16, 1956. AF OSR TN 56-218. Contract AF 18(600) 1390.

Phosphorescent and fluorescent material, by L. H. Dawson. U. S. Naval Research Laboratory. Dec 1956. 50p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 121541

This report is a survey of the properties and uses of phosphorescent and fluorescent materials which are of value as aids to military activity. A brief discussion is given of vision at low values of illumination and of methods of photometry and colorimetry as applied to the measurement of luminosity and color of luminous material. The characteristics of commercially obtainable phosphorescent and fluorescent material are shown. Applications of this type of material as aids to military activity are described and some possible uses are suggested. NRL R 4855.

Selected abstracts of atomic energy project unclassified report literature in the field of radiation chemistry and bibliography of the published literature, compiled by R. W. Clarke. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Order separate reports described below from BIS, giving AERE number of each part ordered.

Part I: Theory, interpretations, water and aqueous inorganic systems, (papers noted up to Dec 1955). 1956. 98p. $2.47. PB 123626

S. O. code no. 91-3-2-56.
1. Atomic power - Research - Gt. Brit. 2. Radiochemistry - Bibliography - Gt. Brit. 3. AERE C/R 1575 (1).

Part II: Organic compounds (including polymerisation reactions), (papers noted up to March 1956). Mar 1956. 226p. $5.26. PB 123627

S. O. code no. 91-3-2-57.
1. Atomic power - Research - Bibliography - Gt. Brit. 2. Radiochemistry - Bibliography - Gt. Brit. 3. Chemical compounds, Organic - Bibliography - Gt. Brit. 4. Polymerization - Reactions - Bibliography - Gt. Brit. 5. AERE C/R 1575(2).

Part III: Gaseous systems (excluding organic compounds), (papers noted up to March 1956). 1956. 60p. $1.52. PB 123628

S. O. code no. 91-3-2-58.
1. Atomic power - Research - Gt. Brit.
2. Radiochemistry - Bibliography - Gt. Brit.
3. AERE C/R 1575 (3).

Survey of the methods used to determine the dynamic mechanical properties of polymers, by Oscar R. Abolafia. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Sep 1954. 35p diagrs. Order from OTS. $1. PB 121767

A literature survey was conducted of the best methods used in determining the dynamic mechanical behavior of polymers. A general theoretical treatment of the information is given in this report by classifying the test methods: attenuation methods, resonance methods, and direct stress-strain methods. Brief comment on the various methods deals with ease of operation, degree of accuracy and precision, and cost of instrumentation. Dynamic mechanical properties are defined for this report as those determined under conditions in which the test material is subjected to sinusoidal stress or strain. Ordnance Project TB 2-0001A. Dept. of the Army Project 599-01-004. PA TR 2060.

DETERIORATION STUDIES

Climatic extremes for military equipment, by Norman Sissenwine and Arnold Court. U. S. Office of the Quartermaster General. Research and De-

velopment Division. Environmental Protection Branch. Nov 1951. 70p maps, tables (1 fold). Order from OTS. $1.75. PB 121741

Environmental conditions whose extremes may damage military equipment, or render it inoperative, are defined under seven stresses: thermal, humidity, precipitation, wind, penetration and abrasion, salt spray, and atmospheric pressure. For each of these seven stresses, the probable and practical extremes have been determined from thorough analyses or available information. Conditions are proposed (summarized in tabular form at the end of the report) for the design and evaluation of military equipment intended for use under such extremes. Unclassified Aug 10, 1956. QMC EPS 146.

ELECTRICAL MACHINERY

Communication Equipment

Instruction book: Model RCG radio receiver equipment, frequency range 0.54 to 30 mc; power supply 110 volts, single phase, 60 cycle or 110 volts, d.c.; radio receiver, type CNA-46200; loud speaker, type LS-1, and accessories. Contractor Radio Marine Corporation of America. National Co., Inc., Malden, Mass. Mar 1943. 16p photos, drawings, diagrs (part fold), tables. Order from LC. Mi $2.40, ph $3.30. PB 122607

Unclassified 1 Nov 1948.
1. RCG (Radio receiver) 2. Radio receivers - Operation 3. Contract NXss-20700.

Electronics

Analysis of lengthening of modulated repetitive pulses, by S. C. Kleene. U. S. Naval Research Laboratory. Jul 1945. 19p (1 fold) graphs. Order from LC. Mi $2.40, ph $3.30. PB 123393

Unclassified.
1. Modulation, Pulse 2. Radar - Echo lines 3. NRL R 2555.

Arbitrarily polarized antennas for X-, S-, and L-bands, by A. J. Simmons and H. N. Chait. U. S. Naval Research Laboratory. May 1952. 17p photos, diagrs, tables, graph. Order from LC. Mi $2.40, ph $3.30. PB 123146

U 22190.
1. Antennas, Paraboloid - Radiation patterns
2. Reflectors, Parabolic 3. NRL R 3985.

Considerations in the design of electronic equipment as influenced by the effect of moisture and mold growth on hook-up wire, by R. H. Luce and K. N. Mathes. Rensselaer Polytechnic Institute, Troy, N. Y. 1952. 83p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 122827

A method is presented for evaluating the DC surface resistance of hook-up wire insulations in respect to the effect of moisture and mold growth. Recommendations are made concerning selection of materials for use in the construction of electronic equipment. The principles established in respect to the effects of moisture plus mold growth on the electrical characteristics of insulation surfaces are applied to the design of electronic equipment. Part 2 written on cover. Final report for the period 9 Mar 1951-8 Aug 1952 under Contract DA 36-039-sc-5517. SC project 32-2005-34. DA proj. 3-93-00-500.

Corona discharge tube stabilization, by T. A. J. Jacques. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 17p graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 55 cents. PB 123613

Date of manuscript: April 1950. S. O. code no. 91-3-2-55.
1. Atomic power - Research - Gt. Brit. 2. Voltage - Stabilization - Gt. Brit. 3. Corona discharges - Gt. Brit. 4. AERE EL/M 42.

Correction to geometric-optical cross sections of circular cylinders and spheres, by T. T. Wu and S. I. Rubinow. Harvard University. Cruft Laboratory. Sep 1955. 46p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122354

The total scattering cross section in the short wave length limit is considered in this paper. The problems treated include diffraction of a plane electromagnetic wave by a conducting cylinder (two possible polarizations) or a conducting sphere, acoustic scattering by a rigid sphere, and quantum mechanical scattering by an impenetrable sphere. The first correction term to the geometric optics result is computed. In each case, this term is proportional to $(ka)^{-2/3}$. The constant of proportionality depends on the specific geometry. AF CRC TN 55-560. HU C L SR 3. Contract AF 19(604)-786.

Dynamic operation of magnetic amplifiers for feedback control systems, by Henry C. Bourne, Jr. and David Nitzan. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. May 1956. 41p diagrs, graph. Order from LC. Mi $3.30, ph $7.80. PB 123415

Nonlinear difference equations are derived to describe the dynamic operation of the a-c output self-saturated magnetic amplifier circuit. From these equations the block diagram representation of core and rectifier functions and the correspond-

ing transfer function are derived. Scientific report no. 1 for period 1 Mar 1956-31 May 1956 under Contract AF 19(604)-1813. UC IER Ser 60, Issue 158.

Electrical control for the limiting of maximum torque, specific application to rolling - in of small condenser tubes, by J. E. Dinger and J. O. Grantham. U. S. Naval Research Laboratory. Dec 1945. 14p photo, drawing, diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 123324

Unclassified.
1. Relays, Electronic 2. Tubes, Condenser
3. Controls, Electronic 4. NRL O-2708.

Experimental investigation of high-frequency current distributions on conducting cylinders, by Lewis Wetzel and Donald B. Brick. Harvard University. Cruft Laboratory. Dec 1955. 25p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122861

The high-frequency current distributions over several elliptic cylinders for normal, plane-wave excitation are measured at a wavelength of 3.2 cm using image-plane techniques. The result for the circular cylinder is compared with the exact theoretical current, allowing an evaluation of the experimental procedure. The experimental distributions over the elliptic cylinders are then compared with the theoretical predictions of V. Fock, yielding an estimate of the range of validity of Fock's approximation. AF CRC TN 55-974. HU CL SR 4. Contract AF 19(604)-786.

Generation, reception, and properties of damped supersonic waves, by H. L. Saxton and H. M. Trent. U. S. Naval Research Laboratory. Oct 1941. 19p drawing, diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120597

Unclassified.
1. Waves, Supersonic - Transmission - Theory
2. Sound, Underwater - Transmission 3. NRL S 1793.

Improvement of signal-to-noise ratios of the Cozi equipment. Interim status report under Contract AF 19(604) 1502. Pickard and Burns, Inc., Needham, Mass. Apr 1956. 8p diagrs. Order from LC. Mi $1.80, ph $1.80. PB 123413

P and B pub. no. 354.
1. Cozi equipment (Transmitter-receiver set)
2. Motors, Servo - Tests 3. Radio receivers - Noise 4. Radio transmitters - Noise 5. Radio - Noises 6. Contract AF 19(604)-1502, Interim report 7. AF CRC TN 56-376.

Installation and operation of Mark 4 mod. 1, serial 285 radar equipment on the USS Murphy, DD603, by Chester B. Cunningham and Louis Schlesinger. U. S. Naval Research Laboratory. May 1944. 30p. Order from LC. Mi $2.70, ph $4.80. PB 120707

Unclassified 15 Dec 1953.
1. Mark 4 (Radar) 2. Murphy (USS) - Radar
3. Radar equipment, Shipborne - Installation
4. Radar equipment, Shipborne - Operation 5. NRL R 2294.

Investigation and measurement of radio transmitting antenna systems on U.S.S. North Carolina, by Carl Christenson and Oscar Norgorden. U. S. Naval Research Laboratory. Nov 1941. 115p drawings, map, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 120675

Unclassified 15 Dec 1953.
1. North Carolina (USS) - Antenna systems
2. Antennas, Shipborne - Radiation patterns - Measurement 3. NRL R 1796.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. First quarterly report for period 1 Jul-30 Sep 1955 under Contract AF 19(604)-1419, by John Koenig. Brush Laboratories Co., Cleveland, Ohio. Sep 1955. 19p drawings, diagr. Order from LC. Mi $2.40, ph $3.30. PB 122360

In an inconel autoclave charged with ammonium chloride solution, ferric oxide and steel (tor supply of iron), spontaneously grown magnetic crystals and iron-nickel alloy crystals were obtained at about 22,000 psi and 500°C. In a steel autoclave which contained ammonium chloride and magnetite, heavy spontaneous crystallization of magnetite occurred at about 23,000 psi and 450°C. A run with sodium carbonate solution resulted in very faint spontaneous crystallization of magnetite and slight etching of the seeds at about 16,000 psi and 450°C. The use of baffles was introduced in an attempt to obtain more favorable conditions of flow and temperature distribution. The usual powdery supply material was replaced by slugs made of magnetite powder by pressing and firing. The delta ring type autoclave closure is under investigation for suitability to replace the Bridgman type which was found difficult to open and also made access to the contents of the vessel awkward. For 2d quarterly report see PB 122191. For 1st-8th and final reports under previous contract (AF 19(604)-867) see PB 112795, 114024, 114669, 115923, 116516, 117348, 117723 and 111934. AF CRC TN 55-951.

Lattice II. Final report under Contract DA 36-039-sc-42582 covering the period Aug 1, 1953 to May 31, 1956, by E. Banks. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Jun 1956. 166p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $7.80, ph $25.80. PB 124312

A study of the methods of preparation and the properties of compounds with defect lattices. A good deal of work was on the ferroelectric oxides and

their solid solutions, other oxide systems, cadmium and other selenides, and reaction products of copper, iron and sulfur. Signal Corps Project 152-B. Dept. of the Army Project 3-99-15-022.

Lovotron, a low voltage triggered gap switch, by E. H. Cullington, W. G. Chace, R. L. Morgan. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Sep 1955. 19p photos, drawing, diagr, graph, table. Order from OTS. 50 cents. PB 121061

The construction of a triggered gap switch which operates at voltages as low as 1 KV and handles currents up to 5 x 10^5 amperes is described. The switch is designed to operate on single pulses. Time jitter is of the order of 0.1 microseconds between successive pulses. Instrumentation for geophysical research, no. 5. AF CRC TR 55-227. AF GRD IGR 5.

Near-zone fields of paraboloid reflectors, by Duane G. Dalley. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Oct 1955. 80p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 123426

The investigations described deal with a determination of the field structure corresponding to the aberrations produced when the feed is displaced off the axis from the focus with the feed horn axis remaining parallel to the reflector axis. Experimental results have been compared with theoretical geometrical optic principles and with theoretical intensity patterns resulting from the theory of aberrations as developed by Nijboer. In discussing the effects of geometrical aberrations upon the intensity pattern it is shown that various types of phase variation over the aperture have the same effect upon the intensity patterns. Contract N7 onr-29529, Report 49. UC IER Ser. 60, Issue 148.

Notes on the analysis and measurement of intermediate frequency shipboard antenna systems, by Oscar Norgorden. U. S. Naval Research Laboratory. May 1941. 78p diagrs, graphs. Order from LC. Mi $4.50, ph $12.30. PB 120686

Unclassified 15 Dec 1953.
1. Antennas, Shipborne 2. Antennas, Shipborne - Resistance 3. Antennas, Shipborne - Radiation patterns 4. NRL R 1734.

On the reflection of electromagnetic waves from a dielectric cylinder, by Hans Wilhelmsson. Chalmers University of Technology, Gothenburg, Sweden. 1955. 17p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122881

It is the purpose of the present investigation to show that the general problem of the reflection of an obliquely incident plane electromagnetic wave from a dielectric cylinder can be solved exactly. This is done for the two cases with the magnetic or the electric field vector of the incident plane wave polarized perpendicularly to the dielectric cylinder. In each case both TM and TE modes will have to be considered in the scattered wave and the wave inside the dielectric cylinder. For the general case of an arbitrarily polarized plane incident wave the solution is obtained by super-position of the two separate solutions. The coupling between the modes is also studied and is shown to vanish for perpendicular incidence. Avd. Electroteknik 47. Chalmers University of Technology, Gothenburg, Sweden, Research Laboratory of Electronics. Report 35. Chalmers University of Technology, Gothenburg, Sweden. Transactions 168.

Report of correct capacitance measurement procedure on metal base shell vacuum tubes, by K. M. Soukaras. U. S. Naval Research Laboratory. Aug 1938. 26p photo, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120460

This report contains a detailed analysis of the problem, develops a theory to account for the causes of disagreement, and presents data showing most excellent agreement between theory and experiment. Finally, what is considered to be the proper method of measurement, which this report proves and advocates, is recommended for adoption. NRL R 1464.

Report on detector characteristics, by E. N. Dingley. U. S. Naval Research Laboratory. Mar 1934. 13p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120638

Unclassified.
1. Detectors - Tests 2. NRL R-1034.

Report on re-test of Model XTAJ-6 radio transmitting equipment, by John M. Coe and Oscar C. Dresser. U. S. Naval Research Laboratory. Apr 1937. 83p photos, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 120474

Unclassified 31 Aug 1955.
1. XTAJ-6 (Radio transmitter) 2. Radio transmitters - Tests 3. Radio transmitters - Performance 4. Radio transmitters - Specifications 5. NRL R 1356.

Report on test of Navy 30328 plate transformers for model GO transmitting equipment, by J. J. MacGregor. U. S. Naval Research Laboratory. Sep 1938. 23p photo, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120465

1. GO (Transmitting equipment) 2. Transformers, Plate - Tests 3. NRL R 1480.

Results of antenna measurements using model OA equipment and substitution method, by R. S.

Baldwin. U. S. Naval Research Laboratory. Apr 1934. 16p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120633

1. Antennas - Measuring equipment - Tests 2. NRL R 1048.

Scattering by a ferrite obstacle in a multimode waveguide, by Gunars Kemanis and D. J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Oct 1955. 46p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 123425

The research reported in this paper deals with ferrite behavior to higher-order modes in a rectangular waveguide. Section II discusses the representation of the microwave properties of ferrite obstacles by means of a scattering matrix. Section III consists of a detailed discussion of ferrite behavior to all rectangular waveguide modes from the point of view of reciprocity and mode conversion. Sections IV - VI present and discuss experimental results of some work with ferrite obstacles for the TE_{10} - and TE_{20} - modes. The remaining portion of this paper discusses the experimental equipment and measurement techniques. Report 48 under Contract N7 onr-29529. UC IER Series 60, Issue 147.

7/8" O.D. coaxial, ceramic insulated transmission line and fittings, by Len G. Robbins and Oscar Norgorden. U. S. Naval Research Laboratory. Dec 1941. 81p drawings, graphs. Order from LC. Mi $4.80, ph $13.80. PB 122691

Unclassified 1 Jul 1946.
1. Radio transmission lines - Installation 2. Radio transmission lines - Measurements 3. NRL R 1824.

Small signal behavior of directly heated thermistors: A study of thermistor circuits, Part 2, by N. Björk and R. Davidson. Chalmers University of Technology, Gothenburg, Sweden. 1955. 44p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122885

In Part 1 of this series an equivalent thermistor circuit for superposed current and voltage variations has been derived. In Part 2 methods are developed for the accurate determination of the linear parameters of this circuit. In order to obtain the complete data of the thermistor it is only necessary to determine its thermal time constant and three points on a static U-I-characteristic. A simple method for measuring the thermal time constant is described. Measured data for a number of thermistor types are presented. The paper results in a convenient method for the investigation of static and dynamic small amplitude problems in thermistor circuits. Applications to the analysis and synthesis of such circuits are given. Avd. Elektroteknik 48. For Part 1 see PB 117116. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 169. Acta polytechnica 186.

Spiraled coils as waveguides, by L. Brillouin. Harvard University. Cruft Laboratory, Cambridge, Mass. Mar 1947. 23p diagrs, table. Order from LC. Mi $2.70, ph $4.80. PB 123148

The discussion is based on some simplifying assumptions about the field distribution in the neighborhood of the solenoid. A simple boundary condition is used that represents an idealized case and enables a rigorous solution of Maxwells' equation in terms of a superposition of TE and TM guided waves. In this idealized case the field inside the solenoid is completely isolated from the field inside the winding. Separate solutions are found independently for both fields and there is no coupling between them. For an actual spiral these ideal conditions could not be met. HU CL TR 10. Contract N5ori-76, T. O. I.

Standard direction finder measurements. Preliminary draft III. U. S. Office of Scientific Research and Development. May 1945. 51f. Order from LC. Mi $3.60, enl pr $10.80. PB 123718

Direction finders function on two generally different principles which may be divided into those employing amplitude comparison and those employing phase comparison, or a combination of both principles. The investigation of the effectiveness of the different processes involved in reducing any of these comparative methods to practice is the subject of these measurements. Unclassifie ' Dec 17, 1954. NDRC Div. 13.1.

Study of environmental temperature and pressure effects on the plate dissipation rating of receiving tubes, by Bernhard M. Schmidt. Dayton. University. Electrical Engineering Dept., Dayton, Ohio. Dec 1955. 40p graphs, tables. Order from OTS. $1. PB 121780

Supplements Pt. 1 by additional information on: (a) Plate dissipation rating extrapolation curves for certain subminiature tube types. (b) More general curves showing constant plate temperature contours plotted on coordinates of total power input versus maximum bulb temperature. (c) Evidence showing that internal tube temperatures are not directly affected by environmental conditions. (d) An empirical method allowing the determination of the maximum bulb temperature from total power input and environmental temperature. (e) Confidence limits on maximum bulb temperature and plate temperature showing variation by manufacturer. AD 110553. Project 4156, Task 41710. Covers work from Oct 28, 1953-May 31, 1955 under Contract AF 33(616)-113. For Part 1 see PB 111575. AF WADC TR 53-433, Pt. 2.

Study of strip transmission lines, by H. S. Keen. Airborne Instruments Laboratory, Inc.,

Mineola, N. Y. Dec 1955. 89p photo, drawings, diagrs, graphs. Order from LC. Mi $4.80, ph $13.80. PB 122992

The recent rapid developments in the field of microwave design have clearly indicated the need for improved construction and design techniques in the fabrication of the more complex and cumbersome microwave structures. Strip transmission line has proved to be one of the most promising approaches to the simplification of microwave circuitry. This type of transmission line is unique from the constructional point of view, because it can be regarded as a two-dimensional medium. The entire circuitry of a system can frequently be fabricated from a single sheet of conducting material. Scientific report 2830-2. AF CRC TN 56-380. Contract AF 19(604) 780.

Test of Class I-A and II-A receiving equipments, by John H. Gough. U. S. Naval Research Laboratory. Nov 1934. 229p diagrs, graphs, tables. Order from LC. Mi $9.90, ph $34.80. PB 123759

1. Radio receivers - Tests 2. NRL R-1098.

Test of lucite loops, by R. A. Gordon. U. S. Naval Research Laboratory. Apr 1941. 31p photos, drawings, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120594

Unclassified 15 Dec 1953.
1. Radio direction finders - Loops 2. Loops - Tests 3. NRL R 1726.

