

U. S. Government

RESEARCH REPORTS

February 14
January 17, 1958
Vol. 29, No. 2

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

In this issue:

Effect of Dehydration, Preparation and
Storage on the Vitamin Content of Beef
Steaks and Pork Chops

Preparation and Properties of Borohydrides
of the Alkaline Earth Metals

Secondary Emission Ratio of Storage Tube
Insulator Films

Feedback System Testing

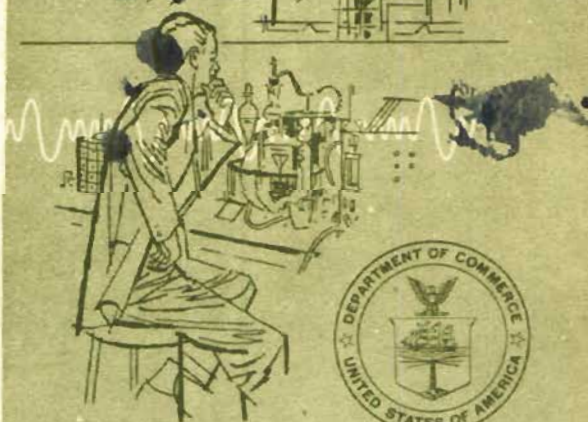
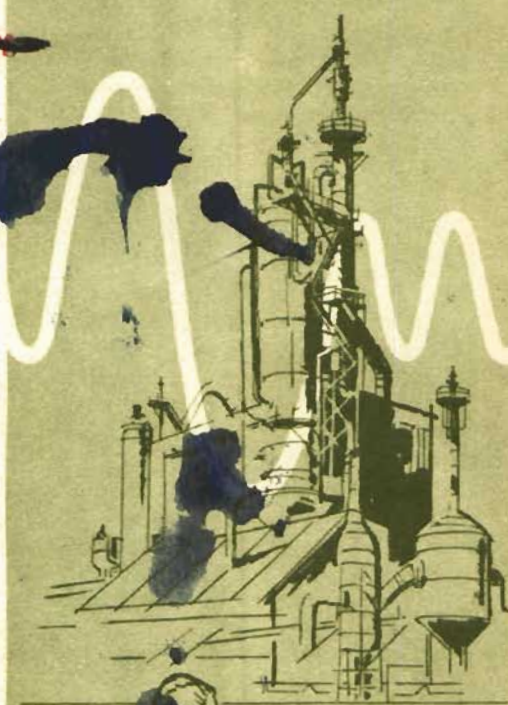
Marine Borers: A Preliminary Bibliography

High Temperature Protective Coatings for
Magnesium

Properties of Titanium Alloys at Elevated
Temperatures

Preparation of Highly Effective Rust
Inhibitors by Fractionation of
Mahogany Sulfonates

*Complete list of printed reports
begins on page 53*



U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

The PB Reports . . .

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

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

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

PB reports of special interest to smaller businesses are abstracted in OTS's monthly *Technical Reports Newsletter*, available from the Superintendent of Documents,

Washington 25, D. C., at \$1 a year domestic, \$1.50 foreign.

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

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

How To Order

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

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

such a machine you may be able to use one at a library in your area.

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

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

U. S. GOVERNMENT RESEARCH REPORTS

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

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

Issued monthly. Annual subscription \$6 (\$3 additional for foreign mailing). Single copy 60 cents. In the U. S. make remittance payable to Superintendent of Documents and mail either to a Department of Commerce field office or to Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Address changes should be sent to Superintendent of Documents. Outside the U. S. make remittance payable to and order from OTS, U. S. Department of Commerce, Washington 25, D. C. Foreign address changes should be sent to OTS.

Contents are not copyrighted and may be reprinted freely. Mention of source will be appreciated.
Use of funds for printing this publication approved by the Director of the Bureau of the Budget, August 22, 1955.



U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 29, No. 2

February 14, 1958

Contents

	Page		Page
Bibliography.....	54	Meteorology and Climatology.....	79
Chemicals and Allied Products	55	Minerals and Mineral Products	81
Electrical Machinery.....	58	Packing and Packaging.....	81
Food and Kindred Products.....	67	Personnel Aptitude Testing.....	82
Fuels and Lubricants.....	68	Physics.....	82
Highways and Bridges	70	Physiology.....	87
Instruments	70	Psychology.....	87
Machinery	73	Rubber and Rubber Products	89
Mathematics and Statistical Analysis.....	73	Transportation Equipment	89
Medical Research and Practice.....	75	Miscellaneous.....	93
Metals and Metal Products.....	76	Atomic Energy Commission Reports.....	95

Printed Reports Available from OTS Announced in This Issue

	Page
Age-hardening characteristics of a cast alloy of copper-6% titanium. (PB 131297) 50 cents	76
Airdrag anemometer. (PB 131533) 50 cents	70
Brief study of the suitability of titanium and a titanium alloy as firewall material. (PB 131392) 50 cents	76
Effect of dehydration, preparation and storage on the vitamin content of beef steaks and pork chops. (PB 131294) 50 cents.....	67
Feedback system testing. (PB 131345) \$1.00.....	66
High temperature protective coatings for magnesium. (PB 131073) \$3.00.....	56
Investigation of beta phase "recrystallization" in Ti-3% Al-5% Cr alloy. (PB 131338) 75 cents	78
Marine borers, a preliminary bibliography. Part I. (PB 131481) \$5.00	54
Marine borers, a preliminary bibliography. Part II. (PB 131058) \$4.75.....	54

	Page
Methods of accelerated weather deterioration for fluorescent paints. (PB 131302) 75 cents	56
NEL reliability design handbook. Supplement. Jan 1958. (PB 121839s2) 75 cents.....	63
Operational requirements for ATC displays. (PB 131387) 50 cents.....	92
Physical properties of monolayers adsorbed at the solid/air interface. Part III: Friction and durability of films on stainless steel. (PB 131493) 50 cents	56
Preparation and properties of borohydrides of the alkaline earth metals. (PB 131293) 50 cents	57
Preparation and structure of poly isopropyl styrene and poly isopropyl styrene hydroperoxide. (PB 131295) \$1.00	56
Preparation of highly effective rust inhibitors by fractionation of mahogany sulfonates. (PB 131231) 50 cents	69
Properties of titanium alloys at elevated temperatures. (PB 121634) \$6.00.....	78
Report of NRL progress, Jan 1958. (PB 131531) \$1.25.....	94
Revised proposal for investigation of self-focusing streams. (PB 131215) 50 cents	64
Secondary emission ratio of storage tube insulator films. (PB 131328) 50 cents.....	64
Stress corrosion and pyrophoric behavior of titanium and titanium alloys. (PB 121635) \$1.50	79
Volumetric scanning GCA antenna design. (PB 131286) \$1.50	65-66

BIBLIOGRAPHY

Bibliography of piezoelectricity. 1955. Final report - supplementary volume under Contract DA 36-039-sc-42587, by Karl S. Van Dyke and E. Charles Crume, Jr. Wesleyan University, Middletown, Conn. Apr 1956. 38p. Order from LC. Mi \$3.00, ph \$6.30. PB 126544

Dept. of the Army project no. 3-99-11-022. Signal Corps project no. 142B. For 10th report see PB 118261. Added title: 5th annual bibliography.
1. Crystals, Piezoelectric - Bibliography 2. Contract DA 36-039-sc-42587, Final report, suppl.

Cumulative list no. 4 of translations made by the American Meteorological Society, from 1 Jan 1952-31 Dec 1956. American Meteorological Society, Boston, Mass. n.d. 72p table. Order from LC. Mi \$4.50, ph \$12.30. PB 126034

1. Meteorology - Bibliography 2. Translations - Bibliography 3. Contract AF 19(604)-1936

List of reports for sale and published papers by A.E.R.E. staff, published mainly between Aug 1954 and Dec 1955, by L.J. Anthony and P.M. Harris. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1957. 41p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. \$1.12. PB 118836

Supplement to PB 118836. S.O. Code no. 91-3-3-22.
1. Atomic power - Research - Bibliography - Gt. Brit. 2. AERE Inf/Bib 96, Suppl. 1

Marine borers, a preliminary bibliography, by William F. Clapp and Roman Kenk. U.S. Library of Congress. Technical Information Division. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I. Feb 1956. 358p. \$5.00. PB 131481

Formerly available as PB 125921.

Part II. Jun 1957. 355p. \$4.75. PB 131058

Tensile strength of liquids, review of the literature,
by F.G. Blake, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jun 1949. 89p graph, table. Order from LC. Mi \$4. 80, ph \$13. 80. PB 126999

A summary of experimental measurements of the tensile strength of liquids is presented. Included are observations of the static breaking strengths and of the pressures, sometimes negative, at which hydraulic and acoustical cavitation occur. It is found that application of the kinetic theory of liquids to this problem leads to predicted tensile strengths far greater than those observed. A brief discussion of superheated liquids and the effervescence of gaseous solutions reveals a close relationship with the phenomena of cavitation. The part played by solid boundary-surface effects is discussed. It is concluded that experimental results can best be explained in terms of rupture nuclei, probably gas-filled, stabilized in the surface cracks of vessel walls or suspended solid matter. Contract N5ori 76, T.O. X, NR 014-903. HU ARL TM9.