Generators, Motors, Transmission

Development of subminiature high temperature capacitors. Summary report, July 1954 to Feb 1955 under Contract no. AF 33(038)-17190, supplemental agreement no. 5. Balco Research Laboratories, Newark, N. J. Mar 1955. 79p photo, diagrs, graphs, tables. Order from OTS. $2. PB 111729

This report presents the data obtained during the testing of Teflon capacitors, an analysis of that data, and a comparison of Teflon and mica units. For earlier reports on this Contract see PB109035, 107679, 108754, 109586, 108874, 107358, 108223, 112003, 112838, 113711, 114312, 114895, and 116333. Appendix I. Room-temperature characteristics of Teflon capacitors. - Appendix II. Size and volume comparison, Teflon and mica capacitors. - Appendix III. Temperature coefficient of capacitance for Teflon capacitors.

Homopolar generator for high current low voltage d.c. supply, by D. A. Watt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 31p drawings, diagrs, tables (part fold.) Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 73 cents. PB 123614

Date of manuscript: Nov 1951. S. O. code no. 91-3-2-60. Declassified edition of AERE CE/R 821. 1. Atomic power - Research - Gt. Brit. 2. Pumps, Electromagnetic - Design - Gt. Brit. 3. Generators - Brushes - Gt. Brit. 4. Generators, Direct current - Gt. Brit. 5. AERE ED/R 1843.

Liquid metal brushes, by D. A. Watt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 41p drawings, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.12. PB 123595

Date of manuscript: Nov 1951. S. O. code no. 91-3-2-43. Declassified 12 Jan 1956.
1. Atomic power - Research - Gt. Brit.
2. Generators - Brushes - Gt. Brit. 3. AERE CE/R 820.

Tentative program of the Magnetics Division, Naval Ordnance Laboratory for fiscal 1953. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1952. 15p table. Order from LC. Mi $2.40, ph $3.30. PB 120806

A summary of studies on Bismanol magnets, perminvar-type alloys, Fe-Al and Fe-Si alloy series, Sendust alloy, thin tapes made of soft magnet alloys, magnetic amplifiers, servomechanisms, and other materials and products. Unclassified. NAVORD 2568.

Transistor feedback amplifier design, by George L. Benning. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Oct 1955. 29p diagrs, graphs. Order from OTS. 75 cents. PB 121556

This report describes a method of multistage wideband transistor amplifier design incorporating constant resistance ladder networks in the external feedback path. The method described allows one to synthesize the feedback amplifier without the use of equivalent circuits for the transistors. This is done by approximating the measured amplifier gain function without feedback with a rational function of frequency and then applying unilateral feedback theory in the design of the feedback path. By use of constant resistance ladder networks in the feedback path interaction effects are eliminated. The results of some design experiments are discussed. UC IER Series 60, Issue 149. Contract N7 onr-29529.

Miscellaneous

Heat balance studies on submarine storage cells, by H. D. Crockford. North Carolina. University. Dept. of Chemistry, Chapel Hill, N. C. Jan 1935. 73p graphs, tables, diagr. Order from LC. Mi $4.50, ph $12.30. PB 120488

Heat balance studies have been made on a WLH-29 Ironclad cell to determine the magnitudes of all heating and cooling effects and to determine the effect of these magnitudes on cell temperature both in the free electrolyte above the elements and at various other locations in the cell. The studies include a complete survey of the cooling effects associated with cell ventilation. There is little temperature change from place to place in the cell during charge. The small temperature difference found in the early stages of the charge disappears when gassing sets in. This equalization in temperature parallels the equalization of gravity. Highest temperatures found are in the center of the cell. Maximum differences average about 8° Fahrenheit. NRL P-1113.

Report on submarine battery ventilation system, "open" type, by E. G. Lunn. U. S. Naval Research Laboratory. Feb 1934. 16p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122716

Unclassified 23 May 1947. Parts of this report will not reproduce well.
1. Submarines - Batteries 2. Ventilation - Submarines 3. NRL P-1023.

FUELS AND LUBRICANTS

Carbon and hydrogen content of the fuel oils in storage at the Naval Research Laboratory, by P. Borgstrom and R. D. Norton. U. S. Naval Research Laboratory. Jan 1934. 10p drawing, tables. Order from LC. Mi $1.80, ph $1.80. PB 122717

1. Oil fuel - Analysis 2. NRL P 1019.

Compatibility of greases, by F. S. Meade. U. S. Arsenal, Rock Island, Ill. Aug 1956. 67p photos, graphs, tables. Order from OTS. $1.75. PB 121737

A total of eight types of greases were tested for compatibility with each other when mixed in three different percentages. Two tests for compatibility were used, the wheel bearing performance test and the 100,000 stroke mechanical worker test. A six months static compatibility test was also made. A series of electron micrographs was made of the components of both a compatible binary grease mixture and an incompatible binary mixture, the components after a wheel bearing test, and a compatible and incompatible grease mixture after a wheel bearing test. Ordnance project no. TB5-4010A, Report no. 16. Dept. of the Army project no. 593-21-053. RIAL R 56-2405.

Flame attachment zone of laminar pre-mixed methane-air flames, by Arthur L. Thomas and Richard H. Wilhelm. Princeton University, James Forrestal Research Center. Feb 1956. 177p photos, diagrs, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 124316

The salient finding of this study is the observation that the blowoff limit of a laminar, pre-mixed hydrocarbon-air flame may be increased greatly through the introduction near the zone of flame attachment of auxiliary combustible (hydrocarbon, hydrogen) or auxiliary oxidant (oxygen). The amount of auxiliary gas introduced in close vicinity of the flame attachment zone is extremely small for the achievement of major effects in the extension of the range of gas flow for a stable flame. Technical note no. 27. AF OSR TN 56-159. Contract AF 33(038)-23976.

Investigation of silicone polymer fluids. II. Chemical and physical properties of importance in connection with their uses as lubricants or hydraulic fluids, by D. C. Atkins, H. R. Baker, Helen F. Fobes, C. M. Murphy, H. Shull, M. V. Sullivan, J. K. Wolfe and W. A. Zisman. U. S. Naval Research Laboratory. Jan 1944. 91p photos, graphs (part fold.) tables. Order from LC. Mi $5.40, ph $15.30. PB 122755

Unclassified 7-1-46.
1. Silicones - Lubricating properties 2. Fluids - Viscosity - Measurement 3. Silicones - Chemical properties 4. Silicones - Physical properties 5. NRL P 2227.

Storage characteristics and stability of safety fuels. Preliminary report, by Dan Fore. U. S. Naval Research Laboratory. Apr 1941. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 123307

1. Fuels, Aviation - Stability 2. Fuels, Aviation - Storage 3. NRL P 1719.

INSTRUMENTS

Acoustic wattmeter, by Theodore J. Schultz. Harvard University. Acoustics Research Laboratory. Nov 1954. 107p photos, diagrs, graphs. Order from LC. Mi $5.70, ph $16.80. PB 124311

The author has constructed a device which gives pointer indications of acoustic intensity over a 50 db range at any frequency between 90 and 10,000 c/s. The theory of operation of the apparatus is discussed; the design, construction and testing of the various components is described; and the report concludes with a brief account of the operation of the acoustic wattmeter as a whole. Contract N5 ori-76, T. O. IX, NR 014-903.

Apparatus for measuring rapid cooling rates, by Walter T. Haswell. U. S. Naval Research Laboratory. Jun 1946. 14p photos, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 123394

1. Cooling systems - Components 2. Steel - Cooling 3. Instruments, Measuring - Temperature 4. NRL M 2454.

Atmospheric electric field indicator, by Ross Gunn. U. S. Naval Research Laboratory. Jan 1936. 8p photo, diagr. Order from LC. Mi $1.30, ph $1.80. PB 122715

1. Atmosphere - Electricity - Measurement 2. Instruments, Aeronautical 3. NRL A 1232.

Automatic network analysis with a digital computational system, by M. Lochen and S. Y. Wong. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N. J. Aug 1955. 17p diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 122991

Project TB3-0538. Technical report 55-02.
1. Networks, Electrical - Mathematical analysis 2. Analyzers, Electronic 3. Computers, Digital - Storage systems 4. Contract DA 36-034-ORD-1646.

Design of electrical control heaters for operation with a supersonic, blow-down wind tunnel, by Raymond A. Fetter, Jr. Texas. University. Defense Research Laboratory, Austin, Tex. Jun 1956. 81p photos, drawings (part fold), diagrs, graphs, table. Order from LC. Mi $4.80, ph $13.80. PB 123115

This paper is concerned with the design and construction of an electric control heater used to maintain a constant stagnation air temperature. This heater is a component of the 6" x 6" supersonic wind tunnel constructed by the Aeromechanics Division of Defense Research Laboratory. AD 87061. Unclassified. TU DRL 382. AF OSR TN 56-188. Contract AF 18(600)-589, T. O. 17500.

Devices for damping mechanical vibrations, a bibliography, part I, by Mildred Benton. U. S. Naval Research Laboratory, Washington, D. C. Dec 1956. 101p. Order from CTS. $2.75. PB 121299

This bibliography covers the period from 1924 to Aug 1956, and includes references to periodicals and technical report literature. NRL B 10, Part I.

Digital instrumentation system developed at the Naval Ordnance Test Station, by R. L. Pitzer, J. A. DeJulio, R. A. Nielsen, H. C. Riggins, Gardner Wilson. U. S. Naval Ordnance Test Station, Inyokern, Calif. May 1954. 37p photos, diagrs. Order from LC. Mi $3, ph $6.30. PB 122614

By a quantizing process of four-state coding, the system records on film in a simple camera containing a neon-lamp bank, an optical system, and a film-pulling mechanism. A miniature recorder has been developed which meets the demand for a unit adaptable to small missiles. Various types of transducers containing digitally wound commutators convey information relating to pitch, yaw, roll, linear and angular motion, acceleration, position, voltage, and current. Special code points serve as reference points for full identification of data after intervals of unexpected missile behavior or momentary circuit difficulties. Film data are reduced to tabular form for use in plotting curves. Unclassified 19 Apr 1955. AD 70893. NAVORD 3322. NOTS 869.

Economic and design study of solar furnaces, by Robert E. De La Rue, Jr., Thomas E. Tietz and Nevin K. Hiester. Stanford Research Institute, Menlo Park, Calif. Jun 1956. 57p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122883

The primary objective of this project is to determine the feasibility of adapting a solar furnace for research on solids at high temperatures. Theoretical and practical factors which affect the specific performance characteristics and costs of solar furnaces are reviewed in detail. Features to be incorporated are discussed. A design study and cost estimate is given in Appendix A and theoretical and design considerations of a concentrator using flat-plate segments is presented in Appendix B. AD 95818. Technical report 1 (Report no. 3) is PB 124331. Report 6. Contract AF 18(600)-1499, Tech. Rept. 3. AF OSR TN 56-382. SRI Proj. CU-1410.

Eddy current type flaw detector. Sixth partial report: Application to inspection of ferrous and non-ferrous rods and tubes, by J. E. Dinger. U. S. Naval Research Laboratory. Mar 1944. 19p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122754

For 2nd and 5th reports see PB 98796 and PB 120537.
1. Detectors, Magnetic 2. Metals, Ferrous - Inspection 3. Metals, Non-ferrous - Inspection 4. NRL O 2256.

8.2 cm solar receiver and heliostat, by M. H. Cohen. Cornell University. School of Electrical Engineering, Ithaca, N. Y. Jul 1956. 24p photo, drawings, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 123083

A heliostat designed for use with an 8 foot paraboloid for monitoring solar noise is described. Several new components for the 8.2 cm receiver are described. Representative drift curves of the sun at 8.2 cm are shown. Research report EE 297. Contract AF 19(604)-73, Scientific report 6.

Electronic apparatus for accurate measurement of periodic strains, by G. V. A. Gustafsson and Carl Olof Olsson. Flygtekniska Försöksanstalten (FFA), Stockholm. Jan 1956. 13p photos, drawings, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122871

An electronic apparatus is described which will accurately measure the static value as well as the extreme values of a periodically varying phenomenon. It is especially adapted for measuring strains and loads in fatigue testing. FFA 63.

High temperature adiabatic calorimeter and the specific heat of uranium between 100° and 800°C, by J. M. North. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 21p diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 64 cents. PB 123597

Date of manuscript: Sep 1952. S. O. code no. 91-3-2-37.
1. Atomic power - Research - Gt. Brit. 2. Uranium - Calorimetric determination - Gt. Brit. 3. Calorimeters - Design - Gt. Brit. 4. AERE M/R 1016.

Investigation of silicon photoconductive cells. Final report, by G. K. Teal. Bell Telephone Laboratories, Inc., New York. Jan 1945. 31f diagrs (part fold) tables. Order from LC. Mi $3, enl pr $7.80. PB 123900

Large area silicon photocells were prepared by thermal decomposition of silicon tetrachloride vapor in a hydrogen atmosphere on ceramic surfaces. These were very stable, had satisfactorily low noise, excellent response in the presence of background radiation, and better frequency response than thallous sulfide cells, but with much lower responsivity under conditions representing normal use than thallous sulfide cells. Declassified. Covers period of work 15 Oct 1943-31 Mar 1944. Contract OEMsr-1213. OSRD 5172. NDRC 16.4-37.

Linear lumped parameter analysis of synchros. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, by J. H. Rosenbloom. Feb 1951. 51p diagrs, tables. Mi $3.60, ph $9.30. PB 120921

In a linear lumped parameter analysis, the action of synchros is completely defined in terms of their impedances and a single-frequency voltage source. The impedances are Fourier series in terms of the angular position of the rotor. Necessary and sufficient conditions for an errorless synchro control system and formulae for the error of an individual synchro are derived in terms of the impedances. An elementary introduction to matrix and tensor analysis to the extent required to develop these results is also included. Parts 4 and 6 are NAVORD 2173 and 2346. NAVORD 1710.

Part II: Null voltages in control systems, by G. H. Weiss and J. H. Rosenbloom. Jan 1953. 46p diagrs, tables. Mi $3.30, ph $7.80. PB 120852

The major result of this report is a formula for null voltage of a synchro control system, consisting of a transmitter and transformer, in terms of its impedances. The approach is an extension of the matrix and tensor methods of Part I which were there applied to the error of control systems. It is found that the error and null voltage (more precisely, the null voltage ratio) are conjugate parts of the same complex function of the impedances. NAVORD 2260.

Part III: Effects of loads on synchro accuracy, by B. D. Fried and J. H. Rosenbloom. Jun 1952. 39p diagrs, tables. Mi $3, ph $6.30. PB 120947

The analysis of the accuracy of synchros as presented in NAVORD Report 1710 is extended to include the effects of arbitrary, passive, linear, 3-terminal networks connected in parallel to a synchro system. The additional inaccuracy of a control system caused by such loads is given as an explicit function of the load impedances and a single impedance of the transmitter. Application of the formulae to long cables is also noted. NAVORD 2172.

Part V: Systems containing control synchros, by G. H. Weiss and J. H. Rosenbloom. Jul 1953. 51p diagrs. Mi $3.60, ph $9.30. PB 120836

In this report a number of situations encountered in practice are considered: with a simple control system as a base one adds a load to the transformer rotor, n wyes in parallel, a load in parallel consisting of n transformers with loaded rotors, etc. All of these cases are solved by a single technique: reduction of the given problem to one studied in previous reports by means of equivalent circuits. NAVORD 2570.

Part VIII: Simple differential control systems, by G. H. Weiss and J. H. Rosenbloom. Dec 1953. 61p diagrs, tables. Mi $3.90, ph $10.80. PB 120835

This report applies the methods and results of reports I-IV of this series to treat the control differential system. The major result is the formula for the accuracy function in terms of impedances. Also developed in this report is a formula for the voltage gradient, and an evaluation of the specification testing of the accuracy of differentials. NAVORD 2569.

Part IX: Effect of angular velocity on a simple control system. Feb 1954. 21p diagrs, graphs. Mi $2.70, ph $4.80. PB 120990

It is the purpose of this report to examine the effects of constant angular velocity on the operation of a basic system consisting of a transmitter and a control transformer. The method of analysis is the Kron method as reported in parts I-VIII, using the Park transformation. The specific aim of this report is to find a formula for the output voltage of a control transformer in a rotating system as a function of the angular velocity and the angle of separation of the rotors. NAVORD 3633.

Magnetic flaw detector. First partial report: Rotating-magnet type of flaw detector, by John Sweer. U. S. Naval Research Laboratory. Oct 1940. 24p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123315

1. Metals - Flaws - Detecting equipment 2. Detectors, Magnetic 3. NRL O-1656.

Permalloy strip magnetometer for fields of 5 to 120 oersteds, by D. A. Gray. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 12p drawings, diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 123621

S. O. code no. 91-3-2-72.
1. Atomic power - Research - Gt. Brit. 2. Magnetometers - Design - Gt. Brit. 3. Magnetometers - Performance - Gt. Brit. 4. AERE GP/R 1937.

Portable self-contained air sampler for emergency use, by R. F. Hounam. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 7p photo, graph, table. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123610

Date of manuscript: Sep 1954. S. O. code no. 91-3-2-52.
1. Atomic power - Research - Gt. Brit. 2. Air - Sampling equipment - Design - Gt. Brit. 3. AERE HP/M89.

Proposed solar radio interferometer, by S. J. Goldstein. Harvard University. Harvard College Observatory. Solar Dept. 1956. 12p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122993

This paper is a description of a wide-band interferometer which will be located at Fort Davis, Texas. It will use two antennas separated by 1000 meters on an east-west line and will accept signals in the frequency range 100-160 mc/sec. The "directivity pattern" of the instrument for a point source with a flat spectrum is a single strip 40 degrees by 2 minutes. The strip will be swept back and forth across the solar disc once per second. The instrument is designed to obtain measurements of one coordinate (approximately hour angle) of the position, and thus one component of the velocity of solar disturbances. It will operate in conjunction with a dynamic spectrum analyzer, so that spectra of the disturbances are simultaneously available. The wide-band interferometer will also provide, with the aid of data from the spectrum analyzer, information on the angular extent of the emitting regions. These measurements can be made several times, when the source has a life of only a few seconds. Scientific report 1. AF CRC TN 56-454.

Report on dehumidification of air for submarines and closed spaces in ships: Design of hoppers for calcium chloride or other desiccants, by J. O. Clayton. U. S. Naval Research Laboratory. Aug 1936. 19p drawings, tables. Order from LC. Mi $2.40, ph $3.30. PB 122706

Continuation of NRL P-1234 and P-1277.
1. Submarines - Air conditioning 2. Air conditioning - Equipment - Design 4. NRL P-1292.

Scintillation counters for radiation instrumentation. Final report under Contract NObsr 42460, for the period Jul 1, 1948 to Dec 15, 1951, by P. W. Davison, M. W. Green, M. H. Greenblatt, G. A. Morton, K. W. Robinson and A. L. Solomon. Radio Corporation of America. RCA Laboratories, Princeton, N. J. Dec 1951. 145f diagrs, graphs, tables. Order from LC. Mi $7.20, enl pr $24.30. PB 124255

The work described in this report covers an investigation of scintillation counters for survey and monitor type radiation instruments. Section I considers the fundamental aspects of scintillation counting. The properties of the crystal necessary for the detection of various types of radiation are discussed together with the requirements placed on the photomultiplier. Section II describes a scintillation counter for alpha particle detection. Sections III-V take up the scintillation counter for gamma ray detection. Section VI discusses in some detail the work done on phosphor crystals to be used for gamma ray detection. Inorganic, organic, liquid and plastic phoshpors are described and given preliminary evaluation.

Single phase annular induction pump for liquid metals, by D. A. Watt. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 44p diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.16. PB 123596

Date of manuscript: Jan 1953. Declassified edition of AERE CE/R 1090. Declassified 17 Jan 1956.
S. O. code no. 91-3-2-42.
1. Atomic power - Research - Gt. Brit. 2. Pumps, Induction - Characteristics - Gt. Brit. 3. Metals, Liquid - Circulation systems - Gt. Brit. 4. AERE ED/R 1844.

Test apparatus for ferroelectric memory condensers, by Charles F. Pulvari. Catholic University of America, Washington, D. C. Dec 1955. 29p photos, diagrs. Order from OTS. 75 cents. PB 121204

The principal steps in testing bistable ferroelectric condensers are the determination of (a) switching characteristics, (b) optimum switching pulse amplitude assuming a given switching pulse ratio, and (c) selection index using the optimum switching pulse amplitude. In order to facilitate development of bistable storage condensers with improved characteristics, a test apparatus was designed and constructed which permits a quick determination of the above stated characteristics reflecting the practical applicability of the developed ferroelectric dielectric in a condenser structure. This technical note presents specifications and design details of the apparatus as well as some characteristic data obtained from ferroelectric sample condensers. Contract AF 33(616)-2934. AF WADC TN 55-748.