CHEMICALS AND ALLIED PRODUCTS

Drugs and Pharmaceuticals

Action of chemotherapeutic agents and substrate analogues, by S. Spiegelman. Illinois. University, Urbana, Ill. Sep 1955. 10p tables. Order from LC. Mi \$1. 80, ph \$1. 80. PB 126136

AD 72936. Covers work from Apr 1 to Jun 15, 1955, under Contract Nonr 781(00), which is continued by Contract N6 ori 071(57). 1. Enzymes - Synthesis 2. Contract Nonr 781(00), NR 135-136, Final report

Organic Chemicals

Colloidal structure in gels. (Structural factors affecting the physical properties of gels of lithium stearate in n-hexadecane). Final technical report, by Marjorie J. Vold. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Aug 1955. 51p photos, graphs, tables. Order from LC. Mi \$3. 60, ph \$9. 30. PB 127022

The fundamental question under investigation is what is the magnitude and nature of the forces between colloidal particles? Subsidiary but still fundamental questions are how do these forces control the internal structure of colloidal systems and how through understanding them, may given desirable properties be realized in such systems. Grease systems have been one of the major areas of study during the last ten years. AD 71094. Ordinance project TB2-0001(1237). Covers work from

Sep 1, 1954-Aug 31, 1955 under Contract DA 04-495-ORD-557.

Final report on Contract N6 ori-212, T.O. I, project 051,028. Minnesota. University. Institute of Technology. School of Chemistry, Minneapolis, Minn. 1955. 12p. Order from LC. Mi \$2. 40, ph \$3. 30. PB 126131

In an attempt to learn as much as possible about the primary acts of photochemical reactions sensitized by chlorophyll, a wide variety of properties of dilute chlorophyll solutions have been investigated. These may be classified in five groups: studies of the properties of chlorophyll in its ground state, in its first excited singlet (fluorescent) state, and in its metastable (triplet?) state, of the steady-state reversible photobleaching of chlorophyll solutions, and of chlorophyll-sensitized photochemical reactions. While some of these approaches led to definite conclusions, the results of others have been negative or indefinite. All of the various attempts, unsuccessful as well as successful, are outlined briefly.

Fluorocarbon chemistry studies. Final technical report under Contract Nonr-1552(00), by Andrew J. Saggiomo. Temple University. Research Institute, Philadelphia, Pa. Apr 1956. 30p. Order from LC. Mi \$2. 70, ph \$4. 80. PB 125587

The purpose of this report is to submit the work accomplished on perfluoroalkyl aluminum complexes and to summarize the findings of the fluorocarbon chemistry studies under this contract. For technical report no. 1 see PB 123997. Half - title: Preparations and reactions of perfluoroalkyl aluminum complexes.

Homogeneous catalytic hydrogenation. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Contract N6onr-238, T.O. IV, NR 052-106. Order separate parts described below from LC, giving PB number of each part ordered.

Part VI: Rate law and temperature coefficient for the hydrogenation of cupric acetate, by W.K. Wilmarth and Max K. Barsh. 1955. 16p graphs. Mi \$2. 40, ph \$3. 30. PB 126128

Taken in part from a thesis by Max K. Barsh, June 1955. 1. Hydrogenation, Catalytic 2. Cupric acetates - Hydrogenation 3. Copper salts - Hydrogenation

Part VII: Rate of hydrogenation of various silver salts in pyridine solution, by W.K. Wilmarth and A.F. Kapauan. n. d. 18p graph, tables. Mi \$2. 40, ph \$3. 30. PB 126132

Date is 1955 or later. 1. Hydrogenation, Catalytic 2. Silver acetates - Hydrogenation 3. Silver salts - Hydrogenation 4. Pyridine - Hydrogenation

Infra-red studies on substitute and natural proteins, by G.B.E.M. Sutherland. Final report covering the period 1 Jan 1952 to 30 Sep 1954. Michigan University, Ann Arbor, Mich. Apr 1955. 5p. Order from LC. Mi \$1.80, ph \$1.80.

PB 126163

1. Proteins - Structure - Infrared research 2. Spectroscopy, Infrared 3. Contract N6onr-23224, Final report

Pressure effects on the ultraviolet absorption spectra of some aromatic compounds, by W.W. Robertson, O.E. Weigang, Jr. and F.A. Matsen. Texas. University, Austin, Tex. Apr 1957. 33p graphs, table. Order from LC. Mi \$3.00, ph \$6.30.

PB 126035

This report presents a study of the change in frequency of an electronic absorption band of a chromophore on change in the surrounding medium. Changes in the medium have been affected not by choosing different solvents, but by varying the density of one solvent, n-pertane, through the application of pressures up to 5,500 bars. Aromatic hydrocarbons were chosen as chromophores for which several transitions could be observed, thereby maintaining constant several important factors. The observations are discussed in terms of the London formula for dispersion forces. AD 120401. AF OSR Chem 20-14. Technical note 1. Contract AF 18(600)-430. Contract AF 49(638)-35. AF OSR TN 57-61.

Plastics and Plasticizers

Preparation and structure of poly isopropyl styrene and poly isopropyl styrene hydroperoxide, by Sidney Axelrod. U.S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N.J. Sep 1956. 35p photo, graphs, tables. Order from OTS. \$1.00.

PB 131295

Poly isopropyl styrene was prepared from polystyrene by means of the Friedel-Crafts reaction. Elemental analysis of the final product and quantity of hydrogen chloride generated during the reaction show that alkylation was essentially complete. Infrared spectroscopy showed the presence of methyl groups on the alkylated polymer. Poly isopropyl styrene hydroperoxide was prepared from poly isostyrene by oxidation with benzoyl peroxide and oxygen. Infrared spectroscopy was used to establish the presence of the CO and OH groups. Potentiometric titration showed the presence of five to seven hydroperoxide (OOH) units per one hundred styrene monomer units in poly isopropyl styrene hydroperoxide. AD 107477. Ordnance project TB2-0001 B. Dept. of the Army Project 599-01-004. PA TR 2333.

Paints, Varnishes and Lacquers

High temperature protective coatings for magnesium, by Clyde R. Fitzgibbon, Edward H. Miller and Milton A. Glaser. Midland Industrial Finishes Co., Waukegan, Ill. Apr 1957. 112p photos, tables. Order from OTS. \$3.00. PB 131073

The objective of the work discussed in this report was to develop an air-drying coating system for magnesium that would have film properties equal to or better than present air-drying finishing systems for this metal, and which would also withstand temperatures up to 500°F. The major testing requirements for the desired coating system was the ability to maintain film integrity for relatively long periods of time when subjected to a cyclic high humidity-high temperature test. Three coating systems were developed in this work. AD 118254. Project 7312, Task 73121. Covers work from May 1955 - Oct 1956 under Contract AF 33(616)-2890. AF WADC TR 56-622.

Methods of accelerated weather deterioration for fluorescent paints, by F.M. Noonan and J.E. Cowling. U.S. Naval Research Laboratory. Nov 1957. 23p photo, diagr, graphs. Order from OTS. 75 cents.

PB 131302

The deterioration of daylight fluorescent paint has been studied by accelerated laboratory methods and by exposure to Miami, Florida weather. It has been determined that laboratory exposure to a carbon arc that simulates "sunshine" will induce approximately the same degradation in 275 hours as results from approximately four months of Miami weather exposure. It has been further determined that this 275-hour carbon arc exposure may be safely extrapolated to indicate whether or not a fluorescent paint will meet the Navy's minimum requirements for six months of subtropical exposure, and that a shorter accelerated exposure is unreliable in reaching this conclusion. A simple photometer type instrument has been designed by which the fluorescence of paints can be evaluated. Fluorescent paint color fading is measured by the NRL 45-Degree Color Photometer, which is the instrument above with a change of one of its filters. NRL R 5027.

Physical properties of monolayers adsorbed at the solid/air interface. Part III: Friction and durability of films on stainless steel, by R.L. Cottington, E.G. Shafrin and W.A. Zisman. U.S. Naval Research Laboratory. Dec 1957. 18p photos, graphs. Order from OTS. 50 cents.

PB 131493

Polar paraffinic compounds and fluorinated derivatives were adsorbed as condensed monolayers at the stainless steel/air interface by retraction from the molten compound or from solution. Measurements of the frictional force were made on a loaded stainless steel ball sliding at uniform slow speed on the monolayer-covered stainless steel platen. The

general conclusion is that the protective value of a condensed monolayer decreases as the solid solubility of the two rubbing surfaces increases. For Parts 1-2 see PB 131013 and 131020. NRL R 5053.

Preparation and application of metal protective base coats containing no. 423 frit, by Dwight G. Bennett and W.J. Plankenhorn. Illinois. Engineering Experiment Station, Urbana, Ill. May 1951. 7p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 125966

This report covers the specifications for the manufacture of No. 423 Frit and for the preparation and application of several metal protective base coats containing No. 423 Frit as the principal ingredient. Frit composition, mill batch formulas, coating preparation, metal preparation, coating application and firing procedure are given. AD 150788. Unclassified 30 Sep 1955. Project no. MX-1035. Contract W33-038-ac-14520. AF TR 6545.

Silver plating brass waveguide components. Final report (Report no. 18), Oct 1, 1951 to Apr 30, 1953, under Contract no. DA 36-039-sc-15421, by Harold L. Schick, William H. Colner and Howard T. Francis. Armour Research Foundation, Chicago, Ill. Jul 1953. 165p photos, drawings (part fold), graphs, tables. Order from LC. Mi \$7.80, ph \$25.80. PB 126609

One phase of the work has been concerned with the electrodeposition of silver coatings with a periodic-reverse technique on the inner surfaces of brass waveguides. The second phase of the work has dealt with the problem of measuring the silver thickness on the inner surface of a waveguide using a nondestructive nuclear technique. This work has culminated in a final working mode, which is described herein. Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 32-2006-3 (31310). ARF Proj B032-1 (Proj. 90-1094B).