Test of "Agastat" time delay relay, by R. B. Meyer and R. A. Gordon. U. S. Naval Research Laboratory. Feb 1934. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 122719

Unclassified.
1. Agastat (Relay) 2. Relays, Time delay - Tests 3. NRL R-1025.

Test of "Agastat" time delay relay and comparison with type "PQ" time delay relay, by R. B. Meyer O. C. Dresser. U. S. Naval Research Laboratory. Nov 1933. 14p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122726

1. Agastat (Relay) 2. PQ (Relay) 3. Relays, Time delay - Tests

Test on dummy log equipment, type DL 40, submitted by Friez Instrument Division, Bendix Aviation Corporation, Baltimore, Maryland, by P. H. Roeser. U. S. Naval Research Laboratory. May 1944. 32p photos, tables. Order from LC. Mi $3, ph $6.30. PB 120585

Unclassified 15 Dec 1953.
1. DL-40 (Dummy log) 2. Logs, Marine - Tests 3. Distance measuring equipment - Tests 4. Speed - Measuring equipment - Tests 5. NRL B 2283.

Theoretical calculation on best smoothing of position data for gunnery prediction, by R. S. Phillips and P. R. Weiss. Massachusetts Institute of Technology. Radiation Laboratory, Cambridge, Mass. Feb 1944. 38p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 124209

A criterion for the best type of smoothing of position data for gunnery prediction is established on the basis of radar tracking data. This is used to obtain smoothing functions which give the best prediction. The maneuverability of the target demands a fast predicting mechanism. For this reason the smoothing functions are made to operate over intervals of time of the order of 20 or 30 secs. The sensitivity of the prediction error to variations in the smoothing function and change in the statistics of the noise is investigated. From this the design criteria for the smoothing networks are found. A final section is devoted to the realization of a simple network for the smoothing suitable for a regenerative tracking unit. Unclassified 12-17-54. MIT Rad Lab 532. NDRC Div. 14. Contract OEMsr 262.

Theoretical considerations on performance characteristics of solar furnaces, by Eugene Loh, Pol Duwez, Nevin K. Hiester and Thomas E. Tietz. Stanford Research Institute, Menlo Park, Calif. Jan 1956. 31p diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 124331

The primary objective of this project is to determine the feasibility of adapting a solar furnace for research on solids at high temperatures. This report presents the results of a theoretical analysis of the parabolic-type solar furnace. Calculations of the heat flux and the maximum temperature obtainable at the focus are presented for furnaces of different diameter-to-focal-length ratios. The analysis is extended to the CIT lens-type furnace. AD 81521. Report no. 3. For Report no. 6 see PB 122883. Technical report no. I. Part of this report is in Mechanical Engineering, Oct 1956. Also submitted to Jet Propulsion. SRI Proj CU-1410, Report no. 3. AF OSR TN 56-69. Contract 18(600)-1499.

Theory, design, and performance of a 420 kw electrical heater for automatic control of stagnation temperature in a blow-down wind tunnel, by William H. Hartwig. Texas. University. Defense Research Laboratory, Austin, Texas. Jun 1956. 100p photos, drawings, diagrs, graphs. Order from LC. Mi $5.40, ph $15.30. PB 123081

This paper is concerned with the design, theory and performance of a 420 kw electric heater with feedback control. It maintains stagnation temperature constant in a 6" x 6" supersonic wind tunnel. The system is characterised by a high speed of response and low absolute error. It uses ignition tubes to control current in a 3 phase, 440 volt circuit. A stable system with a maximum error of 3^{o}F has been achieved, with a design limit of 1400^{o}F. Unclassified. AD 86584. TU DRL 383. AF OSR TN 56-163. Contract AF 18(600)-589, Task 17500.

Theory of the behavior of bolometers cooled by gaseous conduction, by V. W. Meyers, W. D. Walker and H. S. Stewart. U. S. Naval Research Laboratory. Aug 1946. 55p diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 122757

1. Bolometers - Cooling - Theory 2. NRL H 2812.

Theory of the ideal A. C. conduction pump, by W. Murgatroyd. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 18p diagr, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 123615

Date of manuscript: Dec 1954. S. O. code no. 91-3-2-39.
1. Atomic power - Research - Gt. Brit. 2. Pumps, Conduction - Theory - Gt. Brit. 3. AERE ED/R 1566.

Use of Hollerith computing machines in spectroscopic term analysis, by L. F. H. Bovey and C. W. Nott. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 14p diagr, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 46 cents. PB 123594

Date of manuscript: April 1954. S. O. code no. 91-3-2-40.
1. Atomic power - Research - Gt. Brit. 2. Hollerith machines - Gt. Brit. 3. Spectroscopy - Gt. Brit. 4. AERE C/R 1334.

MEDICAL RESEARCH AND PRACTICE

Biological and medical aspects of ionizing radiation: Spinal reflex activity and local x-irradiation, by Eugene B. Konecci and M. B. Danford. U. S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Texas. Sep 1956. 10p. Order from OTS. 50 cents. PB 121822

The normal rat tail withdrawal reflex was determined by a water bath stimulus. The effect of irradiation of the local spinal cord (T-9) and of the distal 3 inches of the tail on the tail reflex was studied. In the local tail irradiated animals some variation in response time was observed but the response never disappeared. Spinal cord damage was not direct. Edema at the locus of irradiation indicated blood vessel damage; the surrounding muscles showed numerous petechiae. AF SAM R 56-90.

Cardiac reflex to tones of threshold intensity, by David Zeaman and Norma Wegner. Connecticut. University, Storrs, Conn. Jul 1955. 10p graphs. Order from LC. Mi $1.80, ph $1.80. PB 123053

The over-all plan of this experiment was simply to measure the human cardiac reflex to auditory stimulation at three widely separated intensity levels: threshold level, above threshold, and below threshold. Four experienced psychophysical observers were employed as subjects. Contract Nonr-631(00), Technical report 13.

Expansion of the visual form field by perimeter training, by C. W. Crannell and J. M. Christensen. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1955. 39p photo, diagrs, graphs, tables. Order from OTS. $1. PB 121392

The present investigation was concerned with the effect of various amounts of perimetric training on the visual form field. Five groups were used: a control group which received no training, and four groups which received, respectively, 10, 20, 30 and 40 half-hour sessions of training. As in a previous experiment, there was considerable improvement in ability to identify familiar stimuli presented farther and farther from the foveal area, but no evidence of transfer to other stimuli. Project no. 7186. For earlier report see PB 111890. AF WADC TR 55-368. Contract AF 18-(600)-25.

In-flight studies of hyperventilation, by Bruno Balke, J. Gordon Wells and Robert T. Clark, Jr. U. S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Texas. Jun 1956. 10p photo, graphs, tables. Order from OTS. 50 cents. PB 121825

Unexplained jet aircraft accidents called for experimental investigations of some physiologic factors possibly leading to a pilot's incapacity for safe flying. Besides hypoxia, which, as is well known, occurs occasionally because of faults in the oxygen supplying system during flights at high altitude, hyperventilation was suspected of being a possible cause for a critical deterioration of flying performance. In laboratory experiments a progressive decrease of psychomotor performance was demonstrated when human subjects were exposed to passive hyperventilation. AF SAM R 56-69.

Measurement of radio-activity in the human body by NaI-Ti scintillation counters, by R. B. Owen. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 12p diagrs, graphs, table. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 45 cents. PB 123612

S. O. code no. 91-3-2-51.
1. Atomic power - Research - Gt. Brit. 2. Radioactivity - Measurements - Gt. Brit. 3. Detectors, Scintillation - Performance - Gt. Brit. 4. AERE EL/R 1851.

Neurological mechanisms in epilepsy, by José M. R. Delgado. Yale University. School of Medicine, New Haven, Conn. Jul 1955. 5p. Order from LC. Mi $1.80, ph $1.80. PB 123054

Proposal for renewal of contract and abstract of results.
1. Epilepsy - Research 2. Neurology 3. Contract SAR/Nonr-609(08), NR 113-320.

Occurrence of Salmonella and Shigella organisms in monkeys transported from India to Randolph Air Force Base, by Anna C. Garner and Carlos Morales. U. S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Texas. Sep 1956. 5p table. Order from OTS. 50 cents. PB 121823

An examination for enteric pathogens was made on 500 monkeys transported by air from India to Randolph Air Force Base. Three hundred three animals were found to be infected with Shigella and/or Salmonella organisms. AF SAM R 56-140.

Radiological health handbook, compiled and edited by Simon Kinsman and others. U. S. Public Health Service. Radiological Health Training Section. Sanitary Engineering Center, Cincinnati, Ohio. Jan 1957. 355p diagrs, graphs, tables (1 fold). Order from OTS. $3.75. PB 121784

Contents: Sec. I. Physical, chemical and mathematical data. - Sec. II. Table of isotopes, by J. M. Hollander, I. Perlman and G. T. Sedborg. - Sec. III. Radioisotope, decay, and radioassay data. - Sec. IV. Radiation protection data. - Sec. V. Glossary. - Sec. VI. Index.

Research on the mechanism of phosphatase inhibitors in caries prevention. Final report, by Henry M. Leicester. College of Physicians and Surgeons, San Francisco, Calif. Jun 1954. 4p tables. Order from LC. Mi $1.80, ph $1.80. PB 123050

Period of contract: 1 Sep 1952-30 Jun 1954.
1. Teeth - Caries - Research 2. Inhibitors, Phosphatase 3. Radioberyllium - Physiological effects 4. Contract Nonr-975(00), NR 180-023.

Study of perimeter training with diversified stimuli, by C. W. Drannell and J. M. Christensen. Miami University, Oxford, Ohio. Jun 1956. 21p graphs, tables. Order from OTS. 75 cents. PB 121521

In the present experiment an attempt was made to control subjects' learning to respond to the unique qualities of stimuli by including a greater diversity of stimuli. In addition, the effect of training predominantly one eye was investigated. There was no evidence of transfer to stimuli different from the training stimuli; in fact, the results support the writers' earlier contention that much, if not all, of the improvement on training stimuli in the first two experiments was due to the subjects learning to respond to reduced cues. No differences in results could be traced to the proportion of training administered to each eye. No evidence was adduced to support the contention that improvement would follow a period of "setting in" of the training effects.

Project 7186. For previous reports on this project see PB 111890 and 121392. AF WADC TR 56-63. Contract 18(600)-25. Contract AF 33(616)-2844.

METALS AND METAL PRODUCTS

Aging in iron and steel, by C. W. Briggs and R. A. Gezelius. U. S. Naval Research Laboratory. Dec 1936. 68p drawing, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120643

1. Iron - Aging 2. Steel - Aging 3. NRL M 1329.

Analysis and laboratory examination of aircraft parts which failed by delayed cracking, by H. A. Robinson and P. D. Frost. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Oct 1955. 31p photos, tables. Order from LC. Mi $3, ph $6.30. PB 124567

Forty-eight parts formed from Ti-8Mn sheet were submitted by four airframe fabricators. All parts had failed, presumably by delayed cracking, in or near high-stress areas, such as bends, dimples, and surface flaws. These parts were given an exhaustive examination to determine the cause of failure. With one exception, the parts contained enough hydrogen to explain the failure as strain aging in regions of high stress. However, other factors, notably manganese content, microscopic and macroscopic structural defects, and degree of stress relief, were found to correlate with failures in such a way as to indicate a strong influence on the failures. BMI TML R 18.

Austempering of STS armor plate, by Blake M. Loring. U. S. Naval Research Laboratory. Mar 1941. 25p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123304

1. Armor plate - Hardness tests 2. NRL M 1708.

Beta transformation in titanium alloys, by F. C. Holden and R. I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Dec 1955. 146p photos, diagr, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 124570

A survey has been made of the literature on the four types of beta transformation encountered in alpha-beta Ti alloys. The present state of knowledge regarding the mechanism and reaction kinetics of these transformations has been summarized in the text and a considerable amount of experimental data are included in the appendixes. The relationships existing between these transformations and the problems of heat treatment and thermal stability of Ti alloys are discussed. BMI TML R 25.

Brazing and soldering of titanium, by W. J. Lewis, G. E. Faulkner and F. J. Rieppel. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jun 1956. 28p tables. Order from OTS. 75 cents. PB 121616

This report is a summary of the information in published literature and in government research reports on the brazing and soldering of titanium. The report includes a discussion of brazing and soldering procedures and also the properties of joints brazed with commercial and experimental filler metals. BMI TML R 45.

Calculation of the tensile strength of slowly cooled steels from the chemical composition, by Irvin R. Kramor and Paul D. Gorsuch. U. S. Naval Research Laboratory. Aug 1943. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120577

1. Steel - Hardenability 2. Steel - Tensile properties 3. Steel alloys - Hardenability 4. NRL M 2150.

Chromizing of steels. Partial report, by I. R. Kramer and R. H. Hafner, Jr. U. S. Naval Research Laboratory. Dec 1941. 15p photos, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122690

1. Steel alloys - Chromizing - Research 2. NRL M 1822.

Corrosion and erosion of nickel by molten caustic soda and sodium uranate suspensions under dynamic conditions, by J. N. Gregory, N. Hodge and J. V. G. Iredale. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 23p photos, drawing, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 77 cents. PB 123618

S. O. code no. 91-3-2-62. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Nickel - Corrosion tests - Gt. Brit. 3. AERE C/M 273.

Department of Defense titanium sheet-rolling program, by W. J. Harris, Jr. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jun 1956. 30p tables. Order from OTS. 75 cents. PB 121617

The Laboratory was requested to prepare a general outline of a program of government sponsorship to complete development of proposed titanium alloys for use in high-performance aircraft. This report summarizes the objectives and the technical goals of the program. BMI TML R 46.

Development of titanium powder production. Final report, by Alan J. Hatch, Edward P. Weber and Arthur D. Schwope. Clevite Research Center, Cleveland, Ohio. Sep 1955. 44p photos, diagr, tables. Order from OTS. $1.25. PB 121766

6% Al-4% V-90% Ti alloy has been synthesized by powder metallurgical methods. Strength properties of the hot pressed alloy have been achieved which are comparable to arc melted and mechanically worked bar stock. Relatively fine titanium master alloy powders can be produced, suitable for powder metallurgical application, by ball milling in an inert atmosphere. Titanium master alloy powders have been successfully hydrided for very rapid commutation. Approximately the same interstitial impurity level was maintained for the hydrided and ball milled, master alloy as compared to the ball milled master alloy. Final report DA 33-019-ORD-14. WALR 401/120-24.

Diffusion of interstitial and substitutional elements in titanium, by J. E. Reynolds and R. I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Oct 1955. 29p graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 124568

The self-diffusion of titanium has not been determined, but the activation energy for this process has been estimated to be 77,000 cal/mol. Diffusion data are available for carbon, oxygen, nitrogen, and hydrogen in alpha titanium and beta titanium. Additional interstitial diffusion data have been obtained in an air-contamination study of three commercial titanium alloys. Data on substitutional diffusion are meager, but some information is available on chromium, molybdenum, iron, and zirconium diffusion in titanium. The theoretical and practical uses of diffusion data in general are reviewed. Appendix A. Limitations of the radioactive tracer method for determining diffusion coefficients. BMI TML R 21.

Discussion of the design of riveted and bolted joints in titanium sheet, by S. A. Gordon. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Feb 1956. 31p graphs, tables. Order from OTS. $1. PB 121611

A survey of the literature on the subject disclosed no data on joints at elevated temperature, but some data on joints at room temperature were available. In order to provide some basis for estimating the behavior of joints at elevated temperature, design data on sheet, including shear and bearing values at elevated temperatures, are presented. BMI TML R 35.

Effect of heat treatment upon lamination detector readings, by Kenneth C. Ripley. U. S. Naval Research Laboratory. Aug 1938. 7p graphs. Order from LC. Mi $1.80, ph $1.80. PB 120461

1. Steel plates - Defects - Determination 2. NRL M 1468.

Effect of hydrogen on the properties of titanium and titanium alloys, by G. A. Lenning and R. I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Dec

1955. 111p photos, graphs, tables. Order from OTS. $3. PB 121607

The effect of hydrogen on mechanical properties of titanium materials is somewhat unique in that two fundamentally different types of embrittlement have been observed. The first type of embrittlement has been shown to be a classical transition behavior in which the precipitation of the brittle hydride phase increases the sensitivity to high testing speeds and notches. The second type of embrittlement has been shown to occur through a strain-aging mechanism. This embrittlement becomes most severe at slow testing speeds and low temperatures. BMI TML R 27.

Effects of interstitial contaminants on the notch-tensile properties of titanium and titanium alloys. Part II: Alloy titanium, by E. P. Klier and N. J. Feola. Syracuse. University, Syracuse, N. Y. Aug 1956. 202p photos, diagr, graphs, tables. Order from OTS. $5.50. PB 121575

The notch-tensile properties of alloy titanium contaminated with oxygen, nitrogen and carbon have been determined. In all, six alloys have been studied and the effects of the various contaminants on the notch sensitivity have been presented in discussion of the results for each alloy. Notch sensitivity has been shown to depend on the tensile strength, and becomes potentially severe as the strength exceeds about 150,000 psi. Metallographic structure and alloy content also profoundly affect notch sensitivity in these alloys. The effects of testing temperature, contamination level, and strain rate on promoting notch sensitivity in the respective alloys are also discussed. AD 97199. Covers work from 15 Nov 1953-1 Oct 1955 under Contract AF 33-(616)-2281. For Part 1 see PB 121335. AF WADC TR 55-325, Part 2.

Electron transport properties of dilute binary magnesium alloys, by Edward I. Salkovitz, Albert I. Schindler, and Erwin W. Kammer. U. S. Naval Research Laboratory. Dec 1956. 19p diagr, graphs, tables. Order from CTS. 50 cents. PB 121581

Unusual lattice parameter behavior in dilute binary magnesium alloys has been observed by Raynor and others, and has been attributed to a Brillouin zone overlap phenomenon suggested by H. Jones. The primary purpose of this paper is to show that if the overlap model is even only qualitatively correct, measurements of electron transport properties should be sensitive to electron overlap. Such measurements have been made on the resistivity, temperature variation of resistivity, Hall coefficient, and thermoelectric power. Monovalent and divalent additions to magnesium are found to cause the Hall coefficient and thermoelectric power to vary monotonically with composition, but trivalent and quadrivalent additions cause these measurements to go through extrema associated with the zone overlap. NRL R 4865.

Engineering properties of precipitation-hardenable stainless steels, by D. B. Roach and A. M. Hall. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jul 1956. 87p graphs, tables. Order from OTS. $2.25. PB 121618

The mechanical and physical properties, as well as the engineering and production characteristics, of the four principal age-hardening stainless steels are reported. These steels carry the trade designation 17-7PH, 17-4PH, Stainless W, and AM 350. The data reported were supplied by the producers. Included are compositions, production practice, heat treatment, engineering properties, availability, forming characteristics, and information on brazing and welding. BMI TML R 48.

Evaluation of compression-testing techniques for determining elevated-temperature properties of titanium sheet, by Walter S. Hyler. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jun 1956. 73p photos, diagrs, graphs, tables. Order from OTS. $2. PB 121615

This report presents an evaluation of elevated-temperature compression-testing techniques currently used for obtaining design data on titanium sheet. Data and techniques were analyzed to determine suitable equipment and experimental technique for obtaining reliable compressive properties. Recommendations are made concerning certain features of a compression-test procedure and equipment associated with such tests. BMI TML R 43.

Forming of titanium and titanium alloys. Vol. 2, by W. P. Achbach. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. May 1956. 175p photos, drawings, diagrs, tables. Order from OTS. $4.50. PB 121614

Vol. 2 is Appendices only. Contents: Appendix A. Typical process specifications applicable to titanium and its alloys. - Appendix B. Forming of titanium sheet - questionaires. - Appendix C. List of Government research projects related to the forming of titanium and its alloys. BMI TML R 42, Vol. 2.

Formability tests on titanium alloy sheet, by L. R. Jackson. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jul 1955. 25p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124565

A discussion of the properties of Ti alloy sheet and their effect on formability is presented. BMI TML R 12.

Fumeless dissolving of uranium, by G. L. Miles. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 9p diagr, tables.

Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123602

Date of manuscript: Jan 1949. Declassified (with amendments) Oct 1955. S. C. code no. 91-3-2-33. Revised version of AERE C/R 298.
1. Atomic power - Research - Gt. Brit. 2. Uranium - Reactions - Gt. Brit. 3. AERE C/R 1804.

Hot extrusion of titanium and titanium alloys, by A. M. Sabroff and F. D. Frost. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Sep 1956. 80p photos, diagrs, graphs, tables. Order from OTS. $2. PB 121621

This report summarizes the available information in published literature and government research reports on the extrusion of titanium and titanium alloys, and also the information obtained in a survey of the companies currently extruding titanium. It includes a discussion of the requirements of the aircraft industry for titanium extrusions and the progress of the extrusion industry in meeting these requirements. The extrusion practices currently employed for the production of titanium alloy shapes and tubes, and the problems encountered in tooling, lubrication, billet heating, and heat treating are described. A final section gives a general discussion of the mechanical properties of extruded titanium and titanium alloys and the uniformity and reproducibility of these properties. BMI TML R 53.

Interim report on studies of the effects of geometry on the properties of gun-metal (88-8-4) castings, by W. H. Johnson. U. S. Naval Research Laboratory. Jan 1957. 8p diagrs, graphs, table. Order from OTS. 50 cents. PB 121769

Tensile strength and elongation were determined at various locations in vacuum-degassed and non-degassed gun-metal (88-8-4) castings of different thicknesses and geometries and were compared with these properties obtained from separately cast test bars. The gun-metal castings exhibited very pronounced edge-to-center effects, with the mechanical properties varying from values higher than for the test bars to values considerably lower. Changes in casting thicknesses had smaller effects. Vacuum degassing did not always improve the mechanical properties, and in some cases it had a deleterious effect. To obtain the utmost in soundness, measures such as chilling should be used in conjunction with vacuum degassing. NRL R 4882.

Investigation of forged cobalt base alloys for high temperature applications, by R. R. MacFarlane, R. K. Pitler and E. E. Reynolds. Allegheny Ludlum Steel Corp., Pittsburgh, Pa. Oct 1956. 36p photos, graphs, tables. Order from OTS. $1. PB 121723

Developmental studies were made of a wrought Co-base alloy for applications at high temperatures. Additions of Al improved oxidation resistance and lowered rupture strength. B additions up to .2 percent increased rupture strength and ductility. This increase was limited by a necessarily low solution temperature of 2150° F since, at 2200° F, eutectic melting of a B phase occurred. Ti additions resulted in a large increase in room temperature hardness through an aging reaction but yielded no improvement otherwise. Attempts at improving the workability of unforgeable air melted modifications by vacuum consumable electrode and vacuum induction melting techniques were not successful. AD 110409. Project 7351. Covers period of work from 1 Feb 1955 to 31 May 1956 under Contract AF 33-(616)-2882. AF WADC TR 56-327.

Investigation of the use of special non-alloy steels for armor piercing capped shot (OD-107): Part 2: Results of experimental work directed toward production of a projectile possessing superior ballistic properties. Final report, by J. S. Jackson, D. P. Buswell, Charles E. Fisher and R. B. Schenck. General Motors Corp. Buick Motor Division. Metallurgical Laboratory. Apr 1944. 98f photos, diagrs, graphs, tables. Order from LC. Mi $5.70, enl pr $18.30. PB 123901

Part II deals with efforts to develop a shot possessing superior ballistic properties from both non-alloy and alloy steels. Various modifications in processing, together with a number of different steel combinations, were tried. The most significant development of the experimental work covered is the importance of the heat treating cycle in the preparation of satisfactory shot. Serial M-256. Unclassified 17 Dec 1954. Covers period of work from 1 May-Dec 31, 1943. Contract OEMsr 969. OSRD 3583. NDRC Div. 18 M-256.

Investigations of deformation and fracture of metals, by R. P. Carreker, Jr., R. W. Guard, and R. E. Lenhart. General Electric Co. Research Laboratory, Schenectady, N. Y. May 1955. 25p graphs, table. Order from OTS. 75 cents. PB 111838

In Part I, correlations of the stress, strain and strain rate are made on a phenomenological basis for both tensile and creep tests. Part II covers investigations into the effects of dispersions on the mechanical properties of magnesium-aluminum alloys. In the case of magnesium, it is shown that particles reduce the amount of twinning and change the deformation behavior in this manner. Since the primary mechanism involved is a function of the preferred orientation in the specimen, the texture resulting from fabrication must be considered in interpreting test data. Project 7351, Task 70627. AF WADC TR 55-303. Contract AF 33(616)-2120.

Measurement of the thermal stability of titanium alloys, by F. R. Schwartzberg, W. D. Rahr, D. N.

Williams and R. I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Oct 1956. 34p photos, diagr, graphs, tables. Order from OTS. $1. PB 121622

The effects of varying the thermal exposure of three titanium alloys on their room-temperature mechanical properties have been determined. Variables studied were stress and strain during exposure and the time and temperature of exposure. The effects of variations in hydrogen content and in surface contamination of the test specimen were also determined. Alloys studied were: Ti-2Mo-2Cr-2Fe, Ti-6Al-4V, Ti-4Al-Mn. BMI TML R 55.

Mechanical and ballistic properties of iron-manganese alloys. Partial report, by I. R. Kramer, S. L. Toleman and B. M. Loring. U. S. Naval Research Laboratory. Sep 1941. 18p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120596

Unclassified 7-26-49.
1. Iron-manganese alloys - Ballistic properties
2. Iron-manganese alloys - Mechanical properties
3. NRL M 1785.

Mechanical properties of manganese-copper alloys (vibration damping capacity and electrical resistance). Partial report, by A. H. Hesse and E. T. Myskowski. U. S. Naval Research Laboratory. Jan 1942. 26p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122732

1. Copper-manganese alloys - Damping capacity
2. Copper-manganese alloys - Mechanical properties 3. Copper-manganese alloys - Heat treatment
4. NRL M 1835.

N.R.L. shock-fracture test for welded joints in connection with welding test no. 302. Third partial report, by F. S. McKenna and F. H. Laxar. U. S. Naval Research Laboratory. May 1944. 17p photos, drawings, tables. Order from LC. Mi $2.40, ph $3.30. PB 123323

For first and second reports see PB 118290 and 109329.
1. Joints, Welded - Fracture tests 2. Armor plate - Welding - Tests 3. Armor plate - Fracture tests 4. NRL M 2306.

New high temperature intermetallic materials, Part 4, by Ronald Silverman. American Electro Metal Corp., Yonkers, N. Y. Mar 1956. 49p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 121232

Three major programs were considered. A. The manufacture of stress-to-rupture bars of alloy 223 (Cr/Mo/Si - 81/16/3) and the testing of said bars. An approximate stress-to-rupture curve for alloy 223 is included herein. B. The continuation of the investigation of the "modified" ternary system Co-Cr-Mo, emphasizing the two-phase, alpha plus sigma region. C. Preparation of intermetallics in the systems Co-Zr, Ni-Zr, V-Fe, V-Co, V-Ni; V-Si, Mn-Co, Mn-Mo, Mo-Co, Ta-Co, Ta-Cr and subsequent evaluation of their properties. Project 7350, Task 70634. Summarizes work from Dec 1, 1954 to Aug 31, 1955 under Contract AF 33(616)-109. For Parts 1-3 see PB 111413, 121018-121019. AF WADC TR 53-190, Part 4.

Oxidation of titanium and titanium alloys, by D. W. Stough, F. W. Fink and R. S. Peoples. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jan 1956. 68p graphs (part col.) Order from LC. Mi $3.90, ph $10.80. PB 124566

The scaling behavior in pure oxygen was found to vary according to three different rate laws in the approximate temperature ranges of 80 to 570°F, 570 to 1100°F, and 1100 to 1800°F, respectively. The rate of oxidation increases with temperature; scaling becomes an important consideration in the fabrication and life of Ti materials above 1100°F. None of the commercial alloys were reported to have good oxidation resistance above 1100°F. However, experimental alloys with Al, Si, W, Nb, Mo, and Ta were found to scale less rapidly than the unalloyed metal between 1200 and 1800°F. Alloys with Cr, Mn, Fe, and V generally were noted to scale faster than unalloyed Ti. Color in graphs will not reproduce. BMI TML R 29.

Principles and practical aspects of titanium heat treatment, by P. D. Frost. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jun 1955. 24p photos, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 124563

A part of the physical metallurgy of Ti alloys has been reduced to basic instructions for fabricators. Specifically treated are alpha and beta phase stabilizers and their suitability for heat treatment. BMI TML R 8.

Production of titanium shaped castings, by R. M. Lang, G. H. Schippereit and J. G. Kura. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Dec 1956. 46p photos, diagrs, graphs, tables. Order from OTS. $1.25. PB 121604

This report describes the types of melting furnaces, mold materials, and alloys that are used in preparing cast titanium parts. No suitable methods have been found for measuring the temperature of titanium melts before they are poured from the melting furnaces. Consequently, superheat in the melts is measured indirectly by the electrical power consumed after the titanium becomes molten. Titanium and titanium alloys cast to date have strengths approaching those of wrought titanium alloys. The ductility of the cast alloys, however, is somewhat lower. BMI TML R 60.

Progress report on the strength and ductility of steel castings at hot tearing temperatures, 1250-1400 degrees centigrade, by C. W. Briggs. U. S. Naval Research Laboratory. Sep 1938. 22p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120464

1. Steel castings - Cracking 2. Steel castings - Strength 3. Steel castings - Ductility 4. Steel castings - High temperature tests 5. NRL M 1479.

Research and development on the welding of aluminum alloy plate, by J. J. Chyle and Ivan Kutuchief. A. O. Smith Corporation, Milwaukee, Wis. Jan 1955. 69p photos, drawings, tables. Order from OTS. $1.75. PB 111850

In the investigation of the 24S-T4 aluminum alloys under this contract, welding procedures were developed that were successful in welding the restrained "H" test plates without encountering cracking or other serious defects. Successful welds were made using the inert-gas tungsten-arc process and also using the consumable electrode inert-gas shielded metal-arc process. Various types of filler metal were investigated and the highest joint efficiency was obtained with the 17-S filler wire. Final report under Contract no. DA-36-038-ORD-11244 for the period Oct 1, 1952 to Dec 31, 1954

Resistance of titanium to sulfuric and hydrochloric acids inhibited by ferric and cupric ions, by Joseph R. Cobb and Herbert H. Uhlig. Massachusetts Institute of Technology. Dept. of Metallurgy. Corrosion Laboratory, Cambridge, Mass. Jun 1951. 10p graphs. Order from LC. Mi $1.80, ph $1.80. PB 123144

Ferric and cupric ions are effective inhibitors for the corrosion of titanium in boiling 10% sulfuric and boiling 10% hydrochloric acids. As little as 0.005 mole of Fe^{+++} or Cu^{++} per liter reduces the corrosion rate from intolerably high values to those typical of class A materials. The corrosion rates range from 3 to 55 mmd (0.001 to 0.012 ipy) for inhibitor concentrations from 0.03 to 0.005 mole per liter. Although the inhibitors are consumed as titanium corrodes, the consumption is moderate, particularly at the higher inhibitor concentrations for which corrosion rates are lower. The primary mechanism, as indicated by potential measurements, is proposed as occurring through adsorption of Fe^{+++} and Cu^{++} on the metal surface with accompanying satisfaction of surface valences and formation of a dipole layer with negative charge outwards accounting for a noble potential. U18584. Technical report 6. Contract N5 ori-07815.

Selective standardization and status of specifications for titanium mill products. Arthur D. Little, Inc., Cambridge, Mass. Nov 1955. 23p table. Order from LC. Mi $2.70, ph $4.80. PB 124569

Producers of wrought Ti have been hampered in the marketing of their products by the wide variety of specifications being used by the consuming manufacturers. To facilitate standardization of specifications, a survey of requirements was made, and general specifications are suggested. BMI TML R 22.

Statistical effects of tensile testing of copper. (North Carolina University armor fracture size effects study), by Rodney M. Squires and Arthur E. Ruark. U. S. Naval Research Laboratory. Jan 1944. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120579

1. Solids - Rupture - Theory 2. Copper - Tensile tests 3. NRL O-2216.

Strength of 75-S-T integral compression skins in box-beams under pure bending, by Sigge Eggwertz. Flygtekniska Forsoksanstalten (FFA), Stockholm. Feb 1956. 42p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122889

Eight one-cell and three two-cell box-beams with unstiffened 75S-T aluminum alloy compression skins integrally connected to the webs, have been tested under pure bending, the strain being measured at a large number of points, particularly on the compression side. The main interest has been concerned with the stress distribution at failure and the maximum average stress in the compression skin has been related to the buckling stress and the maximum corner stress, which is approximately equal to the yield strength of the material. After comparing the test results with published theoretical and experimental investigations on plate sections under pure compression, an empirical procedure is advanced for calculating the maximum bending moment that can be applied to box-beams with two or more webs. This procedure is thought to be applicable to extruded aluminium and magnesium alloys and also, roughly, to rolled plates of the same materials in riveted structures. FFA 64.

Studies on internal friction and vibration fatigue, by R. H. Canfield. U. S. Naval Research Laboratory. Feb 1934. 22p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120635

Unclassified.
1. Metals - Damping capacity 2. Metals - Vibration - Measurement 3. NRL M 1029.

Studies on solidification and contraction in steel castings - the free and hindered contraction of alloy cast steels, by C. W. Briggs and R. A. Gezelius. U. S. Naval Research Laboratory. Jan 1936. 31p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122718

1. Steel castings - Solidification - Research 2. NRL M 1229.

Study of the air contamination of three titanium alloys, by J. E. Reynolds, H. R. Ogden and R. I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jul 1955. 33p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 124564

The air contamination of commercial titanium, Ti-5 Al-2.5-Sn, and Ti-4Al-4Mn alloys has been studied over a temperature range of 815 to 1149C. A Van Ostrand-Dewey diffusion analysis was applied to hardness-penetration curves, and diffusion coefficients associated with the contamination process were calculated. The amount of metal loss due to scaling is also reported. BMI TML R 10.

Study of Thermenol as a compressor blade material. Final report, by J. C. Sawyer and E. G. Pekarek. Thompson Products, Inc., Cleveland, Ohio. Oct 1955. 44p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124308

In the course of conducting a program on the evaluation of Thermenol as a compressor blade material, Thompson Products has devised a means of producing the alloy in quantity and subsequently converting the ingots into sheet and barstock. An extensive investigation was conducted to determine the many physical and mechanical properties of Thermenol for comparison with 403 stainless steel. Various jet engine compressor rotor blades were fabricated after the attending manufacturing problems were eliminated. The blades produced were examined to determine their properties in relation to more comprehensive data compiled from standard test methods and specimens. Contract NOa(s)51-1257-c, Item 1.

Surface hardening of titanium with metalloid elements. Final technical report, Jun 1, 1952-May 31, 1953, under Contract no. DA 11-022-ORD-289, by R. W. Hanzel and V. Pulsifer. Armour Research Foundation, Chicago, Ill. May 1953. 151p photos, diagrs, graphs, tables. Order from OTS. $4. PB 111821

Various surface hardening processes have been examined to determine their applicability to titanium and its alloys. The experimental study included the known hardening effect of nitrogen, oxygen addition by heating in air, carburizing, and the addition of hydrogen. Treatments in purified nitrogen included a number of special titanium-base binary alloys and several commercial alloys. A complete resume of the treatment of unalloyed titanium in molten borax is included, along with information on dissociated ammonia and fused salt bath treatments. ARF Proj B029-7. WAL R401/84-25. Contract DA 11-022-ORD-289, Final report.

Survey of low-alloy aircraft steels heat-treated to high strength levels. Part 1: Hydrogen embrittlement, by George Sachs and Walter Beck. Syracuse University, Syracuse, N. Y. Jun 1954. 96p drawings, diagrs, graphs, table. Order from OTS. $2.50. PB 121700

Data on hydrogen embrittlement of high-strength steels are presented and analyzed. Many failures in aircraft reported of steel parts and of steel bolts were found to be associated with changes in the basic mechanical characteristics of the steel caused by cadmium plating or chromium plating. Heat treating or baking applied to relieve this hydrogen embrittlement were frequently only partly effective. AD 32731. For Parts 2-6 see PB 123090, 121667, 121504-121506. Contract AF 33(616)-392. AF WADC TR 53-254, Pt. 1.

Survey of physical-property data for titanium and titanium alloys, by H. W. Deem and C. F. Lucks. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Mar 1956. 37p tables. Order from OTS. $1. PB 121613

A literature survey was made in the TML and other Battelle libraries on physical-property data for titanium and titanium alloys. Data were found and are reported for eighteen properties. BMI TML R 39.

Survey of the problem of delayed cracking in formed titanium parts, by R. I. Jaffee and D. J. Maykuth. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Jun 1955. 53p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124562

Delayed cracking in F-100 titanium alloys is a manifestation of hydrogen embrittlement which caused trouble with titanium-alloy forgings in compressors. Control of hydrogen to less than 150 ppm in future titanium-alloy sheet (8Mn) appears to be a good means of controlling delayed cracking in the future. Appendix A. Summary of available data on the hydrogen embrittlement of titanium alloys. - Appendix B. Listing of government-sponsored research on projects directly related to the hydrogen embrittlement of titanium and titanium alloys. - Appendix C. References. BMI TML R 7.

Titanium sponge production methods and present status, by J. L. Gissy, G. H. Schippereit and J. G. Kura. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Sep 1956. 32p tables. Order from OTS. $1. PB 121620

The raw materials used in the manufacture of titanium sponge are discussed at length. The advantages and disadvantages of the different titanium ores are reviewed. Particular emphasis is placed on the use of ilmenite instead of rutile. Chlorination of rutile and ilmenite to produce titanium tetrachloride, purification of titanium tetrachloride, and the reduction of titanium tetrachloride to titanium sponge are covered. The merits and

shortcomings of the Kroll process and of the sodium process are pointed out. The industrial organizations, both domestic and foreign, which produce titanium sponge are listed. BMI TML R 52.

Ultrasonic soldering of aluminum, by J. Byron Jones and John G. Thomas. Aeroprojects Inc., West Chester, Pa. Feb 1955. 68p photo, graphs, tables. Order from OTS. $1.75. PB 121551

Ultrasonic soldering techniques were effectively used to prepare aluminum joints with a variety of tin-base and cadmium-base low-melting solders, and the joints were evaluated by corrosion strength tests. Research report no. 55-24. Ordnance Corps project no. TB4-31G-M59. Contract DA 36-034-ORD-1401.

Volume change and gas evaluation on heating electrolytic chromium, by Kenneth A. Moon and George A. Consolazio. U. S. Arsenal, Watertown, Mass. Jan 1956. 15p photos, graphs. Order from OTS. 50 cents. PB 121768

A mass spectrometer and a dilatometer have been employed in a study of the gas evolution from and irreversible shrinkage of electrolytic chromium during heating in vacuum to 1100°C at the rate of 3° per minute. Water, hydrogen, and nitrogen evolution began near 100°C, 300°C, and 800°C, respectively. O. O. Project TB 4-161. D/A Project 593-08-024. WAL R 340/50.

Weldability of iron alloys. Second partial report of research, by W. H. Bruckner. U. S. Naval Research Laboratory. Sep 1936. 28p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122709

1st report is M 1258.
1. Iron alloys - Weldability - Tests 2. NRL M 1303.

Welding of titanium and titanium alloys, by G. E. Faulkner, W. J. Lewis, M. L. Kohn and P. J. Rieppel. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Feb 1956. 82p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.25. PB 121609

This report is a summary of the information in published literature and in government and industrial research reports on the welding of titanium and its alloys. It includes a discussion of welding procedures and methods of evaluating mechanical properties in welded joints. A section also is included on the mechanical properties of welded joints and how these properties are affected by alloying elements. BMI TML R 31.

METEOROLOGY AND CLIMATOLOGY

Air flow over an extended ridge. Final report, by August Raspet. Aerophysics Institute, Inc., Locust Valley, N. Y. Nov 1948. 24p diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123141

This study has aimed at correlating experimentally determined atmospheric flow fields against available theories for air flow over natural obstacles. As a result of these attempts it may be stated that: (a) From the differential equation of micrometeorological flow of Raethjen, it was not possible to define the type of flow from the parameters included in the theory. (b) For the wave-like airflows, wavelengths computed on the basis of short gravity waves were found to agree with experimental results in the level 1 to 4 km only. (c) The theories of Lyra and Queney predict waves to the lee of the obstacle. In the exploration waves were also found windward of the ridge. Research report 2. Contract N7 onr-400, NR 082-011.

Atmospheric oscillations associated with strong temperature inversions, by Andrew F. Bunker. Woods Hole Oceanographic Institution, Woods Hole, Mass. Oct 1955. 10p graph, table. Order from LC. Mi $1.80, ph $1.80. PB 123734

The wave-length and vertical velocities of oscillating clear air near an inversion have been observed off the coast of Rhode Island. When stabilities and wind speeds are averaged over a thick layer (4 or 5 km) of the atmosphere good agreement is reached between the observed wave-lengths and Queney's formula for the mountain lee-wave. Technical report 37 under Contract Nonr-1721(00), NR 082-021. Unpublished manuscript. WHOI Ref 55-61.