Inorganic Chemicals

Cemented borides. Summary progress report for the period 1 Aug 1955 to 31 Jul 1956 under Contract N6 onr-256/1, by Ira Binder. Schwarzkopf Development Corporation, Yonkers, N.Y. 1956. 38p photos, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 127389

During this period attempts have been made to improve the impact strength of Borolite IV (Cr_2B and CrMo alloy) by changes in its microstructure. Basic research has also been conducted on niobium, yttrium and other rare earth borides. For earlier reports on this contract see PB 117522, 118675 and 121346.

Decomposition of ammonia on germanium, by Kenzi Tamaru. Princeton University. Frick Chemical

Laboratory, Princeton, N.J. n.d. 10p graph. Order from LC. Mi \$1.80, ph \$1.80.

PB 126124

The decomposition of ammonia on germanium has been studied by a static method at 278° . The number of ammonia molecules adsorbed was found to be almost exactly half of the number of germanium atoms on the surface. Date of publication is 1955 or later. Contract N6 onr-27018.

Density of lead sulfide, lead selenide and lead telluride, by R.F. Brebrick. U.S. Naval Ordnance Laboratory, White Oak, Md. Oct 1956. 16p. Order from LC. Mi \$2.40, Ph \$3.30.

PB 127391

The densities of a number of crystals of natural PbS and synthetic PbS and PbSe have been measured by a buoyancy method. The probable errors are such that the significant variations observed are attributed to impurities and/or porosity rather than point defects or dislocations. FR 21-57. NAVORD4429

Preparation and properties of borohydrides of the alkaline earth metals, by M.D. Taylor, L.R. Grant, C.A. Sands and M.B. Templeman. Howard University, Washington, D.C. Oct 1955. 13p. Order from OTS. 50 cents. PB 131293

Experiments have been performed for the preparation of calcium, barium, and lanthanum borohydrides. The first two compounds appear to have been obtained as solvates in a reasonably pure state but only in rather small yields. The reactions were generally performed with lithium or sodium borohydride and the appropriate metal iodide in some non-aqueous solvent. Pyridine and tetrahydrofuran were the solvents most commonly used. Two new general methods for preparing anhydrous alkaline earth iodides have been developed and specifically applied in the cases of lithium and barium oxides. Essentially quantitative yields of pure products are obtained by the reaction of the alkaline earth hydride and either iodine or ammonium iodide in a non-aqueous solvent. The approximate solubilities of several inorganic salts in organic solvents were measured. Contract NO as 1024. CCC 1024-TR-140.

Research on anodic chlorination of titanium-oxygen alloys. Research on free energy of dilution of titanium-oxygen alloys. Final report, by R.S. Dean. Chicago Development Corp., Riverdale, Md. Apr 1955. 27p diagrams, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80.

PB 126179

The purpose of this investigation was to study the electrochemistry of processes for the electrolytic recovery of titanium. It concerned electrorefining processes in which titanium anodes are used. Contract Nonr-1140(00), Final report. Contract Nonr-1587(00), Final report.

Zinc oxide photoconduction, an oxygen chemisorption process, by Donald A. Melnick. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Feb 1954. 166p drawings, graphs. Order from LC. Mi \$7.80, ph \$25.80. PB 127195

Photoconductive rise and decay curves of porous sintered zinc oxide are studied as a function of time, ambient oxygen pressure, temperature, incident light intensity and duration of excitation. The photoconductivity is shown to be entirely due to the desorption of chemically adsorbed oxygen atoms from the surfaces of the porous samples. AD 36883. Contract N6 onr-24914, Technical report 9.

Analytical Chemistry

Microwave spectrum on NO₂, a rigid rotor analysis, by George R. Bird. Harvard University. Dept. of Chemistry, Cambridge, Mass. n.d. 15p diagr, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 126605

Four new rotational lines, each of these divided into a multiplet by magnetic interactions, have been observed in the microwave spectrum of N¹⁴O₂, bringing the total number of observed lines to five. A rigid rotor analysis has been performed to identify four of these, and probably the fifth. Date is 1955 or later. A preliminary report was presented at the 1955 meeting of the American Physical Society (Bull. Am. Phys. Soc., v. 30, p. 21, 1955). Contract N5 ori-16, T.O. V.

Separation of rhodium-105 from mixed fission products, by R.B. Chenley, R.G. Osmond and S.G. Perry. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1956. 12p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 41 cents. PB 124582

1. Rhodium, Radioactive - Determination - Gt. Brit.
2. Rhodium, Radioactive - Purification - Gt. Brit.
3. Fission products - Separation - Gt. Brit.
4. AERE C/R 1870

ELECTRICAL MACHINERY

Electronics

Application of correlation techniques to acoustic receiving systems, by James J. Paron, Jr. and Robert Hills, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Nov 1952. 92p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$5.40, ph \$15.30. PB 126816

The application of correlation techniques to acoustic receiving systems is considered theoretically and experimentally. The study is limited, for the most part, to random signals in a background noise which arises in the signal-bearing medium (not in the receiver amplifiers). In some cases, the correlator can effect an improvement in the signal-to-noise ratio of as much as 3 db, while, in other cases, conventional methods result in higher signal-to-noise ratios. Several methods of performing multiple correlation for use with arrays of more than two elements are considered; nothing significantly superior to a simple adding of all the signals and detecting has been found. Contract N5 ori-76, T.O. X, NR 384-903. HU ARL TM 28.

Bearing determinations for SOFAR type signals using two hydrophones, by G.B. Tirey and G.R. Hamilton. Columbia University. Lamont Geological Observatory, Palisades, N.Y. Dec 1955. 21p maps, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 126106

A series of underwater TNT shots fired along an arc 120 miles off Bermuda is used to calibrate two hydrophones as a bearing determination system for SOFAR type signals. The hydrophones do not constitute a matched system. They are located sixteen miles apart. Bearing determinations are possible in the arc S.E. of Bermuda to an accuracy of 1.5°. Use of the system to determine bearings of distant shots is demonstrated. CU-18-55-T024-Geol. Contract N6onr 271, T.O. 24. CUN LGO TR 8.

Bibliography of piezoelectricity. See entry under Bibliography on page 54. PB 126544

Cylindrical diode magnetron with outside cathode, by W.E. Lear. Florida. Engineering and Industrial Experiment Station, Gainesville, Fla. Apr 1955. 50p diagrs, graphs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 125943

A cylindrical inverted (i.e., with the cathode as the outside cylinder) magnetron with smooth anode and cathode is analyzed to determine the possibility of oscillation. Experimental data taken on a tube of this type is presented. Project 4922. For Technical report no. 3 see PB 118569. Contract Nonr-07201, Technical report no. 4.

Design characteristics of resonant cavities, by Daniel Alpert. Sperry Gyroscope Co., Brooklyn, N.Y. Jul 1942. 25p graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 127231

This report is a resumé of available information on the characteristic constants of resonant cavities and their tabulation in a convenient and usable form. Research Report SR-127.

ECIC work sheets. Battelle Memorial Institute, Columbus, O. Contract AF 33(038)-1229. Order separate parts described below from LC, giving PB number of each part ordered.

Special report no. 1: Motors. Data sheets, codes, definitions and test procedures, by J.N. Antonevich, H.E. Pattee, H.J. Behm, A.T. Maieron and R.C. McMaster. Jun 1953. 50p. Mi \$3.30, ph \$7.80. PB 126649

The Electronic Component Information Center, referred to as ECIC, is being developed to assist the equipment designer in the selection of the proper component for the job and will function as a clearing house for electronic-component data. ECIC files will accept engineering data useful to the designer and will store such information in a fashion as to permit rapid searching by machines. 1. Motors - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 2: Resistors. Data sheets, codes, definitions and test procedures, by J.H. Graham, H.E. Pattee, H.J. Behm, and R.C. McMaster. Jun 1953. 52p. Mi \$3.60, ph \$9.30. PB 126650

Covers work Nov 1952 - May 1953. 1. Resistors, Fixed - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 3: Dry-disk rectifiers. Data sheets, codes, definitions and test procedures, by H.E. Pattee, H.J. Behm, and A.T. Maieron. Jul 1953. 48p. Mi \$3.30, ph \$7.80. PB 126660

1. Rectifiers, Dry-disk - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 4: Dynamotors. Data sheets, codes and definitions, and test procedures, by J.N. Antonevich, H.E. Pattee, H.J. Behm, A.T. Maieron and R.C. McMaster. Jul 1953. 53p. Mi \$3.60, ph \$9.30. PB 126659

1. Dynamotors - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 5: Relays. Data sheets, codes, definitions, and test procedures, by H.B. Thompson, H.J. Behm, A.T. Maieron, and R.C. McMaster. Sep 1953. 57p. Mi \$3.60, ph \$9.30. PB 126667

1. Relays - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 6: Capacitors. Data sheets, codes, definitions, and test procedures, by H.E. Pattee, F.E. Berger, H.J. Behm, A.T. Maieron and R.C. McMaster. Oct 1953. 51p. Mi \$3.60, ph \$9.30. PB 126661

1. Capacitors - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 7: Switches. Data sheets, codes, definitions, and test procedures, by T.M. Boland, H.E. Pattee, H.J. Behm, A.T. Maieron and R.C. McMaster. Nov 1953. 52p tables. Mi \$3.60, ph \$9.30. PB 126663