Black sheep system of forecasting winds for long-range jet aircraft. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Mar 1956. 52p maps, tables. Order from LC. Mi $3.60, ph $9.30. PB 123041

The Black Sheep System assumes that a good 500-mb prognostic chart is available. Several methods for predicting the 500-300-mb thickness field are outlined so that a 300-mb prognostic can be obtained (if not already available). The extrapolation of the prognostic wind field from 300 mb to 150 mb is the next step discussed. Since the B-47 in a long mission ascends from around 300 mb to around 150 mb, a special map, the "max-wind and shear chart", is introduced to represent the wind variation in the vertical through this layer. Possible ways for estimating vertical diversions from optimum-cruise level and for computing minimal-time paths are

suggested. Some verification tests of trial forecasts by the system are presented, and recommendations by Project Black Sheep on forecast and forecast-verification procedure given. AF AWS TR 105-139.

Forecasting upper-level winds. Part 1: Forecasting by vorticity techniques. Appendix B: Vorticity, an elementary discussion of the concept. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Aug 1956. 30p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 123671

1. Vortex motion - Theory 2. Winds - Forecasting - Theory 3. Atmosphere, Upper - Turbulence - Theory 4. AF AWS M 105-50/1A.

Precipitation-static problem. Sixth partial report, by Ross Gunn. U. S. Naval Research Laboratory. May 1944. 24p photos, drawing, diagrs. Order from LC. Mi $2.70, ph $4.80. PB 120709

Unclassified 15 Dec 1953. For third partial report see PB 120740.
1. Precipitation static - Research 2. Airplanes - Static 3. Radio interference - Aircraft 4. NRL O 2281.

Report on signalling and detection with ultraviolet and infra-red radiation, by E. O. Hulburt. U. S. Naval Research Laboratory. Jan 1934. 19p photos, graph. Order from LC. Mi $2.40, ph $3.30. PB 120466

It was found that ultraviolet light penetrated haze and fog a little worse, and infrared light a little better than visible light, but that none of these radiations penetrated fog to any useful extent. Ultraviolet signalling in clear weather was accomplished up to six miles between ships at sea, and infrared signals were sent twelve miles. Unclassified 21 Sep 1955. NRL H 1017.

Study of the earth's electrical field. First quarterly report for period May 1, 1951-Aug 1, 1951 under Contract AF 19(122)-467, by R. L. Ives. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Aug 1951. 8p. Order from LC. Mi $1.80, ph $1.80. PB 123142

Work during the period May 1, 1951 to August 1, 1951 consisted of a general study of the problems involved, selection of meteorological and other parameters for measurement, design of equipment for such measurements, and selection of an instrument site. Construction of instruments was started, and procurement of standard instruments, suitable for many of the measurements, is under way. Lease for a convenient and suitable site, directly across Cayuga Road from Cornell Aeronautical Laboratory, is currently awaiting signature. For 5th, 8th-13th reports see PB 108441, 112157, 113586, 115167-115169, 116380. Contract AF 19(122) 467. CAL RA 764-P-1.

MINERALS AND MINERAL PRODUCTS

Bitter magnets in graphite single crystals, by N. N. Apelrod. Rochester. University. Institute of Optics. Apr 1956. 12p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122449

The anisotropy of the resistivity, and the presence of screw dislocations with their axes along the direction of high resistivity, result in low resistivity paths in the direction of graphite single crystals. The magnetic field, which is a necessary concomitant of a helical current flow, is calculated; its magnitude is such that it may be detectable by powder methods. AD 87053. See Bulletin of the American Physical Society, I, 119 (1956) for report of work, presented at the March 1956 meeting of the American Physical Society at Pittsburgh, Pa. AF OSR TN 56-180. Contract AF 18(600)-688.

Ceramic fiber base cermets, by Louis J. Trostel, Charles A. Hauck, John C. Donley and Thomas S. Shevlin. Ohio. Engineering Experiment Station, Columbus, Ohio. Mar 1956. 29p photos, drawings, graphs, tables. Order from OTS. 75 cents. PB 121354

Studies were conducted on three ceramic fiber base cermets containing 302B stainless steel and ceramic fibers with a metal content of 91% by weight. Details include fabrication techniques and test results. Project 7340, Task 70634. Summarizes work during the period 1 Feb 1955 to 1 Feb 1956 under Contract AF 33(616)-472. AF WADC TR 54-172, Part 3.

Investigation of the feasibility of producing part 7713299, hub cap, in a shell mold, by J. William A. Tyler. U. S. Arsenal, Watertown, N. Y., Rodman Laboratory. Mar 1956. 14p photos. Order from LC. Mi $2.40, ph $3.30. PB 123111

Several heats of hub caps were poured into various shell molds. Different types of refractories, several resin contents, as well as some chemical additives were checked in the shell mix. Cost comparisons of silica and zircon sand refractories were made, and time study data on machining the shell molded piece were taken. WAL RPL 13/2.

Metal and self-bonded silicon carbide, by R. E. Wilson, M. T. Curran, J. F. Grant and J. R. Tinklepaugh. New York State College of Ceramics, Alfred, N. Y. Jan 1956. 33p photos, drawings, graphs, tables. Order from OTS. $1. PB 121353

Aluminum and iron, added in amounts of one to three percent, had a marked effect on the density achieved in hot pressing silicon carbide. Several other elements had minor effects. Molybdenum-SiC compositions were investigated in detail and

it was found that Mo_4CSi_3 was the reaction product bond resulting from this combination. Mo_4CSi_3 was synthesized and used as the aggregate in a nickel bonded cermet. Three compositions were selected from those studied for evaluation as rocket nozzle materials by the Bell Aircraft Corporation. Project 7350, Task 70634. Summarizes research from 1 Jan-31 Dec 1955 under Contract AF 33(038)-16190. AF WADC TR 54-38, Part 3

On the electrical conductivity of some alkaline earth titanates, Part II, by E. K. Weise and M. C Andrews. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Mar 1956. 27p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123160

In continuation of investigations about the electrical conductivity of reduced Mg_2TiO_4, $MgTiO_3$, $MgTi_2O_5$, $CaTiO_3$, $SrTiO_3$, and $BaTiO_3$ in the form of sintered rods the temperature range was extended below room temperature down to -190°C. A one or two donor level model was used for the interpretation of the results. Gap width, density and activation energy of donors, and concentration and mobility of electrons were determined. Project 52-670A-85. AD 86001. Part of work was done in partial fulfillment of requirements for degree of Doctor of Philosophy by Dr. Andrews. AF OSR TN 56-125. Contract AF 33(038)-12644.

Research on shell molding. Final report under Contract no. DA-19-020-ORD-1961, Jul 1, 1952-May 1, 1953. Massachusetts Institute of Technology. Dept. of Metallurgy. Metals Processing Division. May 1953. 54p photos, diagrs, graphs, tables. Order from OTS. $1.50. PB 121031

Factors which influence resin consumption in making shell molds were studied by means of strength tests. Polished sections of shell specimens were used to study the mechanism of bonding and fracturing in shell molds. Experiments were made with surface preparation of sand to increase bonding efficiency of the resin, and with vibration to improve packing and so produce shell molds with less resin. Phenol and formaldehyde vapor treatment was investigated as a means for manufacturing thermo-setting resin directly on the surface of sand. Various sand-resin mixtures were evaluated in making shell molds, and in producing castings of aluminum- and copper-base alloys. Cooling rates of castings in shell and green sand molds were measured to study heat transfer, and special casting were made to investigate breakdown time of shell molds. Contract DA-19-020-ORD-1961, Final report.

Technische probleme um das V205 (Technical problems relative to vanadium pentoxide), by K. Konopicky. Translated and edited by F. A. Raven. Jun 1956. 21p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 123429

After presentation of the ranges of existence and properties of the vanadium oxides, the particular effect of V_2O_5 is treated with respect to slag formation (scorification) of fireproof ceramic material and damage to metal structural parts. Translated from Brennstoff-Chemie, Vol. 36, no. 9/10, 1955, p. 151-155. NAVSHIPS T 610. STS 237

ORDNANCE AND ACCESSORIES

Anodizing and dyeing aluminum detonator discs as means of identifying the sensitive ends of flash detonators, by G. U. Graff and E. David Metz. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1951 11p diagr, table. Order from LC. Mi $2.40, ph $3.30. PB 123925

Detonators made with sensitive end discs punched from the anodized and dyed aluminum sheet were found to compare favorably in sensitivity with detonators made with uncolored discs. Unclassified 2 May 1956. NAVORD 1875.

Experimental packaging of the cal. .30 MI carbine in volatile corrosion inhibitor (V.C.I.) materials, by F. H. Wayne. U. S. Arsenal, Rock Island, Ill. Dept. of the Army project 591-07-001. ORD project TB5-1101C. ORD TX-10. Order separate parts described below from LC, giving PB number of each part ordered.

Report no. 12. Feb 1956. 23p photos, tables. Mi $2.70, ph $4.80. PB 122621

1. Packaging materials - Tests 2. MI (Rifle) 3. Rifles, Carbine - Packaging - Tests 4. Inhibitors, Corrosion - Materials 5. RIAL R 56-387.

Report no. 2. Mar 1956. 14p photos, tables. Mi $2.40, ph $3.30. PB 122620

1. MI (Rifle) 2. Packaging materials - Tests 3. Rifles, Carbine - Packaging - Tests 4. Inhibitors, Corrosion - Materials 5. RIAL R 56-709.

Flexible rollers and flexible roller path for main battery turrets, by H. B. Maris. U. S. Naval Research Laboratory. Apr 1941. 28p. Order from LC. Mi $2.70, ph $4.80. PB 123308

1. Gun turrets - Rollers 2. NRL H 1721.

Impact phenomena at high speeds, by M. E. Van Valkenburg, Wallace G. Clay and J. H. Huth. Utah. University. Dept. of Electrical Engineering, Salt Lake City, Utah. Feb 1956. 36p photo, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122414

An important problem associated with the development of scientific satellites is that of the impact of

meteors with the metallic skins of these devices. This paper describes experiments in which pellets were impacted with targets at velocities up to 5 mm/μ sec using both metals and plastics. While the velocity range falls short of that of the meteoric impact problem, the results do relate to the physical process of crater formation and may have a bearing on impacts at the higher speeds. AD 81046. AF OSR TN 54. Contract AF 18(600)-1217.

Measurement of forces which resist penetration of STS armor, mold steel, and 24 ST aluminum, by Gilbert D. Kinzer, A. V. H. Masket, and J. R. Streeter. U. S. Naval Research Laboratory. Apr 1944. 34p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120710

Unclassified 15 Dec 1953.
1. Penetration - Armor 2. Armor plate - Ballistic tests 3. NRL O 2276.

Measurement of non-linear forces and moments by means of free flight tests, by Charles H. Murphy. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Feb 1956. 87p graphs, tables. Order from LC. Mi $6.30, ph $13.80. PB 123110

It has been observed that the behavior of missiles either moving under the influence of non-linear forces and moments or flying at large angles of yaw is frequently well described by curves of the same form as those generated by linear force systems and small angles of yaw. With this in mind an "equivalent" linear solution to the actual equations of yawing motion is obtained. This equivalent linear solution has been used in the analysis of a wide variety of programs fired on BRL's Spark Ranges and considerable success has been experienced. The application of this technique to the equally important problem of predicting yawing motion is described. DA project 5B03-03-001. ORD project TB3-0108. APG BRL R 974.

Penetration of face-hardened bullet proof armor by solid cal. 27 bullet, by G. D. Kinzer. U. S. Naval Research Laboratory. May 1944. 12p photos, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120708

Declassified 15 Dec 1953.
1. Penetration - Armor 2. Armor plate - Ballistic tests 3. NRL O-2290.

Performance tests of a modified Hopkinson pressure bar, by R. H. Suessle. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1952. 33p photos, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123926

Two Hopkinson Pressure Bars were constructed at the Naval Ordnance Laboratory from British drawings. The pressure bars are devices used to obtain a measure of the output of detonators or other small explosive charges. The recording system of these bars was modified by substituting a photoelectric timer for pendulum of the original design. A series of tests was then conducted to compare the performance of the bars to that of detonator tests used commonly in this country. In these tests results obtained from the pressure bars were compared to the results of sand bomb tests, lead plate tests, copper block and Trauzl block tests, and a German test set called the Stauch-apparat. Unclassified 2 May 1956. NAVORD 1816.

PERSONNEL APTITUDE TESTING

Bombing accuracy as a function of the ground school proficiency structure of the B-29 bomb team, by William D. Voiers. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Jan 1956. 31p diagr, tables. Order from LC. Mi $3, ph $6.30. PB 123085

The exploratory research described in this report was undertaken to provide empirical information concerning the contributions of the bomb team's members to simulated radar bombing efficiency. To date, attempts to demonstrate relationships between independent criteria of individual team-member proficiency and criteria of navigational or bombing accuracy have not been markedly successful. While this is partly because of inadequacies of measuring instruments, it seems likely that individual performances interact so as to complicate the relationships between performances and the product criteria. AF PTRC TN 56-4.

Comparisons of a single operator's performance with team performance on a tracking task, by John W. Senders, Julien M. Christensen and Raymond Sabeh. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1955. 9p graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 123178

The performance of a two-man team, each member of which is responsible for one dimension of a two dimensional tracking task, is compared with that of one man performing the whole task. In addition, the effects of knowledge of the partner's performance are investigated for the two man situation. Using time-on-target as a criterion, the results show that (1) the two-man team obtains a score two to three hundred percent better than that obtained by the single man, and (2) knowledge of partner's performance has little or no effect on an individual's performance. Project 7182. AF WADC TN 55-362.

Comparison of training methods in the recognition of spatial patterns, by Malcolm D. Arnoult. U. S. Air Force. Air Research and Development Command. Personnel and Training Research Center. Skill Components Research Laboratory, Lackland Air Force Base, Texas. Jan 1956. 18p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123456

This report gives the results of a laboratory study in which several different methods were used to train observers to recognize complex visual patterns. In terms of performance on a criterion task it was shown that the best results were obtained by training methods involving a number of attempts to draw the pattern from memory. Significantly less effective were methods involving a verbal analysis of the patterns in terms of the interrelationships among the pattern elements. Project 7706, Task no. 77119. AF PTRC TN 56-27.

Prediction of academic grades with a projective test of achievement motivation. II: Cross-validation at the high school level, by Henry N. Ricciuti and Robert Sadacca. Educational Testing Service, Inc., Princeton, N. J. Jun 1955. 26p tables. Order from LC. Mi $2.70, ph $4.80. PB 123039

Validation of the test scores against academic grades, adjusted for differences in ability level, yielded small but encouraging correlations generally similar to those found in the previous study. The results are interpreted as confirming the findings of the original validation study, indicating that the achievement-motivation measures show promising relationships to high school grade achievement, adjusted for differences in ability. For Part I see PB 118251. Contract Nonr-694(00), NR 151-113.

PHOTOGRAPHIC AND OPTICAL GOODS

Comparative tests on commercial radiographic films for Naval use, by A. L. Christenson. U. S. Naval Research Laboratory. Feb 1942. 15p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122736

1. Films (Photography), X-ray 2. Films (Photography), Gamma ray 3. NRL M 1843.

Geometrical optics of angular stratified media, by Raymond Sedney. U. S. Aberdeen Proving Ground Ballistic Research Laboratories, Aberdeen, Md. Dec 1955. 11p. Order from LC. Mi $2.40, ph $3.30. PB 122584

Some aspects of the geometrical optics of angular stratified media are considered. A similarity property of the light paths enables one to draw some general conclusions about the behaviour of light rays traversing a cone. An application to the interferometric method of observing supersonic flows shows that a conical flow test is valid including the refraction effect. DA Project 5B03-03-001, ORD Project TB3-0108. APG BRL M 952.

Gun-camera records as measures of pedestal sight gunnery proficiency, by Douglas S. Ellis. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Feb 1956. 32p tables. Order from LC. Mi $3, ph $6.30. PB 123084

This report describes an investigation of measures of flexible gunnery proficiency obtained during aerial training missions. The proficiency measures were derived from gun-camera records generated during the aerial missions. The major finding was that the between-mission reliability of the gun-camera scores was essentially zero, indicating that the scores did not offer the stable discrimination between gunners required of a proficiency measure. It was also found that the poor reliability of gun-camera scores could not be attributed to the procedures used in deriving scores from the gun-camera film. Project 7708, Task 77141. AF PTRC TN 56-30.

Pinhole camera gun tester for investigation of electron beams, by Richard M. Campbell. Ohio State University Research Foundation, Columbus, Ohio. Jan 1956. 40p photos, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 123418

The object of this research was to find a means of making measurements on electron beams to determine whether or not the associated electron gun was performing as expected. From these measurements it should be possible to determine what must be done in the electron gun to improve or modify the resulting electron beam. AF OSR TN 56-222. OSURF Proj 580, Technical report no. 4. Contract AF 18(600)-980.

Tilt computation by analytical means, by Anton S. Rosing. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aerial Reconnaissance Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 64p photos, diagrs, tables. Order from OTS. $1.75. PB 121492

Before an aerial photograph can be used for any purpose which requires extreme accuracy, it is necessary to determine the tilt of the photograph. This can be done graphically, mechanically, or by analytical computation. This report is concerned with the latter and the various methods by which analytical computations can be made. It is concluded that the most accurate tilt computation method should be made available to field organizations in the form of procedures which utilize electronic computers. Project 6255, Final report on Task no. 62311. AF WADC TR 56-7.

PHYSICS

General

Approximate method for calculations using concentration-dependent diffusion coefficients, by A. G. Guy, M. Golomb and A. S. Yue. Purdue University. Purdue Research Foundation, Lafayette, Ind. Mar 1956. 33p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122421

AD 87067. Submitted for publication in the Transactions, American Society for Metals. Purdue Research Foundation, report 4.
1. Mathematical equations and solutions 2. Diffusion theory 3. Approximate computations 4. Contract AF 18(600)-1463 5. AF OSR TN 56-194.

Convex cones, sets and functions, by W. Fenchel. Princeton University. Mathematics Dept., Princeton, N. J. Sep 1953. 162f. Order from LC. Mi $7.80, enl pr $27.30. PB 123896

These notes contain a survey of those properties of convex cones, convex sets, and convex functions in finite dimensional spaces which are most frequently used in other fields. Emphasis is given to results having applications in the theory of games and in programming problems. AD 22695. From notes by D. W. Blackett of lectures at Princeton University, Spring term, 1951. Contract N6onr-27011.

Electrical analogy method for the solution of differential equations: Final report, by Walter C Johnson and Reuben E. Alley, Jr. Princeton University. Dept. of Electrical Engineering, Princeton, N. J. Jun 1948. 124f photos, diagrs, graphs, tables. Order from LC. Mi $6.30, enl pr $21.30. PB 123894

This report presents the results of theoretical and experimental investigations of a new method of design of an electrical network which will give approximate solutions, over a given range of the independent variable, of single, simultaneous, and partial differential equations, both linear and nonlinear. ATI 47829. Contract N6 ori-105, T. O. VI, Technical report no. 3.

Exponential solutions of second-order systems, by Abe Shenitzer. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. 1956. 13p. Order from LC. Mi $2.40, ph $3.30. PB 122447

It is shown for a 2 x 2 matrix depending analytically on a parameter t that the vanishing of all Lie functionals of an order exceeding a given but arbitrarily large number implies the vanishing of the second-order Lie functional. Some relations of Hellman for the coefficients of a matrix which is analytic in t and has certain vanishing Lie functionals are generalized. AD 86595. AF OSR TN 56-172. NYU RR BR-17. Contract AF 18(600)-367.

Introduction to some nonparametric generalizations of analysis of variance and multivariate analysis, by S. N. Roy and S. K. Mitra. North Carolina State College. Institute of Statistics, Raleigh, N. C. Nov 1955. 37p. Order from LC. Mi $3, ph $6.30. PB 122408

AD 80556. Institute of Statistics mimeograph series no. 139. Continues PB 119236.
1. Variance - Analysis 2. Statistical analysis 3. Contract AF 18(600)-83 4. AF OSR TN 56-44.

Notes on the use of transformations in the analysis of variance. Fifth report of a series on analysis of variance, by Edwin G. Olds, Thomas B. Mattson and Robert E. Odeh. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Jul 1956. 34p tables. Order from OTS. $1. PB 121716

A cause for the general interest in analyzing variance is given. Some reasons for needing transformations are set forth and the possibility of planning experiments so as to lessen the need is noted. The problem of finding the best transformation is discussed. The advantage of formulating rules which would always lead to transformations is stated and a standard procedure for a particular case is exemplified. AD 97208. Project 7032. For previous reports see PB 112386, 111878, 121333 (part 1), 121334 (part 2) and 121249. AF WADC TR 56-308. Contract AF 33(616)-2418.

On the asymptotic solutions of a class of ordinary differential equations of the fourth order, with special reference to an equation of hydrodynamics, by Rudolph E. Langer. Wisconsin. University. Department of Mathematics, Madison, Wis. Feb 1953. 74p. Order from LC. Mi $4.50, ph $12.30. PB 122409

AD 81042. Project R-354-10-59.
1. Equations, Differential 2. Hydrodynamics - Theory 3. Asymptotic expansions 3. Contract 18(600)-1110, Report 4 5. AF OSR TN 56-50.

On the coefficients of meromorphic Schlicht functions, by Z. Nehari and E. Netanyahu. Carnegie Institute of Technology. Dept. of Mathematics, Pittsburgh, Pa. Feb 1956. 14p. Order from LC. Mi $2.40, ph $3.30. PB 122419

AD 81539. Unclassified.
1. Mathematical equations and solutions 2. Schlicht functions 3. Contract AF 18(600)-1138, Technical rept. 8 4. AF OSR TN 56-86.

Plastic bending of circular rings, by Wolfe Mostow. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1951. 29p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 123923

This report considers the problem of pure bending of a plane circular ring of rectangular cross-section under the action of static loads which carry the deformation into the plastic range. Theoretical formulas are derived for deflection contours and the work done as functions of load. Both point-loading and uniform-loading with respect to a diameter are treated. Some experimental results are given which show the applicability of the foregoing results to dynamically (quasi) point-loaded rings. Unclassified 2 May 1956. NAVORD 1823.

Probability and statistics in item analysis and classification problems: Probability and statistics in psychometric research with special regard to item analysis and classification techniques, by Herbert Solomon. U. S. Air Force. School of Aviation Medicine, Randolph Air Force Base, Tex. Aug 1956. 33p graphs. Order from OTS. $1. PB 121824

The attenuation paradox in test theory is developed and analyzed from a probabilistic point of view with consideration given as to why a paradox is suggested, how it comes about, and what may be done with it. The paradox is also analyzed to obtain information about the operating characteristics of a test in terms of item difficulty and item intercorrelations Several classification procedures for the assignment of elements to groups and the clustering of elements into groups are discussed in terms of the possibility of the analytical assessment of the risks inherent in using them. AF SAM R 56-88.

Sequential life tests in the exponential case, by Benjamin Epstein and Milton Sobel. Wayne University. Dept. of Mathematics, Detroit, Mich. Jan 1954. 17f graphs, table. Order from LC. Mi $2.40, enl pr $4.80. PB 123897

AD 26141. Technical report no. 8.
1. Sequential analysis 2. Contract Nonr-451(00), NR 042-017.

Theory of dilute high polymer solutions (The pearl necklace model), by A. Isihara and R. Koyama. Maryland University. Physics Dept., College Park, Md. Apr 1956. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122422

AD 87512. Report submitted for publication in the Journal of Chemical Physics.
1. Polymers, High - Theory 2. Polymers, High - Molecular weight 4. AF OSR TN 56-199 5. UM TR 34.

Use of the Mann-Whitney statistic, by Z. W. Birnbaum. Washington. University. Dept. of Mathematics. Laboratory of Statistical Research, Seattle, Wash. Aug 1955. 12p. Order from LC. Mi $2.40, ph $3.30. PB 123200

AD 71755. Technical report 21.
1. Mathematical equations and solutions
2. Variance - Analysis 3. Contract N8 onr-520, T. O. II, NR-042-038.

Nuclear

Calibration of a spontaneous fission neutron source, by R. Richmond. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 5p diagr. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 28 cents. PB 123606

S. O. code no. 91-3-2-59.
1. Atomic power - Research - Gt. Brit. 2. Neutrons - Sources - Calibration - Gt. Brit.
3. AERE RP/M79.

Compact D. C. power supplies in the 100 KV region, by H. C. Whitby. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 19p photos, drawings, diagr, graph. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 81 cents. PB 123611

S. O. code no. 91-3-2-48.
1. Atomic power - Research - Gt. Brit. 2. Power supplies - Design - Gt. Brit. 3. AERE GP/R 1855.

Dependence of fast neutron attenuation in Portland concrete on its hydrogen content, by J. A. Dyson and J. R. Harrison. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 9p graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 123607

S. O. code no. 91-3-2-64. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Neutrons - Attenuation - Gt. Brit. 3. Concrete - Shielding properties - Gt. Brit. 4. AERE RP/R 1942.

Design of a large antimony-beryllium neutron source for use with exponential assemblies, by V. S. Crocker and K. J. Henry. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 10p photo, drawings. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 36 cents. PB 123608

S. O. code no. 91-3-2-46. Unclassified.
1. Neutrons - Sources - Design - Gt. Brit.
2. Atomic power - Research - Gt. Brit. 3. AERE RP/M 72.

Diffusion length of thermal neutrons in Portland concrete, by A. Salmon. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 14p diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 41 cents. PB 123619

S. O. code no. 91-3-2-69. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Concrete - Shielding properties - Gt. Brit. 3. Neutrons - Attenuation - Gt. Brit. 4. AERE RR 1943.

Fast neutron detector, by K. Skarsvag. Norway. Joint Establishment for Nuclear Energy Research, Kjeller, Norway. Dec 1955. 8p graphs. Order from LC. Mi $1.80, ph $1.80. PB 123187

1. Atomic power - Research - Norway 2. Neutrons - Detection - Norway 3. Neutrons - Energy measurements - Norway 4. Radiation counters - Performance - Norway 5. JENER 39.

Heat release in concrete reactor shields, by D. B. Halliday. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 18p graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 55 cents. PB 123622

Date of manuscript: Nov 1954. S. O. code no. 91-3-2-67. SWP/P31. Declassified version of SWP/P11.
1. Atomic power - Research - Gt. Brit. 2. Neutrons - Shielding - Materials - Gt. Brit. 3. Shielding materials - Neutron reactions - Gt. Brit. 4. AERE R/R 1963.

Mathematics of fission product formation in reactors with circulating fuel, by C. J. L. Lock. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 18p diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 46 cents. PB 119910

S. O. code no. 91-3-2-73.
1. Atomic power - Research - Gt. Brit. 2. Reactors - Fission products - Gt. Brit. 3. Fission products - Decay schemes - Gt. Brit. 4. Fission products - Formation - Gt. Brit. 5. AERE C/M 278.

Note on density relationships in boiler tubes, by P. Fortescue. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1955. 8p graphs. Order from AEC Depository Libraries. PB 123601

1. Atomic power - Research - Gt. Brit. 2. Tubes, Boiler - Gt. Brit. 3. AERE ED/M 27.

On the chemical state of radioactive phosphorus-32 extracted into water from pile-irradiated sulphur, by J. B. Dahl. Norway. Joint Establishment for Nuclear Energy Research, Kjeller, Norway. 1956. 23p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123188

1. Atomic power - Research - Norway 2. Phosphorus, Radioactive - Chemical analysis - Norway 3. JENER 40.

Production of radioactive phosphorus-32 from pile irradiated sulphur, by Knut Sarnsahl. Norway. Joint Establishment for Nuclear Energy Research, Kjeller, Norway. 1956. 8p diagr. Order from LC. Mi $1.80, ph $1.80. PB 123189

1. Atomic power - Research - Norway 2. Phosphorus, Radioactive - Production - Norway 3. Sulfur, Radioactive - Uses - Norway 4. JENER 41.

Report on intensifying screens for gamma ray radiography, by C. W. Briggs and R. A. Gezelius. U. S. Naval Research Laboratory. Aug 1936. 16p drawing, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122708

Plates 7-13 omitted.
1. Radiography - Apparatus 2. Gamma rays - Shielding 3. Screens, Radiographic 4. NRL M-1301.

Routine production of zirconium-tritium and zirconium-deuterium targets, by W. J. Arrol, E. J. Wilson and C. Evans. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 10p photos, diagr. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 32 cents. PB 123598

Date of manuscript: Apr 1953. S. O. code no. 91-3-2-38.
1. Atomic power - Research - Gt. Brit. 2. Targets, Radiation - Preparation - Gt. Brit. 3. AERE I/R 1135.

Scattering of low velocity molecular beams in gases, by Edward A. Mason. Maryland. University. Institute of Molecular Physics. May 1956. 37p diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122450

A large number of partial and total molecular scattering cross sections have been calculated numerically for molecules obeying an exp-six potential, consisting of an exponential repulsion term and an inverse sixth power attraction term. The tabulations cover a wide range of scattering angles, energies, and potential parameters, and can be used to obtain information about intermolecular forces from the results of experiments on the scattering of low velocity molecular beams in gases. The use of the tables is illustrated by a comparison with Knauer's results on the scattering of beams of H_2 in mercury vapor. AD 87522. AF OSR Chem 40-31. AF OSR TN 56-208. Contract AF 18(600)-1562.

Some comments on the hazards arising from fission-product heat in the event of an accident to a heavy water boiling reactor, by J. P. Davidson. Norway. Joint Establishment for Nuclear Energy Research, Kjeller, Norway. Sep 1955. 17p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 123186

Certain interest attaches to the question of what hazards would arise, in the event of an accident to a pressurized water boiling reactor system, from the continuing heat generation from the fission products. Two different situations can be distinguished. In the first, and perhaps less probable, one may assume that the water moderating the system suddenly disappears at some time t_o. In this case fission stops almost at once in the fuel elements, the disappearing water carries with it a vast amount of energy, and one deals only with the heat arising from the beta and gamma decays of the fission products. In the second case one may suppose that the pressure is suddenly relieved. Here, as shall be seen, a large amount of heat is available to vaporize the moderator, and in addition, heat is available in the fuel elements both in the thermal form (instantaneously) and from the fission products. JENER 37.

Tables of neutron cross sections of fissile materials. I: Harwell data, compiled by P. A. Egelstaff. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 28p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 77 cents. PB 123593

S. O. code no. 91-3-2-36. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Neutrons - Cross sections - Tables - Gt. Brit. 3. Tables, Mathematical 4. AERE NRDC 81.

Thermal neutron activation cross-section of sodium, by S. J. Cocking and J. F. Raffle. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 10p diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 37 cents. PB 123620

S. O. code no. 91-3-2-65. Unclassified.
1. Atomic power - Research - Gt. Brit. 2. Sodium carbonates, Irradiated - Neutron density - Gt. Brit. 3. Sodium ions - Cross sections - Gt. Brit. 4. AERE NP/R 1894.

Tritium production by high energy protons, by Lloyd A. Currie, W. F. Libby and Richard L. Wolfgang. Chicago. University. Enrico Fermi Institute for Nuclear Studies. Nov 1955. 30p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122407

AD 81048. Based on a doctoral dissertation by L. A. Currie (Sep 1955). Parts of this report will not reproduce well.
1. Atomic power - Research 2. Tritium - Nuclear properties 3. Tritium - Proton reactions 4. Tritium - Production 5. Contract AF 18(600)-663 6. AF OSR TN 56-56.

Vacuum equipment for the 4 mev. linear electron accelerator, by B. G. Loach. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 51p photo, drawings, diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.39. PB 123623

Date of manuscript: March 1949. S. O. code no. 91-3-2-70.
1. Atomic power - Research - Gt. Brit. 2. Accelerators, Linear - Gt. Brit. 3. Accelerators, Electronic - Components - Gt. Brit. 4. AERE EL/R 229.

Zero-zero transition in carbon 12, by B. F. Sherman and D. G. Ravenhall. Stanford University. Dept. of Physics. Mar 1956. 19p. Order from LC. Mi $2.40, ph $3.30. PB 122454

The electric monopole transition density between the ground state and the 7.68-Mev level of carbon 12 is examined on the basis of the nuclear shell model. It is concluded that if all of the possible states of the low-lying configurations were to be included in the diagonalization, agreement with experiment might result, but that in this case some semi-collective model might better be applied to the problem. Part of a thesis - Stanford University. Report 545-15. Project R-357-40-3. SU DP TR 15. AF OSR TN 56-152. Contract AF 18(600)-545.

PSYCHOLOGY

Characteristics of fighters and non-fighters. Part I: Analysis of intelligence and personality scales, by Robert L. Egbert, Victor B. Cline and Tor Meeland. George Washington University. Human Resources Research Office, Washington, D. C. Mar 1954. 21p graphs, table. Order from LC. Mi $2.40, ph $4.80. PB 123022

This study was done to obtain information which could lead to increasing the proportion of fighters in small combat infantry units. The specific purpose of this report is to present the psychological differences between fighters and non-fighters. Men were identified as having performed effectively or ineffectively in close combat during the final enemy offensive in Korea during July 1953. Component, rank, time in Army, time in combat zone, age, education, and marital status were compared for the two groups.

Conditions affecting the military utilization of peer ratings: The Newport study, by E. P. Hollander. Carnegie Institute of Technology. Psychological Laboratories, Pittsburgh, Pa. May 1956. 5p. Order from LC. Mi $1.80, ph $1.80. PB 123140

This is the final summary report of a large-scale study of peer ratings completed in 1955 at the U.S. Naval School, Officer Candidate (OCS) in Newport, Rhode Island, with the 23 sections comprising OCS class 23. The study's objective was to yield supportive data on the use of peer ratings -- specifically, "peer nominations" -- for supplemental screening in the OCS. The effects on the reliability and validity of ratings were studied for four core factors: the length of time the group had been together; the use of a "research" set vs. a "real" set on the peer rating forms; the nature of the quality to be rated; and, friendship choice. Final summary report under Contract Nonr-760(06).

Consistent differences in the objectively measured performance of members and groups, by Bernard Bass. Louisiana State University, Baton Rouge, La. Jul 1955. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 123044

Specifically, the present report concerns itself with the consistency or reliability of the individual and group measurements. Table 1 lists the measures of individual performance examined in this study. Table 2 shows the same information about the measures of group performance which in most cases were averages of the performance of the members of the group. For reports 2, 4-5 see PB 122311, 123124, 124233. Contract N7onr-35609, Technical report no. 3.

Evaluation of motion pictures to simulate reality in the thematic apperception test, by Charles J. McIntyre. Pennsylvania State University, University Park, Pa. Sep 1955. 14p tables. Order from LC. Mi $2.40, ph $3.30. PB 123749

The thematic apperception test has been widely used to permit people with personality problems to project themselves into situations portrayed by still pictures. This study was done to discover whether motion picture films could be used to make the situations portrayed by the test seem more real and thereby increase their effectiveness in diagnosis of personality problems. Instructional film research program. SDC project 20-E-4. SDC TR 269-7-47. Contract N6onr-269.

MMPI trends of small group leaders and members, by Donald W. Olmsted and Elio D. Monachesi. Minnesota. University. Dept. of Sociology, Minneapolis, Minn. Jul 1955. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 123043

AD 70972. For Technical report 5 see PB 123042. 1. Personality - Research 2. Personality tests 3. Group behavior 4. Minnesota Multiphasic Personality Inventory 5. Contract N8 onr 66216, Technical report no. 4.

Preservice personality problems and subsequent adjustments to military service: Gross outcome in relation to acceptance-rejection at induction and military service, by Merrill Roff. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1956. 17p graph, tables. Order from OTS. 50 cents. PB 121806

This is the first report of a longitudinal follow-up study of patients of public school child guidance clinics and a nonpatient control group through subsequent military service. The object is to discover objective factors associated with predisposition to adult maladjustment, with particular reference to military service, for application in selection procedures. A preliminary prediction study of gross outcome, based on global analysis of clinic case folders, resulted in a high degree of successful predictions. AF SAM R 55-138.

Recognition of three magnitudes of interphonemic transitional influence, by Henry M. Moser, John J. Dreher and George J. Harbold. Ohio State University Research Foundation, Columbus, Ohio. Dec 1955. 26p diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 122891

It was concluded from the results of this study that (1) transemes, or discrete magnitudes of interphonemic transitional influence, exist as entities and deserve further consideration in future efforts to delineate the code units of speech; (2) magnitude of transition, direction disregarded, does not provide recognition cues; (3) position of transition shift, with respect to the vowel, is significant for certain magnitudes; (4) direction of shift does not contribute to recognition of magnitude; and (5) transition magnitude might be investigated to determine possible involvement in articulation testing. Project 7681. AF CRC TN 55-74. OSURF Proj 664, Technical report 33. Contract AF 19-(604)-1577.

Some experiments and related theory on the measurement of utility and subjective probability, by Donald Davidson, Sidney Siegel and Patrick Suppes. Stanford University. Applied Mathematics and Statistics Laboratory. Aug 1955. 104p graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 123223

The aims of the work reported here may be summarized: first, to develop a theory of decision making in situations involving uncertainty leading to the interval measurement of utility or subjective value which would, in certain essential respects, be more realistic than formal theories previously advanced; second, to determine experimentally, in situations involving the loss and gain of real money, whether the conditions imposed by the theory are satisfied; third, if utility is measurable in an interval scale, to study the shapes of individual utility curves over the range tested; fourth, to demonstrate briefly how the method can be used to measure subjective probabilities. AD 72866. Technical report 1. SU AMSL TR 1. Contract Nonr-225(17), NR 171-034.

Validity check on MMPI scales of "responsibility" and "dominance", by Donald W. Olmsted and Elio D. Monachesi. Minnesota. University. Dept. of Sociology, Minneapolis, Minn. Jul 1955. 5p tables. Order from LC. Mi $1.80, ph $1.80. PB 123042

AD 70973. For Technical report 4 see PB 123043.
1. Personality - Research 2. Personality tests
3. Minnesota Multiphasic Personality Inventory
4. Contract N8 onr-66216, Technical report no. 5.

RUBBER AND RUBBER PRODUCTS

Engineering study to determine the feasibility of using butyl synthetic elastomer in mechanical rubber items. Final technical report, by D. A. Meyer and J. G. Sommer. Dayton Rubber Co., Dayton, Ohio. Dec 1955. 33p tables. Order from OTS. $1. PB 121426

Butyl rubber has been proven feasible for use in mechanical rubber goods. The four different items listed below, having met all of their respective specifications, were supplied to Ordnance for experimental testing. 1. Wheel cylinder boot. 2. Master cylinder boot. 3. Air brake hose. 4. Windshield wiper hose. In order to meet low temperature brittleness requirements it was found necessary to incorporate high levels of plasticizers in the butyl compounds. A number of plasticizers were evaluated. All of the plasticizers tested were found to lower the ozone resistance of the compounds to a level below that normally associated with butyl and this effect was especially severe at the higher plasticizer levels. Contract DA 33-008-ORD-1071.

Performance cycling tests of high temperature hydraulic O-ring packings, by Frank R. Straus. U. S. Air Force. Air Research and Development Command, Wright Air Development Center, Aircraft Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1955. 25p photo, drawings, diagr, table (1 fold.) Order from LC. Mi $2.70, ph $4.80. PB 123720

This report describes methods used to determine the mechanical performance of synthetic rubber O-ring packings in hydraulic fluids at temperatures up to +550°F. Project 1371, Task 13495. AF WADC TN WCLS 54-71.

Study of sealing compounds for integral fuel tanks, by A. T. DiMasi. U. S. Naval Research Laboratory. Sep 1945. 37p tables. Order from LC. Mi $3, ph $6.30. PB 123370

The effect of a series of organic and inorganic reagents on the fuel resistance, application, stability and adhesiveness of butadiene-acrylonitrile, butadiene-styrene and polysulfide polymers was studied and is reported herein. These materials have been prepared and examined to determine their possible use as a sealing compounds for integral fuel tanks. A few results are given as to the practicability of the same materials for use as rubber adhesives. NRL P-2622.

STRUCTURAL ENGINEERING

Buckling of a circular ring plate under internal uniform pressure, by Tsu-Tao-Loo and Michael Sadowsky. Rensselaer Polytechnic Institute. Dept. of Mechanics, Troy, N. Y. Aug 1955. 20p diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 123016

The buckling of the structural member under non-uniform stress field has received only limited attention. Meissner in 1933 found the critical buckling load for a thin circular ring plate under external hydrostatic pressure with various edge conditions. In 1941, Egger extended the work to a plate with variable thickness. The present report investigates the case of a ring plate under internal hydrostatic pressure. A general approach to include both external and internal hydrostatic pressure is used in the analysis. AD 70658. ONR proj. NR 064-405. Contract Nonr-591(02), Technical report 11.