1. Switches - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 8: Indicating instruments. Data sheets, codes, definitions, and test procedures, by J.N. Antonevich, H.E. Pattee, H.J. Behm and A.T. Maieron. Dec 1953. 34p. Mi \$3.00, ph \$6.30. PB 126666

1. Instruments, Indicating - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 9: Inductors. Data sheets, codes, definitions, and test procedures, by R.A. Corby, H.E. Pattee, H.J. Behm, A.T. Maieron. Feb 1954. 31p. Mi \$3.00, ph \$6.30. PB 126665

1. Inductors - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 10: Piezoelectric crystals. Data sheets, codes, definitions, and test procedures, by H.E. Pattee, C.F. Salt, H.J. Behm and A.T. Maieron. Feb 1954. 34p. Mi \$3.30, ph \$6.30. PB 126658

1. Crystals, Piezoelectric - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 11: Fuses. Data sheets, codes, definitions, and test procedures, by H.E. Pattee, H.J. Behm and A.T. Maieron. Feb 1954. 27p. Mi \$2.70, ph \$4.80. PB 126652

1. Fuses - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 12: Vibrators. Data sheets,

codes, definitions, and test procedures, by H.B. Thompson, H.E. Pattee, H.J. Behm, and A.T. Maieron. Feb 1954. 29p. Mi \$2.70, ph \$4.80. PB 126653

1. Vibrators - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 13: Connectors. Data sheets, codes, definitions, and test procedures, by H.B. Thompson, H.E. Pattee, H.J. Behm, and A.T. Maieron. Mar 1954. 35p. Mi \$3.00, ph \$6.30. PB 126655

1. Connectors - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Special report no. 14: Batteries. Data sheets, codes, definitions, and test procedures, by C.F. Salt, H.E. Pattee, H.J. Behm and A.T. Maieron. Mar 1954. 55p diagr. Mi \$3.60, ph \$9.30. PB 126656

1. Batteries - Tests 2. Electronic equipment - Components 3. Data collection procedures

Special report no. 15: Lamps. Data sheets, codes, definitions and test procedures, by H.B. Thompson, H.E. Pattee, H.J. Behm and A.T. Maieron. Mar 1954. 33p. Mi \$3.00, ph \$6.30. PB 126654

1. Lamps - Tests 2. Electronic equipment - Components - Tests 3. Data collection procedures

Equations of similitude for a discharge in an argon-mercury mixture, by Max Hoyaux and Paul Gans. Ateliers de Construction Electriques de Charleroi, Societe Anonyme, Brussels. n.d. 31p graphs. Order from LC. Mi \$3.00, ph \$6.30. PB 125979

The first part of this report is theoretical, and aims at the study of conditions in which the equations of similitude previously found by one of the authors in the case of mercury-vapor arcs at moderate current intensities remain valid in the case of an arc striking in an argon-mercury mixture such as exists in fluorescent tubes. The second part of the report is experimental. It is shown that fluorescent tubes do not quantitatively obey the equations of similitude of mercury vapor rectifiers; but the experimental results are in agreement with the idea of a "migration" of the curves owing to the argon content. AD 88352. Contract AF 61(514)-630-C. AF OSR TN 56-233. EO ARDC TN 55-10.

Experimental and theoretical aspects of the design

of microwave strip transmission lines. Final report under Contract AF 19(604)-575, by Albert D. Frost. Tufts University. Dept. of Physics, Medford, Mass. Dec 1956. 42p diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 125977

The research performed under the sponsorship of this contract was for the purpose of determination, evaluation and tabulation of the parameters and design criteria that govern the theory and functioning of flat strip transmission lines. Because of the possibility of fabrication by printing or photo-etching techniques, strip transmission lines and associated components of various types have also been described as microwave printed circuits. AD 110176. For interim reports 7-9, see PB 122378, 122377 and 122369. Contract AF 19(604)-575, Final report. AF CRC TR 56-187.

Ferromagnetic resonance in metal single crystals, by J.O. Artman. Harvard University. Gordon McKay Laboratory of Applied Physics, Cambridge, Mass. Jun 1956. 35p diagrs, graphs. Order from LC. Mi \$3.00, ph \$6.30. PB 126117

Microwave susceptibility expressions for ferromagnetic resonance have been derived for metal single crystals possessing crystalline anisotropy. Crystals of uniaxial and cubic magnetic symmetry are considered. Predictions of the theory are compared with the microwave measurements of Kip and Arnold and magnetic domain pattern observations in the literature. For Scientific report no. 2 see PB 125041. Contract AF 19(604)-1084, Scientific report no. 3. AF CRC TN 56-381.

High frequency rectification efficiency of crystals, by A.W. Lawson, P.H. Miller, L.I. Schiff and W.E. Stephens. Pennsylvania. University, Philadelphia, Pa. Jul 1943. 33p diagrs, graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 127076

An extension of Bethe's simple theory of capacity in crystal detectors reveals that it is inadequate to explain the observed dependence of conversion gain on frequency. A new model is suggested which makes it possible to correct this deficiency. This model requires that the donor levels lie somewhat deeper than hitherto supposed and that the time required to ionize them is sufficiently long to produce a saturation effect in the capacitive component of the current at high frequencies. The evidence supporting such a model is discussed. Contract OEM sr 388. NRDC Div. 14-153.

Human factors in the design of electronics test equipment, by Paul Spector, Alan D. Swain and David Meister. American Institute for Research, Inc., Pittsburgh, Pa. Apr 1955. 134p. Order from LC. Mi \$6.90, ph \$21.30. PB 125981

This report describes problems encountered by maintenance men in the utilization of ground electronics test equipment and details recommendations for the human engineering design of test equipment. The purpose of the report is: 1. to determine what difficulties are found in the use of test equipment; 2. to suggest means of eliminating these difficulties by using human engineering principles in test equipment design; 3. to outline a method of applying these human engineering principles in actual design of test equipment. AD 81084. Contract AF 30 (602)-24, Final report.

Investigation of atmospheric radio noise. Scientific report 13, Jul 1-Sep 30, 1956, under Contract AF 19(604)-876, by P.J. Nawrocki. Florida. Engineering and Industrial Experiment Station, Dept. of Electrical Engineering, Gainesville, Fla. Nov 1956. 40p drawing, diagrs, graphs, table. Order from LC. Mi \$3.00, ph \$6.30.

PB 126602

Investigation of the electromagnetic field components (E_z and H_z) of the ground wave from individual sferic pulses is initiated. Preliminary experiments indicate that H_z exceeds the theoretical value obtained from Sommerfeld's theory, and that H_z and E_z probably have a common functional dependence upon the distance of propagation. AD 110127. For reports 1-10 and 12 see PB 113559, 113764, 116122-116123, 116501, 116979, 117733, 119364, 119807, 123165 and 125147. Contract AF 19(604)-876, Report no. 13. AF CRC TN 56-788.

Investigation of the conditions in the plasma in mercury-vapor arc discharges and oscillating electron ion sources. Ateliers de Constructions Electriques de Charleroi, Société Anonyme, Brussels. 1955? 68p graphs (part fold). Order from LC. Mi \$3.90, ph \$10.80. PB 126139

The program of work involved two major divisions: Phase A, mercury vapor arc discharges and phase B, oscillating electron ion sources. In each case, the investigation represented a continuation of work previously undertaken and each section of this report begins with a brief résumé of the relevant parts of this previous work. The work on mercury vapor arc discharges falls conveniently into three topics; the behaviour of the arc at very high current intensities, the behaviour at very low pressures and the dynamic behaviour in fluorescent type tubes. Contract AF 61(514)-630-C. AD 88353. AF OSR TR 56-23. EO ARDC TR 54.

Investigations of the properties of the pinch effect on an ionized gas carrying a high current, by Winston H. Bostick, Lewis S. Combes and Morton A. Levine. Tufts University. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Jan 1956. 96p photos, drawings, graphs. Order from LC. Mi \$5.40, ph \$15.30. PB 127157

The pinch effect is the constriction of a compressible conductor by the self-magnetic field of the current in that conductor. In the course of investigating deionization during the afterglow of a pulsed discharge and other phenomena associated with high toroidal currents a definite constriction of these currents was observed and subsequently studied. In various toroids used, instabilities in the pinch have been evident. Two types of instability are possible, kink instability or sausage type instability. It was found that glass toroids with copper plated shells helped to stabilize the pinch and prevent the discharge from striking the walls of the toroid. An extremely promising method of preventing or decreasing both types of instability in the pinch effect appears to be the inclusion of a longitudinal magnetic field inside the conducting plasma, thus forming a hollow pinch. This is called the H-centered pinch and is currently being investigated. Final report on Contract AF 19(122)-89. For other reports on this contract see PB 124017, 113332 and 113329.

Kinetics of fast electrode reactions, by Talivaldis Berzins and Paul Delahay. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Jun 1955. 34p diagrs, graphs, table. Order from LC. Mi \$3.00, ph \$6.30. PB 124937

A method is described for the study of the kinetics of fast electrode reactions. The working electrode, whose kinetics is being studied, is coupled with an unpolarized electrode, and the potential of the former electrode is adjusted at its equilibrium value. A current impulse represented by a step function is passed through the electrolytic cell, and the potential of the working electrode is recorded. The parameters characterizing the kinetics of electron transfer are determined from potential-time curves. A rigorous mathematical analysis, which takes into account the double layer capacity, is developed for potential-time curves. Report 23. Contract Nonr 30,000, NR 051-258.

Lattice II, by E. Banks. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Contract DA 36-039-sc-42582. Signal Corps project no. 152-B. Dept. of the Army project no. 3-99-15-022. Order separate parts described below from LC, giving PB number of each part ordered.