K statisticheskoi teorii khrupkoi proch nosti (On the statistical theory of brittle strength), by B. B. Chechulin. Translated by Lloyd G. Robbins; edited by F. A. Raven. Apr 1956. 15p graphs. Order from LC. Mi $2.40, ph $3.30. PB 122456

A critical analysis is given of the main points in statistical theories proposed by Weibull and Kontorova and Frenkel. It is established that some inadequacies in these theories result from poor theoretical assumptions concerning a statistical distribution of dangerous defects, which are statistically distributed about the volume of the body and are responsible for the general disintegration of the body when under stress. By assuming a Type III Pearson distribution function as best substantiated for the given case, a new solution of the statistical theory by Kontorova and Frenkel is mathematically presented; moreover, the accuracy of this solution in comparison with the previous solution is demonstrated. It is demonstrated that the Weibull equation constitutes a special case of the proposed formula for brittle strength when the number of defects in the volume of the body is great. Translated from Zhurnal Tekhnicheskoi Fiziki (Journal of Technical Physics) (USSR), vol. XXIV, no. 2, 1954, pp. 292-298. NAVSHIPS T 603. STS 230.

TEXTILES AND TEXTILE PRODUCTS

Breaking of single cotton fibers under various conditions, by Ray L. Pearson, Albert G. Funk and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Sep 1954. 21p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123898

This paper studies the variation in percentage elongation of each cotton fiber at break and what determines the strength of each fiber. A single fiber breaker was used which is a modification of the Sookne-Rutherford autographic balance. Contract N7onr-45101, NR 032-168. UU ISRP TR 45.

Development of Dacron parachute materials, by Ernest R. Kaswell and Myron J. Coplan. Fabric Research Laboratories, Inc., Boston, Mass. Sep 1956. 168p diagrs, graphs (part fold.), tables. Order from OTS. $4.25. PB 121793

Certain Air Force deceleration parachutes are exposed to temperatures in the 350-400°F. range. Nylon is severely degraded when exposed to these temperatures for relatively short time periods. Dacron exhibits significantly better heat degradation resistance. Selected threads, braids, cloths, webbings, ribbons and tapes were designed, developed and tested. All confirm the improved heat degradation resistance. While Dacron does not degrade at high temperatures, it does shrink appreciably. This required that all Dacron items be stabilized via heat relaxation shrinkage at 350-375°F. Nylon is outstanding in its ability to deform under load and recover upon load removal without evidencing a large amount of non-recoverable elongation or permanent set. Dacron, in its originally produced state has almost as good recovery properties. It has been determined that losses in strength, elongation and energy of the subject Dacron materials after heat ageing for 24 hours at 350°F amount to about 10-20%. In conjunction with the development of heat stable Dacron yarns, preliminary studies indicate that a proper sequence of stretching and relaxing at below-rupture loads and at high temperatures will produce Dacron yarn of high tenacity, normal elongation and zero heat shrinkage. AD 97241. Project 7320, Task 73201. Covers work from Apr 1954 - Mar 1955 under Contract AF 33(600)-24087. AF WADC TR 55-135.

Evaluation of fungus resistance of cotton thread treated with selected fungicidal formulations. Supplement 1. Statistical analysis of data, by Arthur Rose and Thomas B. Hoover. Applied Science Laboratories, Inc., State College, Pa. Oct 1956. 22p tables. Order from OTS. 75 cents. PB 121804

The statistical treatment includes analyses of variance of breaking strengths of threads exposed to the fungus tests and also of the corresponding unexposed control threads. The direct effects of each of the main factors (color, finish, fungicidal agent, level of concentration of fungicide, and test method) upon the loss in breaking strength are evaluated and confidence limits are estimated. AD 110441. Project 7312, Task 73124. Covers work from Jan - Apr 1956 under Contract AF 33(600)-26749, S. A. 3. AF WADC TR 56-480, Suppl. 1.

Interim technical summary report on progress in the study of blended woolen yarns, by Myron J. Coplan. Fabric Research Laboratories, Inc., Dedham, Mass. Dec 1955. 29p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 124313

Study of blended-yarn geometry and mechanics has progressed through several stages. An effort has been made to go beyond the empirical determination of properties. More intensive theoretical interpretation has been made wherever possible, employing intrinsic fiber properties and yarn geometry to develop an understanding of blended-yarn mechanics. Low strain, repeated-stress and tensile-rupture properties have been examined, explained, and in some respects quantitatively formulated. Theoretical aspects of blend distribution have been established, and the actual distributions in some woolen-type blended yarns ascertained. Yarn-blending properties, regidity, resilience, and elastic recovery have been examined. An entirely new test technique was developed for this purpose. Case no. C51137. For technical reports 1-2 see PB 121343 and PB 121471. Contract Nonr-478(00). Contract Nonr-1422(00).

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Material properties for design of airframe structures to operate at high temperatures, by L. R. Jackson. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Mar 1956. 66p diagrs, graphs, tables. Order from OTS. $1.75. PB 121612

This report lists and discusses those mechanical and physical properties which may be of possible significance in the design of airframes which are to operate at elevated temperatures. These properties are evaluated on the basis of the precautions required to determine them accurately at elevated temperatures. A discussion is included on the availability of this type of property data. BMI TML R 38.

Review of the Air Force materials research and development program, by Helen E. Hines and

Ruth F. Walden. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1956. 94p. Order from OTS. $2.50.
PB 111648s2

One hundred and forty-five technical reports and technical notes written during the period of 1 July 1955 - 30 June 1956 are abstracted. These reports cover the following areas of research: adhesives, metallurgy, analysis and measurement, biochemistry, textiles, petroleum products, plastics, packaging, protective treatments and rubber. A contractor index, investigator index, and a numerical index of all the technical reports issued during the period March 1923 - June 1956 are provided. AD 110468. Supplement 3 to PB 111648. AF WADC TR 53-373, Suppl. 3.

Instruments

Analytic determination of two-dimensional supersonic nozzle contours having continuous curvature, by James C. Sivells. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jul 1956. 27p graphs. Order from LC. Mi $2.70, ph $4.80. PB 123082

An analytic method is presented for determining the contours of two-dimensional supersonic nozzles having continuous curvature. The method described is more accurate and less time consuming than the characteristics method of obtaining contours. The assumption is made that radial flow can be obtained at the inflection point through the use of a simple polynomial for the initial part of the contour. This radial flow is converted to parallel flow at the test section Mach number as described herein. AD 88606. Contract AF 40(600)-620. AEDC TR 56-11.

Development and use of the airport orientator, by I. R. Metcalf. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Dec 1938. 24p photos, diagrs (1 col.) Order from LC. Mi $2.70, ph $4.80. PB 123557

Formerly Report no. 5, Technical Development Division, Civil Aeronautics Authority. Reprinted 1941. Color in diagram will not reproduce. 1. Instruments, Aeronautical 2. Pilots, Air - Orientation 3. CAA TDR 20.

Evaluation of the resetting continuous fire detection system for the B-36 aircraft nacelle, by Lyle E. Tarbell. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Nov 1956. 17p photos, diagrs, table. Order from OTS. 50 cents. PB 121777

A continuous type of fire-detection system was designed, installed in a B-36 test nacelle, evaluated approved, and a contract awarded. At the time the award was made, the foreward portion of the nacelle was, for all practical purposes, a portion of the wing. Subsequent modifications to the nacelle created a new zone in this region. Further tests were conducted to contrive an effective arrangement of the system in the new zone. The system described in this report is recommended for protection of the entire revised B-36 aircraft nacelle. CAA TDR 295.

Friction of aircraft pulley-cable combinations, by J. B. Jewell, R. J. Lutz and Bruce Smith. Westcoast Engineering Development Co., San Diego, Calif. Nov 1946. 382f diagr, graphs, tables. Order from LC. Mi $11.10, enl pr $61.85.
PB 123899

These tests were made to provide directly applicable data for use in aircraft control system friction analysis and to establish a datum for control system evaluation. The main conclusions are that friction varies directly as the first power of cable tension at a given wrap-angle; that low temperatures cause sufficient friction rise to make operating temperature a major consideration in system design and that an increase in pulley-to-cable diameter ratio is the most effective means of reducing friction at a given wrap-angle and cable tension. Additional conclusions are presented. ATI 30074. WEDCO Report A461. AF WADC TR 56-35.

Engines and Propellers

Development of molybdenum nozzle blades, by D. V. Doane. Climax Molybdenum Company, Detroit, Mich. Apr 1955. 19p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 123113

This report describes the development of methods to produce coated molybdenum gas turbine guide vanes (nozzle blades) conforming as closely as possible to USAF Drawing X52D9613. Under this contract 60 vanes have been fabricated and 6 vanes have been coated, using two different coating procedures. The detailed fabrication procedures, coating experiments, and detailed coating procedures are presented in the report. AD 75793. Project no. 7351, Task no. 73512 (formerly RDO 615-13). AF WADC TR 55-96. Contract AF 33(600)-23851.

Investigation of aircraft ducting components at high subsonic speeds, by Owen P. Lamb and James S. Holdhusen. FluiDyne Engineering Corp., Minneapolis, Minn. Sep 1956. 150p photos, drawings, diagrs, graphs. Order from OTS. $3.75.
PB 121710

The components, all of circular cross section, include mitre bends, radius elbows, compound bends, conical diffusers and contractions, diverging and converging Y-branches, and small takeoffs. Component design information at entrance Mach numbers from M = 0.2 to 1.0 are presented graphically as

total- and static-pressure loss coefficients and as functions of exit Mach number. Limited tests of combinations of components were conducted as a check on the applicability of the individual component data to duct system analysis. AD 97321. AF WADC TR 56-187. Contract AF 33(616)-2792.

Research to develop improved spark plug cleaning methods with particular emphasis on cleaning of fine-wire (platinum electrode) spark plugs, by John E. Clifford. Battelle Memorial Institute, Columbus, Ohio. Jun 1953. 38p drawings, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123143

Previous research indicated that chemical cleaning offered the best chance of success. A method was developed using a caustic soda solution which could be blasted into the firing end of a spark plug by means of a steam ejector. A prototype machine employing this method was designed and is to be tested. AF WADC TR 53-358. Contract AF 18-(600)-109.

Selection of materials for high-temperature applications in aircraft gas turbines, by Armor Research Foundation. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, Ohio. Aug 1956. 35p diagr, graphs, table. Order from OTS. $1. PB 121619

A survey was made of the major gas-turbine manufacturers to determine the applicability of titanium in gas turbines and the criteria whereby gas turbine materials are selected. The ultimate tensile strength, yield strength, stress-rupture properties, and fatigue strength of three commercial titanium alloys and one experimental alloy are compared on a strength/density basis with similar properties for other metals. Other properties considered are modulus of elasticity, damping capacity, creep strength, corrosion resistance, weldability, thermal stability, and notch sensitivity. The temperature range for superior performance of titanium over other metals is identified. A discussion is given on the current applications of titanium in gas turbines and the possible influence of future trends in gas-turbine development. Report prepared by Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill. Covers work from Oct 1 1955-Apr 30, 1956 under Contract AF 18(600)-1375, Subcontract 2. BMI TML R 50. ARF Proj L-060.

Airports and Airways

Analytical studies of orthotropic landing mats for forward airfields, by Gerald Pickett. Wisconsin. Engineering Experiment Station, Madison, Wis. Feb 1955. 41p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123993

This research deals with the mathematical solutions for deflections of landing mats under concentrated and distributed loads and supported by an elastic solid foundation. The effects of three rigidities, longitudinal, transverse, and torsional, in reducing deflections are studied. Miscellaneous paper 4-113. Reprint 266. Paper submitted Sep 1953. DA project 8-69-04-004. Contract DA 22-079-eng-114, Final report.

Development plan for an improved air traffic control system. Revised. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Sep 1956. 25p diagrs, graph, table. Order from OTS. 75 cents. PB 121841

An improved air traffic control system based on the best known technical approach is described. Each element under the recommended program for accomplishment is divided into an in-service improvement section and a research and development section. This program is directed toward the development of a semiautomatic air traffic control system. Increased use of radar data is recommended. Emphasis is placed on the automatic flow of data in the ground-control system. Computers for planning and problem-detection functions are included. The need for an evolutionary approach is emphasized as a basic principle in this program. CAA TDR 300.

Evaluation by simulation techniques of a proposed traffic control procedure for the New York metropolitan area, by Clair M. Anderson and Charles E. Dowling. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1954. 35p maps, diagrs, graphs, table. Order from LC. Mi $3, ph $6.30. PB 123551

This report describes a study to determine methods of expediting air traffic to and from the six major airports in the New York metropolitan air-traffic-control area. This study was made with the aid of simulation techniques developed jointly by the Franklin Institute Laboratories for Research and Development and by the Technical Development and Evaluation Center of the Civil Aeronautics Administration. Comparative tests were made of two different arrangements of radio navigational facilities. These configurations included the one in use at present as well as a system in which the present configuration was modified to provide more independent arrival routes. A map showing one possible arrangement using VHF omnirange stations is also included in this study. CAA TDR 245.

Aerodynamics

Contributions on the mechanics of laminar-turbulent transition of jet flow, by U. Domm, H. Fabian, O. Wehrmann and R. Wille. Berlin. Technische Universität. Hermann Föttinger-Institut für Strömungstechnik. Nov 1955. 54p photos, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 122446

This report is divided into two parts. The first part is devoted to a hypothesis which, based on visual studies of a water jet in water, introduces a ring vortex street embracing the jet in its first downstream section as a characteristic feature of the transition process. The instability of the ring vortex pattern leads to coalescence of vortices and these processes of "vortex-fusion" are the beginning of the decay of the discernible centres of vorticity. Some topics, e.g. the instability of the ring-vortex street are considered in the light of hydrodynamic theory. In the second part of this report hot-wire measurements in a free air jet serve to substantiate the phenomena delineated in part one. As at the present stage only conventional hot-wire anemometry could be used, it was difficult to investigate the nonhomogeneous processes in detail. However, it was possible to distinguish different processes involved in transition. Part of this report will not reproduce well. AF OSR TR 56-9. Contract AF 61(514)-808, Final report.

Optimum climb theory and techniques of determining climb schedules from flight test, by Kenneth J. Lush. U. S. Air Force. Air Research and Development Command. Air Force Flight Test Center, Edwards Air Force Base, Calif. Feb 1956. 52p. Order from LC. Mi $3.60, ph $9.30. PB 122426

Present knowledge at the Air Force Flight Test Center of the science and art of determining optimum climb schedules from flight test is reviewed, to provide an easy reference for engineers newly assigned to flight test work and a starting point for extension of present knowledge to the supersonic airplane. Climb schedules are defined to reach a given height in the shortest distance from take-off; for minimum time, minimum fuel used, or maximum range; and for interception at maximum distance. For jet airplanes the level acceleration, in which the airplane is accelerated through the speed range at approximately constant altitude, is the preferred flight test technique from which to establish optimum climb schedules. Properly flown, recorded and analyzed it gives good results with a saving of better than 50% in flight test time relative to the classical sawtooth climb method. AF FTC TN 56-13.

Rockets and Jet Propulsion

Modification of Air Force type J-8 attitude horizon indicator for Aerobee aspect instrumentation, by J. A. Foster, H. S. Sicinski and H. F. Schulte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jul 1955. 73p photos, drawings. Order from LC. Mi $4.50, ph $12.30. PB 124169

This report presents the procedures necessary for the modification of a standard Air Force type J-8 attitude horizon indicator for Aerobee aspect instrumentation. The gyro as manufactured is a "vertical gyro" which, as such, is not satisfactory for missile use. The modification procedure converts the instrument to a "free gyro" which is suitable for Aerobee missile use. Detailed drawings, photographs, and a description of special equipment and test procedures are included so that a well-trained technician or an engineer can achieve the desired result. MU ERI TN CT-2. MU ERI Proj 2096-10-T. Contract AF 19(604)-545.

Marine Transportation

Analysis of methods and means of anti-submarine attack, by H. C. Hayes. U. S. Naval Research Laboratory. Aug 1941. 21p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120595

Unclassified 15 Dec 1953.
1. Anti-submarine warfare 2. Bombs, Depth 3. Charges, Anti-submarine 4. NRL S 1776.

Benthonic productivity project. Final report, by David M. Pratt and Donald A. Campbell. Rhode Island. University. Narragansett Marine Laboratory, Kingston, R. I. Jun 1955. 53p map, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 124006

Ref 55-10. Contents: Part I. Environmental factors affecting growth in venus mercenaria L. - Part II. Phytoplankton production.
1. Plankton - Use as food 2. Plankton - Growth 3. Clams - Growth - Narragansett Bay 4. Contract Nonr-396(03), NR 163-100, Final report.

Distribution of the standing crop of total net plankton off the Texas coast, by Kenneth H. Drummond and Jerome E. Stein. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Sep 1955. 23p maps, graph, tables. Order from LC. Mi $2.70, ph $4.80. PB 123958

Ref: 55-30T. A and M project 77. Biological oceanography, Technical report no. 10.
1. Oceanography, Biological 2. Plankton - Distribution 3. Contract N7 onr-487(08), Technical report 10.

Exhaust-stack ejectors for marine gas turbine installations, by A. L. London and Paul F. Pucci. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Jul 1955. 47p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123023

In marine power plant installations, ventilation of the machinery space is an essential requirement for both the operating personnel and for the air-cooled electrical equipment. For a gas turbine installation, because of the large specific flow rate of exhaust gas, (lb/hr/shp), an exhaust stack ejector offers many advantages, and in fact has already been installed in several types of naval craft. In this report a one-dimensional flow analysis of an exhaust-stack

ejector is developed which (1) provides the correct form of an expression for ejector behavior, and (2) specifies the nondimensional ejector parameters needed for model investigations. Additionally, model test results are reported which provide a momentum correction factor useful for the design problem. AD 72559. SU ME TR 26. Contract N6 onr-251, T. O. 6, NR 065-104.

Flow maps of American coastal and foreign ocean traffic, by Edward L. Ullman, Burton F. Kelso, Howard E. Vogel and Robert P. Hinkle. Washington. University, Seattle, Wash. Jul 1955. 18p maps. Order from LC. Mi $2.40, ph $3.30. PB 123180

This report contains flow maps of U. S. foreign, ocean borne trade for dry cargo in 1948 and for tanker traffic in 1947, as well as for domestic ocean traffic in 1950. In addition origin and destination maps for U. S. coastal areas for domestic ocean traffic are also presented for 1950. The years chosen are fairly representative and were the only ones for which data were available to the author. Report no. 16. Contract Nonr-477(03).

James River winter cruise II, Feb 13 - 17, 1953, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute, Baltimore, Md. May 1955. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 123987

Reference 55-2. Data report 25.
1. Sea water - Salinity - Measurements - James River 2. Sea water - Temperature - Measurements - James River 3. Weather forecasting 4. Contract Nonr-248(20), NR 083-016 5. Contract Nonr-248(30), NR 083-070.

Literature study on the chemical composition of sea water, by Gordon C. Stone. U. S. Naval Research Laboratory. Feb 1936. 52p tables (1 fold.). Order from LC. Mi $3.60, ph $9.30. PB 122714

1. Sea water - Chemical analysis - Bibliography 2. NRL P 1236.

Oceanographic survey of the Gulf of Mexico. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Order separate reports described below from LC, giving PB number of each report ordered.

Circular slide rule for determination of pressure independent specific volume anomalies of sea water, by William H. Clayton. May 1955. 12p photo, table. Mi $2.40, ph $3.30. PB 123989

This paper discusses the design of a circular slide rule for direct evaluation of the specific volume anomalies. The rule is suitable for office or shipboard use and requires little practice to permit rapid computations. A and M Project 24-A, Ref: 55-19T. Contract N7 onr-48702, NR 083-036, T. O. II.

Physical and meteorological data, cruises 5, 8 and 10 of the U. S. Fish and Wildlife vessel Alaska, by Dale F. Leipper. Oct 1955. 95p maps, tables. Mi $5.40, ph $15.30. PB 123740

A and M project 24 - Reference 55-37D.
1. Sea water - Temperature - Measurements 2. Oceanography - Records 3. Sea water - Salinity - Measurements 4. Sea water - Chemical analysis 5. Oceans - Depth - Measurements 6. Contract N7 onr-487, T. O. 11, NR 083-036.

Oils for calming rough waters. Partial report, by E. G. Lunn. U. S. Naval Research Laboratory. Aug 1936. 10p tables. Order from LC. Mi $1.80, ph $1.80. PB 122705

Plate 1 omitted.
1. Oils, Synthetic - Uses 2. Films, Liquid 3. NRL P 1293.

Profile measurements during cavitation (Profilmessung bei kavitation), by O. Walchner. Translated by J. Vanier. U. S. National Advisory Committee for Aeronautics. Jan 1944. 13p diagrs, graphs, tables. Order as TM 1060 from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 124183

Reprint of a report before the Congress on Hydromechanical Problems of Ship Propulsion at Hamburg, May 18 and 19, 1932.
1. Cavitation - Research 2. Airfoils - Cavitation - Determination 3. NACA TM 1060.

Shoreside facilities for trailership, trainship and containership services, by Tippets, Abbett, McCarthy and Stratton. U. S. Maritime Administration, Washington, D. C. Nov 1956. 81p photos (part fold), diagrs (part fold), tables. Order from OTS. $2. PB 121771

This report summarizes the functional requirements and criteria for the planning of shoreside facilities to accomodate various types of roll-on, roll-off, and lift-on, lift-off terminal operations. The data on which this report is based include information on shoreside facilities currently in operation and proposals for ship construction received by the Maritime Administration.

MISCELLANEOUS

Abstracts of published papers and list of translations, vol. 4, no. 2 (abstracts 53-93). Australia. Commonwealth Scientific and Industrial Research Organization. Feb 1956. 20p. Order from LC. Mi $2.40, ph $3.30. PB 122458

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

Bedrock geology of Marguerite Bay area, Palmer Peninsula, Antarctica, by Robert L. Nichols. Ronne Antarctic Research Expedition. Nov 1955. 65f photos, drawings, diagrs, maps, table. Order from LC. Mi $4.50, enl pr $12.30. PB 123903

AD 79017. Technical report 13.
1. Geology - Research - Antarctica 2. Contract N6 onr-280 3. Contract Nonr-979(00).

Report of NRL progress. U. S. Naval Research Laboratory. Feb 1957. 60p. Order from OTS. $1.25. Also available at annual subscription rate of $10 a year in U. S. A., foreign subscription rate $13 a year. PB 121840

Contents: Articles: Importance of basic research to the new Navy, by Charles S. Thomas. - NRL research reactor control system, by M. P. Young and G. F. Wall. - Our atomic future, by Willard F. Libby. - Scientific Program: Problems accepted. - Problem notes: Astronomy and astrophysics: Night airglow measured directly with rocket-borne photometers centered at 6300A, 5893A, 5577A, and 5335A. . . .Report on Aerobee-Hi rocket firings (NRL 39, 42, 46, and 50). . . .Neutral gas and ion composition of the upper atmosphere measured simultaneously in pre-IGY test firing of an Aerobee-Hi (NRL 48). . . .Visibility of the scientific earth satellite. - Chemistry: Infrared spectra of some salts of organophosphorous acids. . . .Progress in algebraic methods for application to the phase problem in crystal structure studies. - Mathematics: Computation of orbital trajectories for an artificial earth satellite. . . .Simulation and design of an automatic control system for the Van-guard launching vehicles. . . .Analysis of sea clutter data; and computations associated with the tabulation of Debye characteristic temperatures. - Mechanics: A strain gage technique for measuring the driving force on a crack, which is applicable to widely different loading conditions. - Metallurgy and ceramics: A metallographic study of some Panama Canal Zone corrosion specimens. . . .Electrical resistivity measurements of the Ni-Pd alloy system above 300°K. . . .Tear test results on some 1-inch thick steel place specimens. . . .Current-voltage relationship of galvanic anode arrays in cathodic protection systems for naval ships. - Nuclear and atomic physics: Fallout protection afforded by standard enlisted men's barracks. - Radio: A radio meteorological propagation experiment. . . . Scanning antenna research. - Solid-state physics: Estimating the noise in nonlinear oscillators. . . . Electron spin resonance absorption in carbons . . . .Emission of Z-centers in KCl. . . .Luminescence and symmetry of color centers. . . .Concentration quenching in phosphors. . . .Symmetry properties of V_1 centers. . . .Theory of cyclotron resonance absorption by conduction electrons in indium antimonide. . . .X-ray properties of plastically deformed LiF single crystals. . . . Magnetic refrigerator installed for producing extremely low temperatures. - Published reports. - NRL bibliographies. - Papers by NRL staff members. - Patents.

Research on calcification in mollusks. Final report, by Gerrit Bevelander. New York University, New York, N. Y. Jul 1955. 6p. Order from LC. Mi $1.80, ph $1.80. PB 123049

1. Mollusks - Calcification 2. Contract Nonr-995(00), NR 163-159.

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Biology and Medicine

Carcinogenesis by radioactive substances, by Jacob Furth and John L. Tullis. Children's Cancer Research Foundation, Boston and New England Deaconess Hospital. Cancer Research Inst., Boston. 1955. 60p. Order from LC. Mi $3.90, ph $10.80. AECU-3080

Study of the biological effects of irradiation. Progress report for the period of January 16, 1955 to January 15, 1956, by Richard L. Potter, Frank H. Bethell, David F. Bohr, H. Owen France, Henry J. Gomberg, Sylvester E. Gould, James W. Lineman, and John B. Villella. Michigan. Univ., Ann Arbor. n.d. Contract AT(11-1)-75. 173p. Order from LC. Mi $8.10, ph $27.30. AECU-3152

The role of bacterial infection in radiation injury, by C. Phillip Miller. Chicago. Univ. Dept. of Medicine. Dec 1955. Contract AT(11-1)-46. 16p. Order from LC. Mi $2.40, ph $3.30. AECU-3351

A review of the MPC's for natural thorium, by J. W. Healy. Hanford Atomic Products Operation, Richland, Wash. Nov 1955. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. HW-40105

Columbia River travel time measurements by float methods, by J. K. Soldat. Hanford Atomic Products Operation, Richland, Wash. Jan 1956. Contract W-31-109-eng-52. 18p. Order from LC. Mi $2.40, ph $3.30. HW-41275

Biological effects of inhalation of high concentrations of tritium gas, by T. T. Trujillo, E. C. Anderson, and W. H. Langham. Los Alamos Scientific Lab., N. Mex. Dec 1955. Contract W-7405-eng-36. 37p. Order from LC. Mi $3, ph $6.30. LA-1986

Chemistry and Chemical Engineering

Innovations in processing uranium ores, by J. B. Rosenbaum, J. B. Clemmer, and W. L. Lennemann. Intermountain Experiment Station. Bureau of Mines, Salt Lake City, Utah. Sep 1956. 20p. Order from OTS. 25 cents. AECU-3367

Temperature dependence of silver-silver chloride exchange, by T. W. Olcott. University of Michigan, Ann Arbor, Mich. Oct 1956. Contract AT(11-1)-70. 22p. Order from OTS. 25 cents. AECU-3372

Nuclear chemical research radiochemical separations and activation analysis. Progress report 5 November 1955-October 1956, by W. W. Meinke. University of Michigan. Dept. of Chemistry. Nov 1956. Contract AT(11-1)-70. 85p. Order from OTS. 50 cents. AECU-3375

High density graphite. Semiannual report for June through November 1952, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT(11-1)-221. 33p. Order from LC. Mi $3.30, ph $7.80. AECD-3751

Preliminary report on high concentration of deuterium by catalytic exchange reactions, by Harris Mayer and Robert Bonner. Columbia Univ., New York. Div. of War Research. Feb 1943. Decl. Aug 1956. Contract OEMsr-412. 21p. Order from LC. Mi $2.70, ph $4.80. AECD-3754

Quarterly report for July, August, September 1951, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT(11-1)-172. 17p. Order from LC. Mi $2.70, ph $4.80. AECD-3755

Quarterly report for October, November, December 1951, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT-(11-1)-172. 27p. Order from LC. Mi $2.70, ph $4.80. AECD-3756

Quarterly report for January, February, March 1952, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT-(11-1)-172. 27p. Order from LC. Mi $2.70, ph $4.80. AECD-3757

Mass spectrometric determination of isotopic ratio with varying ion beam intensity, by A. E. Cameron and J. R. White. Tennessee Eastman Corp., Oak Ridge, Tenn. Mar 1946. Decl. Nov 1955. Contract W-7401-eng-23. 5p. Order from LC. Mi $2.40, ph $3.30. AECD-4211

Flotation characteristics of Florida phosphate leached zone material. Progress report no. 7, by Robert E. Snow. Pennsylvania State Univ., University Park, Mineral Industries Experiment Station. Dec 1955. Contract AT(49-6)-919. 27p. Order from LC. Mi $3, ph $6.30. AECU-3146

Vapor pressure-temperature relations on the system NaF-HF, by Wallace Davis, Jr. Carbide and Carbon Chemicals Div. K-25 Plant, Oak Ridge, Tenn. Sep 1953. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. AECU-3240

Determination of PVT relationships and heat capacity of steam-oxygen mixtures. Final report, by James A. Luker and Thomas Gniewek. Syracuse Univ., N. Y. Research Inst. For Oak Ridge National Lab. Aug 1955. Contract W-7405-eng-26, Subcontract No. 548. 34p. Order from LC. Mi $3, ph $6.30. AECU-3300

Decontamination and waste disposal in indium gamma irradiation facility, by Lawrence C. Widdoes. Internuclear Co., Clayton, Mo. May 1956. 7p. Order from LC. Mi $1.80, ph $1.80. AECU-3339

Progress report for February 15 to March 12, 1954, by Edward A. Mason. Ionics, Inc., Cambridge, Mass. For Westinghouse Electric Corp. Atomic Power Div. Subcontract 14-316. Mar 1954. 7p. Order from LC. Mi $1.80, ph $1.80. AECU-3356

Progress report for March 15 to April 15, 1954, by Carolus M. Cobb. Ionics, Inc., Cambridge, Mass. For Westinghouse Electric Corp. Atomic Power Div. Apr 1954. 9p. Order from LC. Mi $1.80, ph $1.80. AECU-3357

Radiochemical separations. I. Barium strontium, and calcium, by Duane N. Sunderman and W. Wayne Meinke. Michigan. Univ., Ann Arbor. (1955?) Contract AT(11-1)-70. 42p. Order from LC. Mi $3.30, ph $7.80. AECU-3360(Pt. I)

Radiochemical separations. II. Separation of radioactive silver by isotopic exchange, by Duane N. Sunderman and W. Wayne Meinke. Michigan. Univ., Ann Arbor. (1955). Contract AT(11-1)-70. 21p. Order from LC. Mi $2.70, ph $4.80. AECU-3360(Pt. II)

O^{18} study of the reaction of hydroxide with mercury(II) nitrate. Characterization of basic mercury(II) nitrates. Technical report on fundamental research on isotopic reactions, by Richard B. Bernstein, Harry G. Pars, and Doris C. Blumenthal. Michigan. Univ., Ann Arbor. Oct 1956. Contract AT(11-1) 321. 21p. Order from LC. Mi $2.70, ph $4.80. AECU-3363

Nonaqueous extractive methods for Western uranium ores. Final report, by R. A. Ewing, S. J. Kiehl, Jr., and A. E. Bearse. Battelle Memorial Inst., Columbus, Ohio. Jan 1955. Decl. Nov 1956. Contract AT(49-1)-635. 50p. Order from LC. Mi $3.30, ph $7.80. BMI-279

Investigation of ammonium uranates, by Robert A. Ewing, Samuel J. Kiehl, Jr., and Arthur E. Bearse. Battelle Memorial Inst., Columbus, Ohio. Jul 1956. Decl. Aug 1956. Contract W-7405-eng-92. 28p. Order from LC. Mi $2.70, ph $4.80. BMI-1115

The distribution of uranyl nitrate in a nitric acid, tributyl phosphate and water system, by M. W. Lerner and George Petretic. New Brunswick Lab., AEC, N. J. Dec 1951. Decl. Oct 1955. 14p. Order from LC. Mi $2.70, ph $4.80. CF-51-12-43

A process for uranium as a single product from LZ ore using minimum sulfuric acid: A preliminary cost estimate, by C. F. Coleman, F. A. Schimmel, and K. B. Brown. Oak Ridge National Lab., Tenn. Jun 1953. Decl. Jun 1956. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. CF-53-6-176

Design of a pilot plant to study liquid-liquid extraction of uranium from acidic sulfate leach liquors, by B. B. Klima, J. F. Manneschmidt, and J. R. Buchanan. Oak Ridge National Lab., Tenn. Nov 1954. Decl. Feb 1956. Contract W-7405-eng-26. 51p. Order from LC. Mi $3.60, ph $9.30. CF-55-11-185

Raw materials economic studies: A preliminary estimate of the cost of uranium extraction from a slime slurry. I. Depa—capryl alcohol, by B. B. Klima and R. R. Wiethaup. Oak Ridge National Lab., Tenn. Sep 1955. Decl. May 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-55-9-85

Raw materials process testing. Progress report of Engineering Section for March 1956, by A. D. Ryon and K. O. Johnsson. Oak Ridge National Lab., Tenn. Aug 1956. Contract W-7405-eng-26. 22p. Order from LC. Mi $2.70, ph $4.80. CF-56-8-30

Quarterly report for December 1952 through February 1953, by L. H. Juel. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT(11-1) 221. 20p. Order from LC. Mi $2.70, ph $4.80. COO-136

Quarterly report for June, July, August 1953, by E. C. Thomas. Great Lakes Carbon Corp., Morton Grove, Ill. Oct 1953. Decl. Jun 1956. Contract AT(11-1) 221. 9p. Order from LC. Mi $1.80, ph $1.80. COO-138

Quarterly report for September, October, November 1953, by M. W. Nathans. Great Lakes Carbon Corp., Morton Grove, Ill. Jan 1954. Decl. Jun 1956. Contract AT(11-1)-221. 17p. Order from LC. Mi $2.40, ph $3.30. COO-139

Quarterly report for December 1953, January, February 1954, by M. W. Nathans. Great Lakes Carbon Corp., Morton Grove, Ill. Decl. Jun 1956. Contract AT(11-1)-211. 22p. Order from LC. Mi $2.70, ph $4.80. COO-201

Entrainment of solvent in extraction of uranium from heavy slurries, by J. B. Byrne. Dow Chemical Co. Western Div., Pittsburg, Calif. Jul 1956. Contract AT(30-1)-gen-236. 35p. Order from LC Mi $3, ph $6.30. DOW-146

A monitor for surface adsorbed tritium, by D. G. Karraker. Du Pont de Nemours (E.I.) & Co. Savannah River Lab., Augusta, Ga. Dec 1953. Changed from Official Use Only June 29, 1956. Contract AT(07-2)-1. 15p. Order from LC. Mi $2.40, ph $3.30. DP-34

The gasometric determination of nitrite and sulfamate, by W. N. Carson, Jr. Hanford Works, Richland, Wash. Mar 1950. Changed from Official Use Only July 6, 1956. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. HW-17097

Refractive index measurements, by L. L. Burger. Hanford Works, Richland, Wash. May 1950. Changed from Official Use Only July 6, 1956. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-17822

Hazardous materials--Redox plant, by J. W. Underwood. Hanford Atomic Products Operation, Richland, Wash. May 1956. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. HW-43319

Nuclear safety of right elliptic and right annular cylinders, by Norman Ketzlach. Hanford Atomic Products Operation, Richland, Wash. Jun 1956. 9p. Order from LC. Mi $1.80, ph $1.80. HW-43463

Alternating current and square-wave polarography, by Randall E. Hamm. Hanford Atomic Products Operation, Richland, Wash. Sep 1956. Decl. Nov 1956. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. HW-45513

Spectrochemical analysis of cesium in high concentrations of sodium and iron salts, by J. M. Taylor. Hanford Atomic Products Operation, Richland, Wash. Oct 1956. Contract W-31-109-eng-52. 11p. Order from OTS. 15 cents. HW-45964

Determination of small amounts of chloride in high nickel-chromium-iron solutions, by Kenneth W. Puphal, Glenn L. Booman, and James E. Rein. Phillips Petroleum Co. Idaho Operations Office, Idaho Falls, Idaho. Nov 1956. Contract AT(10-1)-205. 9p. Order from OTS. 20 cents. IDO-14389

Recovery of uranium from slag from the electric furnace production of phosphorus, by H. Z. Cammack and G. L. Bridger. Ames Lab. Iowa State College, Ames, Iowa. Aug 1955. Contract W-7405-eng-82. 84p. Order from OTS. 50 cents. ISC-638

Kinetics of the exchange reaction between two oxidation states of cerium, by Frank R. Parchen, Jr. and F. R. Duke. Ames Lab. Iowa State College, Ames, Iowa. Mar 1955. 34p. Order from OTS. 30 cents. ISC-671

Annotated bibliography of diaminoethanedione-dioxime, by Charles V. Banks and Richard Fullerton. Ames Lab. Iowa State College, Ames, Iowa. Oct 1956. Contract W-7405-eng-82. 14p. Order from OTS. 15 cents. ISC-794

Determination of microgram amounts of calcium in vanadium metal, by J. Rynasiewicz, R. Guenther, M. E. Sleeper, and R. H. Gale. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1950. Changed from Official Use Only June 26, 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-326

Summary report of reaction tests of various materials tested with sodium and sodium-potassium, by C. C. Nelson. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1951. Changed from Official Use Only June 26, 1956. Contract W-31-109-eng-52. 51p. Order from LC. Mi $3.30, ph $7.80. KAPL-557

An atomatic two-stage pump for transferring gases in a vacuum system, by O. N. Salmon. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1953. Changed from Official Use Only June 26, 1956. Contract W-31-109-eng-52. 20p. Order from LC. Mi $2.40, ph $3.30. KAPL-891

The continuous detection and measurement of low concentrations of oxygen in gases, by L. P. Pepkowitz. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1954. Changed from Official Use Only June 26, 1956. Contract W-31-109-eng-52. 29p. Order from LC. Mi $2.40, ph $3.30. KAPL-1176

Solubility of sodium monoxide in liquid sodium, by C. N. Salmon and T. J. Cashman, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1956. Contract W-31-109-eng-52. 29p. Order from OTS. 25 cents. KAPL-1653

The reaction of tritium and stopcock grease, by B. B. McInteer and E. R. Grilly. Los Alamos Scientific Lab., N. Mex. Aug 1950. Changed from Official Use Only July 18, 1956. Contract W-7405-eng-36. 8p. Order from LC. Mi $1.80, ph $1.80. LA-1138

A precision calorimeter for the measurement of heats of combustion, by Charles E. Holley, Jr. and Elmer J. Huber, Jr. Los Alamos Scientific Lab., N. Mex. Nov 1955. Contract W-7405-eng-36. 18p. Order from CTS. 20 cents. LA-2084

Development of the flow sheet for the Mound Laboratory liquid waste evaporation system. Engineering Research final report, by G. W. Frink, R. L. Bates, and M. McEwen. Mound Lab., Miamisburg, Ohio. Dec 1950. Changed from Official Use Only July 30, 1956. Contract AT-33-1-gen-53. 9p. Order from LC. Mi $2.40, ph $3.30. MLM-532

Synthesis of β-gentiobiose-1-C^{14}, by Robert Schaffer and Horace S. Isbell. National Bureau of Standards, Washington, D. C. Apr 1956. 9p. Order from OTS. 15 cents. NBS 4616

A review of the reaction kinetics of deuterium and tritium compounds. V. Association-addition and elimination reactions, by Lawrence M. Brown. National Bureau of Standards, Washington, D. C. Jun 1956. 25p. Order from OTS. 25 cents. NBS-4674

Polarographic behavior of organic compounds. V. Analysis of mixtures of dichloroacetic and trichloroacetic acids, by Philip J. Elving and Chiang-Siang Tang. Pennsylvania State College, University Park. May 1950. Contract AT(30-1)-822. 12p. Order from LC. Mi $2.40, ph $3.30. NYO-642

A study of the removal of radioactive particulate matter from water by coagulation, by Nathan C. Burbank, Jr., Robert A. Lauderdale, and Rolf Eliassen. Sedgwick Laboratories of Sanitary Science. Massachusetts Inst. of Tech., Cambridge, Mass. Sep 1955. Contract AT(30-1)-621. 108p. Order from OTS. 60 cents. NYO-4440

The removal of radioactive fall-out from water by municipal and industrial water treatment plants, by Robert A. Lauderdale and Rolf Eliassen. Sedgwick Laboratories of Sanitary Science. Massachusetts Inst. of Tech., Cambridge, Mass. Mar 1956. Contract AT(30-1)-621. 79p. Order from CTS. 50 cents. NYO-4441

Graphitization studies. Final report, by John Hay, W. J. Sutton, Yung Tao, and V. D. Frechette. New York. State Univ. Coll. of Ceramics, Alfred. Apr 1956. Contract AT(30-1)-1297. 48p. Order from LC. Mi $3.30, ph $7.80. NYO-7553

Progress report for October 1949, by Gordon C. Williams, Simeon V. Galginaitis, E. G. Baker, Jr., A. H. Isaacs, E. W. Holzknecht, R. A. Gillespie, R. G. Moody, and Robert Kaplan. Louisville, Ky. Univ. Inst of Industrial Research. Nov 1949. Decl. Jan 1956. Contract AT(30-1)-534. 18p. Order from LC. Mi $2.40, ph $3.30. NYOO-1003

A survey of the information available concerning the effects of radiations on water. (With particular regards to the application of water as a high temperature pile coolant), by W. L. Sibbitt. Oak Ridge National Lab., Tenn. Mar 1948. Decl. Sep 1956. Contract W-7405-eng-26. 20p. Order from LC. Mi $2.70, ph $4.80. CRNL-532

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