First interim report, covering the period Aug 1, 1953 to Oct 31, 1953. Dec 1953. 31p. Mi \$3.00, ph \$6.30. PB 126177

A study of the methods of preparation and the properties of compounds with defect lattices. Work on mixed oxides with the perovskite structure is reported. Two main series of compounds are being investigated, the first containing lanthanum with two different trivalent metal ions, while the second series contains lanthanum plus an alkaline earth ion in combination with one transition metal in two valence states. Large single crystals of high purity

cadmium selenide were grown by the pressure fusion method. An apparatus for orientation of the crystal, prior to cutting, is described. Some experiments involving the preparation of CdSe by reduction of the selenide were made, in an effort to obtain a more nearly stoichiometric starting material.

Second interim report, covering the period Nov 1, 1953 to Jan 31, 1954. Feb 1954. 33p photos, drawings, tables. Mi \$3.00, ph \$6.30. PB 126178

New ferromagnetic phases in the system $\text{La}_2\text{O}_3\text{-Fe}_2\text{O}_3$ at temperatures higher than 1200°C . are described. Several new, strongly ferromagnetic phases have been prepared by substituting La^{+3} and one of the alkali metal ions for two Ba^{++} or Sr^{++} in formulas like $\text{BaO} \cdot 6\text{Fe}_2\text{O}_3$.

Third progress report, covering the period Feb 1, 1954 to Apr 30, 1954. May 1954. 58p diags, graphs, tables. Mi \$3.60, ph \$9.30. PB 127128

Construction has been completed on a vessel for high temperature reactions under high oxygen pressures. New ferromagnetic phases with a probable composition $\text{M}_2\text{La}_4\text{Fe}_{12}\text{O}_{19}$ (where M=Na, K, Rb) have been prepared. Resistivity and Hall effect measurements have been made on specimens cut from a large single crystal of cadmium selenide.

Fourth progress report, covering the period May 1, 1954 to Jul 31, 1954. Aug 1954. 24p diags, table. Mi \$2.70, ph \$4.80. PB 127121

A device for making magnetic measurements by the ponderometer method is nearing completion. The principle of this apparatus is discussed. Preparations of solid solutions between $\text{LaCoO}_3\text{-SrCoO}_3$ have been investigated. A new apparatus for simultaneous Hall coefficient and conductivity measurements on single crystals has been designed. The conditions which may be required for the growth of stoichiometric single crystals of CdSe are discussed.

Fifth progress report, covering the period Aug 1, 1954 to Oct 31, 1954. Nov 1954. 35p photos, graphs, tables. Mi \$3.00, ph \$6.30. PB 127122

Small single crystals of $\text{La}_{0.5}\text{Na}_{0.5}\text{Fe}_{12}\text{O}_{19}$ have been grown from a melt containing Na_2CO_3 . They were obtained as flat hexagonal plates which are strongly and anisotropically ferromagnetic. The program of cation substitutions in the hexagonal mixed iron

oxides has been extended by the substitution of gallium and aluminum for iron. Solid solution formation, up to compositions corresponding to $\text{BaGa}_8\text{Fe}_6\text{O}_{19}$ and $\text{BaAl}_6\text{Fe}_6\text{O}_{19}$, has been determined by X-ray diffraction. All these solid solutions, except $\text{BaGa}_8\text{Fe}_4\text{O}_{19}$, were ferromagnetic above room temperature.

Sixth progress report, covering the period Nov 1, 1954 to Jan 31, 1955. Mar 1955. 20p graphs, tables. Mi \$2.40, ph \$3.30. PB 127123

Curie temperatures and the magnetization measurements were made on solid solutions ranging from $\text{BaO} \cdot 6\text{Fe}_2\text{O}_3$ to $\text{BaO} \cdot 2\text{Fe}_2\text{O}_3 \cdot 4\text{M}_2\text{O}_3$, where M = Ga or Al. Some new CdSe of high purity has been prepared, but attempts to grow new single crystals were unsuccessful. An attempt has been made to prepare the selenide analog of the ferromagnetic mineral, cubanite, CuFe_2S_3 .

Seventh progress report, covering the period Feb 1, 1955 to May 31, 1955. Jun 1955. 22p diags, graph, table. Mi \$2.70, ph \$4.80. PB 127124

With solid solutions of Al_2O_3 and Ga_2O_3 in $\text{BaFe}_{12}\text{O}_{19}$ an increase in ferromagnetism occurs at very low Ga and Al concentrations. A new ternary selenide, probably CuFe_2Se_3 , has been prepared and characterized by its X-ray pattern. Its density is about 4.5g/cm^3 . The material is weakly ferromagnetic.

Eighth progress report, covering the period Jun 1, 1955 to Aug 31, 1955. Sep 1955. 27p. Mi \$2.70, ph \$4.80. PB 127125

Additional repeat preparations of $\text{BaO} \cdot 0.02\text{Ga}_2\text{O}_3 \cdot 5.98\text{Fe}_2\text{O}_3$ and $\text{BaO} \cdot 0.04\text{Ga}_2\text{O}_3 \cdot 5.96\text{Fe}_2\text{O}_3$ have been prepared and seem to reproduce the original values of magnetization at 78°K . The conclusion that the maximum magnetization in the solid solutions occurs on substitution of 0.04 moles of Ga_2O_3 is verified. Attempts to synthesize cubanite, CuFe_2S_3 , have resulted in the formation of CuFeS_2 and Cu_2S . Attempts to grow CdSe crystals from molten cadmium have proved to be unsuccessful.

Ninth progress report, covering the period Sep 1955 to Nov 30, 1955. Jan 1956. 18p graphs, tables. Mi \$2.40, ph \$3.30. PB 127126

Large single crystals have been prepared by slowly cooling Na_2CO_3 melts containing $\text{BaO} \cdot 6\text{Fe}_2\text{O}_3$ and some of its solid solutions with Al_2O_3 and Ga_2O_3 . Preparations of $\text{Na}_{0.5}\text{Nd}_{0.5}\text{Fe}_{12}\text{O}_{19}$ and $\text{Na}_{0.5}\text{GdFe}_{12}\text{O}_{19}$ were

carried out in similar fashion, but did not yield large crystals. The latter were weakly ferromagnetic at room temperature.

For Final report see PB 124312.

Magneto-hydrodynamics. Final report under Contract AF 19(604)-926. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Nov 1956. 13p. Order from LC. Mi \$2.40, ph \$3.30. PB 125102

AD 110241. For reports 1-4 (MH-1-MH-4) under this Contract see PB 117757, 119032, 119033 and 119474. Contents: MH-1. Electrohydrodynamics. 1. The equilibrium of a charged gas in a container, by Joseph B. Keller. - MH-2. Decay of magnetic fields, by Bernard A. Lippman. - MH-3. Decay of a stellar magnetic field, by Bernard A. Lippman. - MH-4. Remarks on Alfvén's perturbation method, by O. Fleischman and B. A. Lippman. - MH-5. Resolution of an initial shear flow discontinuity in one-dimensional hydromagnetic flow, by Jack Bezar. Contract AF 19(604)-926, Final report. AF CRC TR 56-461.

Measurement and analysis of instantaneous height-gain curves at 8.6 millimeters over rough surfaces, by A. W. Straiton and C. W. Tolbert. Texas. University. Electrical Engineering Research Laboratory, Austin, Tex. Apr 1955. 26p photos, diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126107

By the use of an array of ten vertically-spaced antennas and a rotating wave guide switch, a portion of the height-gain pattern for a short radio path was obtained as a function of time for a wave length of 8.6 millimeters. In the analysis of the data taken across a small lake, the reflection from the water is assumed to be made up of two components. One component is a constant value equal to the median signal received at the antennas over the sampling period and the other component is a variable signal of the proper phase and magnitude to give the measured total signal at each instant. The angle of arrival, phase and magnitude of the fluctuating signal are obtained for a short sample of data and their characteristics described. Contract Nonr 375(01). TU EERL 76.

Measurement of low power microwave pulses by comparative methods, by L. K. Anderson. National Research Council of Canada. Radio and Electrical Engineering Division. Sep 1956. 28p photos, diagrs, tables. Available from the National Research Council of Canada, Ottawa 2, Canada. 25 cents. PB 126011

Three methods of measuring the peak power of low-level microwave pulses are compared, the tangential signal method, the notch method, and the heterodyne method. The tangential signal method gives

power level in terms of calculable thermal noise, and the result is therefore absolute. The other two methods give the peak pulse power in terms of a measurable average power level. An outline of the theory, actual measurements, and some of the difficulties encountered are given for each method. NRCC 4111. NRCC ERA 308.

NEL reliability design handbook. Supplement. U.S. Navy Electronics Laboratory, San Diego, Calif. Jan 1958. Order from OTS. 75 cents per single issue, or on annual subscription rate of \$2.25 a year in U.S.A., foreign rate \$3.00 a year. PB 121839s2

These supplements are issued quarterly and may replace pages in the original loose-leaf edition of Nov 1955 or contain additional pages to be inserted in it.

New junction-transistor high-frequency circuit, by R. D. Middlebrook. California Institute of Technology. Antenna Laboratory, Pasadena, Calif. Mar 1957. 43p diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 126020

A small-signal equivalent circuit for a junction transistor is presented which is applicable to alloy or grown types of p-n-p or n-p-n transistors, and which is valid from d-c up to twice the cutoff frequency. AD 120469. Contract AF 18(600)-1113. CIT AL TR 9. AF OSR TN 57-116.

On radio scattering by dielectric turbulence, by Richard A. Silverman. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research, New York, N.Y. Sep 1956. 32p. Order from LC. Mi \$3.00, ph \$6.30. PB 126669

A unified formulation of radio scattering theory in the language of random functions is given. The problem of probabilizing atmospheric dielectric noise is discussed in detail. Local properties of second-order random functions are defined and discussed, and certain gaps in the literature are pointed out. AD 110138. Contract AF 19(604)-1717. NYU RR EM 98. AF CRC TN 56-797.

Overvoltage measurements on aluminum electrodes in cryolite-alumina baths, by Giulio Montanelli. Politecnico di Milano. Laboratorio di Elettrochimica Chimica Fisica e Metallurgia, Milano, Italy. Mar 1956. 36p diagrs, graphs, table. Order from LC. Mi \$3.00, ph \$6.30. PB 125986

By means of improved experimental methods, the cathode and anode overvoltages have been determined at Al electrodes in cryolite-alumina bath with or without additives in conditions corresponding to those of the industrial production of the metal. The "exchange overvoltage" in the Al separation at

1000°C is as a maximum of the order of some mV even at c.d. of 100 A/dm². The concentration overvoltage depends essentially upon the decrease of AlF₃ concentration in the electrode layer and may correspond to some tenth of volt. These results support the hypothesis of the primary discharge of Al from "donors" in the cells, and explain the conditions in which the Na discharge may intervene as a "parasitic" process. AD 88023. Technical note 3. For Technical notes 1-2 see PB 122405-122406. Contract AF 61(514)-733C. AF OSR TN 56-217.

Performing research on new approaches to printed circuitry. (Mar 1, 1956 through May 31, 1956). Haloid Company, Rochester, N.Y. Jul 1956. 22p. Order from LC. Mi \$2.70, ph \$4.80. PB 126122

Various methods of in-place fabrication of electronic circuits have been examined to find means of improvement and extension of the basic practice. Only materials which can yield circuits operative above 200°C. are considered for use. The fabrication of condensers, resistors, and inductors as well as conductive lines and mounting means are included in evaluating of the methods. The scope of fabricating means are not limited but particular attention is given to exploitation of xerographic techniques. Contract AF 19(604)-1736, Scientific report no. 1. AF CRC TN 56-588.

Persistent internal polarization, by Hartmut P. Kallmann. New York University. Washington Square College of Arts and Sciences. Physics Dept., New York, N.Y. Jan 1956. 83p drawings, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 126162

The behavior of P.I.P. (persistent internal polarization) in numerous samples were investigated. Two methods were developed to produce samples which display reproducible values of polarization under all conditions and the P.I.P. of which can be predicted. The laws of light release, and of spontaneous decay and the dependence of P.I.P. on the thickness of the samples are determined. These experiments resulted in finding means to increase the polarization per unit area considerably. A charge of over 10⁻⁷ coulombs per square cm. was observed with a decay of only 25 percent in 24 hours. A survey of the P.I.P. behavior of numerous different materials is presented. AD 81041. Annual report for the period 15 Oct 1954-14 Oct 1955. Contract AF 18(600)-1004, Progress report no. 5. AF OSR TN 56-49.

Piezoelectric crystal studies and measurements. Report no. 16 (Final) under Contract DA 36-039-sc-42587 for the period 1 Feb 1953 to 31 Jan 1956, by Karl S. Van Dyke. Wesleyan University, Middletown, Conn. Jun 1956. 72p photos, diags, graphs, table. Order from LC. Mi \$4.50, ph \$12.30. PB 126525

The report continues the studies of shear vibrations of quartz plates and investigates the amplitude distribution of these vibrations; prepares and investigates representations of matrix data by crystal classes with a view to their more direct relation to the basic phenomena; and includes a bibliography of recent advances in the field of piezoelectricity. Dept. of the Army project no. 3-99-11-022. Signal Corps project no. 142B. Part 2 is a thesis: Electrical measurement of strain distribution in quartz plates, by Paul Ernest Weston.

Research on design criteria for microwave filters. Second quarterly progress report, SRI project 1331 covering the period 15 Jun to 15 Sep 1955, by E.M.T. Jones. Stanford Research Institute, Menlo Park, Calif. Oct 1955. 44p drawings, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 130027

This is the second quarterly report on a broad program, the purpose of which is to investigate design criteria for u-h-f and microwave filters, and to present this information in handbook form. This report is devoted almost exclusively to describing a new synthesis technique that allows one to synthesize a class of low-pass and band-pass microwave filters to have any desired physically realizable insertion loss characteristics over frequency bands of an octave or more. Several typical examples are worked out in detail to further illustrate the techniques. Dept. of the Army project 3-26-00-600. Signal Corps project 2006-A. Contract DA 36-039-sc-64625. SRI Proj 1331, Progress report no. 2.

Resonant power transfer within a plasma in a magnetic field, by James E. Drummond. Electronic Defense Laboratory, Mountain View, Calif. Apr 1956. 73f graphs. Order from LC. Mi \$4.50, enl pr \$13.80. PB 127978

Describes conditions under which power can be transferred to or from a small oscillating electromagnetic field within a plasma in a static magnetic field. AD 101889. Contract DA 36-039-sc-71053. EDL E-14.

Revised proposal for investigation of self-focusing streams, by Willard H. Bennett. U.S. Naval Research Laboratory. Jul 1957. 16p diags. Order from OTS. 50 cents. PB 131215

A method is proposed for producing sustained self-focusing streams of relativistic electrons in a closed loop. The objective is to study the physical characteristics of self-focusing streams in order to exploit their peculiar properties. NRL R 4993.

Secondary emission ratio of storage tube insulator films, by G.L. Stambach. U.S. Naval Research Laboratory. Nov 1957. 17p photos, diags, graphs. Order from OTS. 50 cents. PB 131328

Measurements of secondary emission ratio for bentonite clay, SiO_2 , MgF_2 , MgO , natural mica, synthetic mica, and talc have been made over a range of primary electron energy from 20 volts to 4000 volts. The curves which have been developed from this work fill in gaps in the published data on several commonly used storage tube insulating surface materials and are intended to be used in the design of storage tubes. The insulating materials which were tested were discharged by heating, and a pulse technique was used to measure the initial charging current from which the secondary emission ratio was calculated. An axial magnetic field was used to focus the beam and reduce electron redistribution. NRL R 5029.

Shock excitation in radar receiver circuits, by W. M. Cameron. National Research Council of Canada. Radio and Electrical Engineering Division. May 1956. 17p photos, diagr, tables. Available from National Research Council of Canada, Ottawa 2, Canada. 25 cents.

PB 126012

Electrical shock excitation of the input circuits of the intermediate-frequency amplifier of a radar system is discussed. The deleterious effects of shock from the trailing edge of a high-amplitude pulse is shown to be related to the frequency at which the amplifier input circuit is resonant. The pulse fall time is shown to be an important factor in the choice of an intermediate frequency. Although the report is written with reference to a marine navigational radar having high definition at short range, it may be of value in the design of other radar systems where shock effects following a high-amplitude pulse cannot be tolerated. NRCC ERC 304. NRCC 4059.

Standard electrode potentials in non-aqueous solvents. Final report, by H. Taniguchi, S. S. Danyluk and G. J. Janz. Rensselaer Polytechnic Institute. Dept. of Chemistry, Troy, N. Y. Nov 1956. 14p. Order from LC. Mi \$2.40, ph \$3.30.

PB 126610

The standard reference electrodes, hydrogen and silver, silver chloride, have been the subject of an exact investigation. A best procedure for the preparation of stable and reproducible electrodes for precision investigations has been developed. The conductance of hydrogen chloride was investigated at 25°C to interpret the behaviour of this solute in the light of the interionic attraction theory. In absolute ethyl alcohol, the determination of the standard potential for the silver, silver chloride electrode and the thermodynamics of hydrogen chloride have been completed at 25°C. The theoretical problem of the concept of the absolute electrode potential, and the experimental attempts to measure absolute potentials have been critically examined. The problem of the relation of the electromotive force series in various non-aqueous solvents to that in water has also been discussed. AD 115060. Project Chem 40-3. Includes abstracts of technical

reports on the Contract listed in chronological order. Contract AF 18(600)-333, Final report. AF OSR TR 57-4.

Theoretical study of electromagnetic waves scattered from shaped metal surfaces, by William W. Hansen and Leonard I. Schiff. Stanford University. W. W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Sep 1948. 21p diagrs, graphs. Order from LC. Mi \$2.70, ph \$4.80.

PB 126167

This report is a final statement of work performed under the above-named contract, including the contract extension to September 30, 1948. The first part summarizes the results reported previously. The second part develops the complete analytical theory for the scattering by a semi-infinite cone. The third part presents the results of numerical calculations, along with some suggestions for future work. Quarterly report 4. Contract W 28-099-333, Final report.

Theory and applications of ferrites at microwave frequencies, by Perry H. Vartanian, Jr. Electronic Defense Laboratory, Mountain View, Calif. Apr 1956. 152f photos, diagrs, graphs, tables. Order from LC. Mi \$7.50, enl pr \$25.80.

PB 127642

Relations concerning reciprocity and energy conservation in a microwave structure containing anisotropic media are derived. The properties of the impedance matrix of such a non-reciprocal network are considered. The effects of shape on the design of ferrite devices, and several new devices including two broadband isolators, an electronically controllable attenuator, and a new type circulator, are discussed. Frequency doubling in ferrites and the factors influencing the bandwidth of isolators are investigated. Measurement techniques necessary to characterize the basic ferrite microwave properties are considered. AD 101888. Contract DA 36-039-sc-71053. ADL E15.

Tracking proficiency as a function of visual noise in the feedback loop of a simulated radar fire control system, by George E. Briggs and Paul M. Fitts. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center, Lackland Air Force Base, Tex. Dec 1956. 11p graph, tables. Order from LC. Mi \$2.40, ph \$3.30.

PB 126674

AD 098911. Project 7716, Task nos. 77292 and 57050. 1. Tracking - Two dimensional 2. Tracking - Operator response 3. Radar - Tracking 4. Simulators, Fire control 5. Contract AF 18 (600)-1201 6. AF PTRC TN 56-134

Volumetric scanning GCA antenna design, by W. F. Gabriel, G. D. M. Peeler, H. P. Coleman and D. H. Archer. U.S. Naval Research Laboratory.

Nov 1957. 58p photos, drawings, diags (1 fold), graphs, tables. Order from OTS. \$1.50.

PB 131286

The new antenna, by virtue of increased resolution and solid, three-dimensional, rapid scan coverage, will permit coordinate control of multiple landings of high-speed aircraft. Based on modest estimates, the GCA system employing this antenna will be capable of handling simultaneously up to 10 aircraft on their final approach run, landing them at a rate of two or three per minute. NRL R 5019.

Generators, Motors, Transmission

Dynamic operation of magnetic amplifiers for feedback control systems. Scientific report no. 2 for the period 1 Jun 1956-31 Aug 1956 under Contract AF 19(604)-1813, by Henry C. Bourne, Jr., Takashi T. Kadota and David Nitzan. California University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Aug 1956. 48p photos, diags, graphs. Order from LC. Mi \$3.30, ph \$7.80.

PB 125984

Consists of Chapter IV, Experimental investigation of the self saturating A-C output circuit, including: (1) circuit components, (2) dynamic behavior of the B-H loop, (3) steady-state transfer characteristics compared to "exact" analysis and (4) to approximate linear analysis; and Chapter V, Transfer function of the n-winding magnetic amplifier, including: (1) derivation of the transfer function of the self-saturating (A-C output) magnetic amplifier, and (2) self-saturating (A-C output) magnetic amplifier with n control windings. AD 110101. a Continues work presented in Scientific report no. 1, AF CRC TN 56-555 (PB 123415). UC IER Series 60 Issue no. 60. AF CRC TN 56-769.

Feedback system testing, by Charles F. White.

U.S. Naval Research Laboratory. Nov 1957.

31p diags, graphs. Order from OTS. \$1.00.

PB 131345

An analog method of servo system performance testing applicable to experimental analysis and system development and to go-no-go production and maintenance testing has been devised. The analog method described, as distinguished from transient and sinusoidal methods, uses time-domain signals (a step-function signal generator input is found suitable) to obtain frequency-domain parameters in a method effectively making an open-loop test of a closed-loop servo system. The 1- μ s signal generator is conveniently realized using an analog computer of the operational amplifier type. An alternative mechanization of the signal generator uses only passive elements. Nonlinear as well as linear servo systems may be tested by the method. Single-integrator, angle tracking, and range-tracking servo systems, have been analyzed. The range-tracking

transfer function was employed in an analog computer experiment. A study of these recordings revealed potentialities for control of adaptive servo systems. NRL R 5039.

Investigation and research pertaining to the development and design of tantalum electrolytic capacitors, by A.L. Jenny and A.F. Torrisi. General Electric Co. Capacitor Materials Research Division, Hudson Falls, N.Y. n.d. 30p tables. Order from LC. Mi \$2.70, ph \$4.80.

PB 125956

A "universal" formula has been derived so that the expected life of a 150 volt rated tantalytic over a wide range of temperatures and voltages can be estimated. Etched foil units have reached the stage of development where commercial units can be made available. Over wide range of capacities (100 mfd. and over) and a wide range of voltage (up to 150 volts d-c) it has been shown that etched foil units show comparable stability to plain foil units. The resulting very small capacitors (compared to plain foil) have slightly higher leakage currents initially but approach the leakage current of plain foil units during use. The percent dissipation is slightly higher than in plain foil capacitors. Dept. of Army Project: 3-26-00-600. Signal Corps Project: 32-2006. Includes Supplement to the final quarterly report. Contract 36-039-sc-15423, Final report.

Magnetic modulators for radar application, by E.J.

Smith, J. Antin and K.T. Lian. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Apr 1955. 106p photos, diags, graphs, tables. Order from Polytechnic Institute of Brooklyn, 55 Johnson Street, Brooklyn 1, N.Y. \$2.00.

PB 127543

The basic theory of the cascaded magnetic-modulator circuit is extended to include the effects of copper and core losses, and a magnetic pulse-shaping technique is described. Experimental results obtained from a model low-power modulator are presented. Finally, core-loss data for representative square-loop magnetic materials, under conditions of sinusoidal and pulse excitation, are presented and the calorimeter measurements technique is described. AD 68547. Project 4506, Task 45360. Contract AF 30(602)-984. PIB 351. PIB R 419-55.

Silver oxide-zinc alkaline primary cell, by C.M.

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

Part II: Effects of various types of negative electrodes on cell characteristics, by C.M. Shepherd. Dec 1951. 30p diagr, graphs (1 fold), tables. Mi \$2.70, ph \$4.80.

PB 129129

Preliminary investigations have been made of

a number of negative electrodes which can be used in the silver oxide-zinc alkaline primary cell. High surface area electrodes which can be closely spaced in the cell are shown to be the most desirable, particularly at low temperatures and at high current densities. The types of negative electrodes found to merit further investigation are: electroformed zinc, electroplated wire screen, zinc wire screen, and rectangular zinc fiber. It is possible in most cases to calculate the approximate capacity of a particular electrode from the data obtained on sheet-zinc electrodes. For Parts 1 and 4 see PB 109794 and 121744. NRL R 3876.

Part III: Cell design, by C.M. Shepherd.
Feb 1953. 46p graphs. Mi \$3.30, ph \$7.80.
PB 129130

A theoretical method is derived for minimizing the weight or volume of a silver oxide-zinc alkaline cell. Available information is presented graphically in a manner that may be readily utilized by this method to design a specific cell having certain characteristics. A discussion is given of the limitations and sources of error that are applicable to this type of cell design. NRL R 4089.

Study of high power magnetic modulators for radar applications, by Edward J. Smith and Joseph Antin. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N.Y. Jan 1954. 119p photos, diagrs, graph, tables. Order from Polytechnic Institute of Brooklyn, 55 Johnson Street, Brooklyn 1, N.Y. \$2.00.
PB 127542

A brief survey of the available literature in the field is followed by the development of an elementary theory of magnetic modulators. A paper design of a 2-megawatt, all-magnetic circuit is carried out in order to obtain an appreciation of the size and weight of a typical system. Specific problems of design and circuit operation, including jitter, are next considered and some experimental results are shown. Finally, general conclusions are reached regarding the relationship between total reactor weight and performance specifications; an improved modulator circuit is proposed; and recommendations for future work are made. AD 36784. Contract AF 30(602)-387, Task 2, B-6, Final report. PIB R 369-54. PB 303.

Miscellaneous

Research on effect of steric factors on hydrolytic reactivity, by M.S. Newman. Ohio State University Research Foundation, Columbus, O. Jun 1956. 12p tables. Order from LC. Mi \$2.40, ph \$3.30.
PB 126028

Experimental data are presented for the effect of steric groups on the hydrolytic stability of highly substituted amides and nitriles. The extent of hydrolysis, base-catalyzed for such amides at 190°C and acid-catalyzed for hindered aliphatic nitriles, is correlated with the Newman "Rule of Six" and the "Six Numbers". The nitrosation of hindered aliphatic amides to acids is also described. AD 110519. Project no. 5(7-7312), Task 70304. Contract AF 33(616)-325. AF WADC TR 56-350.

FOOD AND KINDRED PRODUCTS

Effect of dehydration, preparation and storage on the vitamin content of beef steaks and pork chops. U.S. Quartermaster Food and Container Institute, Chicago, Ill. Aug 1956. 10p tables. Order from OTS. 50 cents.
PB 131294

The vitamin content of dehydrated beef steaks and pork chops has been determined after processing, cooking and storage at various temperatures. The results indicate that during the dehydration of beef steaks, no significant loss of vitamins occurred. Rehydration resulted in no loss of thiamine, 27% loss of riboflavin, and 14% loss of niacin. The losses which took place during storage occurred during the first 10 days of storage and amounted to 40% of thiamine, 30% of riboflavin, and 20% of niacin. Statistics are also given for pork chops. AD 107473. Project 7-84-13-002 Food Research.

Nutrient requirements of domestic animals. No. III: Nutrient requirements of dairy cattle, prepared by the subcommittee on Dairy Cattle Nutrition: J.K. Loosli, Chairman; R.B. Becker; C.F. Huffman; P.H. Phillips; J.C. Shaw. National Research Council. Division of Biology and Agriculture. Committee on Animal Nutrition. Revised. 1956. 36p photos, tables. Order as Publication 464 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.00.
PB 126073

1. Cattle - Feeding and nutrition 2. Animals - Feeding and nutrition 3. NRC 464

Safe use of pesticides in food production. A report by the Food Protection Committee of the Food and Nutrition Board, W.J. Darby, Chairman. National Research Council. Division of Biology and Agriculture. Food and Nutrition Board. Nov 1956. 19p. Order as Publication 470 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 50 cents.
PB 126072

1. Insecticides - Uses 2. Insecticides - Toxicity
3. Food - Pests 4. NRC 470

FUELS AND LUBRICANTS

Analysis of laminar flame propagation limits due to thermal loss, by E. Mayer. Arde Associates, Newark, N.J. Sep 1956. 36p graphs, table. Order from LC. Mi \$3.00, ph \$6.30.

PB 126141

The effect of thermal loss on laminar flame propagation is investigated on the basis of simplified (Semenov) relations in thermal flame theory. AD 97362. Technical note 4555-3. Chem 50-16. Contract AF 18(600)-1560. AF OSR TN 56-478.

Fire research correlation conference, 1st, Washington, D.C., Nov 8 and 9, 1956. National Research Council. Division of Engineering and Industrial Research. Committee on Fire Research. 1957. 286p photos, drawings, diags, graphs, tables. Order as Publication 475 from NAS-NRC Publications Office, 2101 Constitution Ave, N.W., Washington 25, D.C. \$2.50.

PB 126007

This conference was conducted as part of the work under Contract CD-GA-56-38 between the National Academy of Sciences and the Federal Civil Defense Administration. The following papers were presented: Introduction and background, by Louis Jordan. - Mass fire problem, by Lloyd Layman. - Fire research in the United Kingdom, by D. I. Lawson. - Research challenge of forest fires, by Keith Arnold. - Meteorology and fire research, by DeVer Colson. - NACA research pertinent to the fire problem, by Walter T. Olson. - Fire research at the National Bureau of Standards, by A. F. Robertson. - Bureau of Mines fire research, by Robert W. VanDolah. - Role of industrial and fire insurance groups in fire research, by Mathew M. Braidech. - Army fire research program, by James E. Malcolm. - Thermal radiation attenuating clouds, by Elmer H. Engquist. - Mechanism of flame inhibition, by Henry Wise. - Fire research in the United States Navy, by Richard L. Tuve. - Ignition by thermal radiation, by S. B. Martin. - Effect of intense radiant heat on materials, by Thomas I. Monahan. - Fire research in the U.S. Air Force, by W. R. Smith. - Survey of fundamental knowledge of the mechanics of flame extinguishment, by Raymond Friedman. - NACA research on aircraft crash-fires, by I. Irving Pinkel. - The meaning and method of fire research, by H. C. Hottel. - Panel on fire systems and models. - Operations research, by Philip M. Morse. - Classification of fire research, by William H. Avery. NRC 475.

Inflammability characteristics of liquid fuels, by L. T. Taylor. U.S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, O. Jul 1949. 100p photos, graphs. Order from LC. Mi \$5.40, ph \$15.30.

PB 129681

As a result of the danger of fires involved in the use of aircraft and rocket fuels, a detailed study of the inflammability characteristics of these fuels became necessary. Laboratory investigations have been conducted on many different fuels in recent years to determine the behavior of these fuels under various conditions of test. These data consisted of spontaneous ignition temperature determinations, vapor pressure studies and the combustion characteristics of fuels under varying pressure and temperature conditions. The initial investigation comprised a study of practically all liquids used as fuels or proposed as fuels by the Air Force. In general, the data obtained were reproducible and in most cases agreed well with results of tests conducted by other laboratories. It was established that the combustion of volatile fuels is controlled by variations of temperature and pressure. The results also established the relative inflammability of various liquids used as fuels. Unclassified 29 Mar 1957. AF TR 5895.

I. Interference during burning of body-centered cubic arrays of nine fuel droplets in air. II. Spray formation and evaporation, by J. N. Kanewsky. California Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Jun 1956. 70p photos, diags, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80.

PB 126025

In order to gain some understanding of interference effects during the combustion and evaporation of fuel sprays, simple three-dimensional body-centered cubic arrays of nine n-heptane or nine methyl alcohol droplets burning in air have been studied. Photographic studies of the center droplet in this nine-droplet array were made in order to determine the qualitative effects of droplet spacing on evaporation constant (K') while combustion was in progress and to determine whether the mass rate of burning was proportional to the first power of droplet diameter for a three-dimensional array of droplets. Unsuccessful attempts to study the combustion of liquid bipropellant mixtures and to examine the "burning" of red fuming nitric acid in an ammonia atmosphere are described. In Part II, a general discussion of information available on the disintegration of liquid jets, spray characteristics, mean droplet size, droplet-size distribution, and spray evaporation is presented. The use of similarity considerations in analyzing spray-nozzle performance is demonstrated. Calculation of K' for a spray from experimental spray evaporation data is described and the results of these calculations are tabulated. Thesis - California Institute of Technology. For Technical report no. 7 under this Contract see PB 118677. Contract DA 04-495-ord-446, Technical report no. 15.

Investigation of fuel quantity measuring techniques. Raytheon Manufacturing Co., Waltham, Mass. Jun 1952. 459p drawings, diags, graphs, tables. Order from LC. Mi \$11.10, ph \$69.60.

PB 127162

The pertinent factors of fuel gage design are tactical, structural, aerodynamic, psychological, and chemical in nature. A sample quantitative derivation of a fuel gage design objective is carried through. Part II collects the pertinent information on fuels, airframes, and the atmosphere, regarded as the environment of a fuel gage. A classification of fuel-gaging principles is illustrated by roughly 140 new suggestions for fuel gage designs. Nine of these are examined in some detail: gaging by radio frequency fields, by the titration of dyes, by the heat capacity of the fuel body, by float gages or buoyant probes, by capacitance-type gages, by multiple fuel-operated switches, by cyclical pumping of the fuel through a meter, by acoustic methods, and by the use of pressure gages. A collection of techniques and information generally useful in fuel gage design completes the report. Contract AF 33(038)-22632.

Investigation of low-pressure flames, by Mitchell Gilbert. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Aug 1949. 74p photos, diagrs, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30.

PB 127060

Low-pressure flame research was proposed late in 1946, and a preliminary experimental combustion chamber was completed and tested during the latter half of 1947 and early part of 1948. After major problems encountered in the earlier apparatus had been solved, an improved combustion chamber was designed and installed in the new physical measurements laboratory in July, 1948. The main purpose of this report is to describe the equipment, facilities, instruments, and techniques now being used and contemplated in the low-pressure flame research. ORDCIT Project. Power Plant Lab. Project MX527. Contract W-04-200 ORD-455. Contract W33-038-AC-4320. CIT JPL 4-54.

Method of determining thermal stability of synthetic oils, by Oliver M. Ballentine. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, O. Mar 1955. 20p photos, drawings, diagrs, graphs, table. Order from LC. Mi \$2.40, ph \$3.30.

PB 128429

An apparatus has been developed for determining thermal stability of synthetic oils. Thermal decomposition temperatures were determined by plotting vapor pressures over a wide temperature range. The point at which the curve deviates from a straight line relationship will be the point at which thermal decomposition occurs. AD 73441. Project 3044, Task 73314. AF WADC TR 54-417.

Organo-metallic and organo-metalloidal high-temperature lubricants and related materials, by Henry Gilman, Robert K. Ingham and Richard

G. Gorsich. Iowa State College, Ames, Ia. Apr 1954. 130p tables. Order from LC. Mi \$6.30, ph \$19.80. PB 129468

A number of organo-metallic and organo-metalloidal compounds have received preliminary screening for thermal stability in connection with high-temperature lubricants. The most effective materials tested thus far have been the tetra-substituted silanes and compounds containing a silicon-oxygen bond. Among the more promising groupings are the 1-naphthyl, benzyl and long-chained alkyl groups. Several classes of organo-silicon, -germanium, -tin and -lead compounds have been synthesized and tested for thermal stability. Information obtained from the screening of these compounds has been utilized for the design and syntheses of addition compounds to receive further evaluation. For Part 2 see PB 111889. Contract AF 33(616)-94. AF WADC TR 53-426, Part I.

Preparation of highly effective rust inhibitors by fractionation of mahogany sulfonates, by K.R. Fisch. U.S. Frankford Arsenal. Pitman-Dunn Laboratories, Philadelphia, Pa. Mar 1957. 18p diagrs, graphs, tables. Order from OTS. 50 cents. PB 131231

Very effective rust inhibitors were prepared by the fractionation of commercial mahogany sulfonates. It was found that the rust-preventive effectiveness of the fraction of highest equivalent weight was approximately three times that of the original material. The highest equivalent weight was 548, calculated as the sodium salt. Infrared spectra indicate that the fractions are all similar and that the structure is that of an alkylated benzene sulfonate. The similarity of the infrared curves and the variation of the equivalent weights of the fractions indicate that the differences among the fractions are in the size and, possibly, in the configuration of the alkyl side chains, and in the number of naphthenic rings. Project TB 5-7010D. To be published in the Journal of Lubrication Engineering. FAL R 1382.

Report of the first Services-Industry Conference on high temperature hydraulic systems, 26, 27 Jan 1954. U.S. Bureau of Aeronautics. Airborne Equipment Division. 1954. 190p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$8.40, ph \$28.80. PB 127049

AD 36013. Appendix is AD 32831, Contract AF 33 (038)-18193, Rept. PRL 6.3: Some properties of Spec. MIL-O-56-06 hydraulic fluid at elevated temperatures, by Petroleum Refining Laboratory, Pennsylvania State University. 1. Hydraulic fluids - Thermal properties 2. Airplanes - Hydraulic systems 3. Hydraulic systems - Components 4. Hydraulic fluids - Specifications 5. Lubricants, Aircraft 6. Airframes - Materials - Physical properties 7. NAVAER AE 61-8, Part 2

HIGHWAYS AND BRIDGES

Accident analysis and impact studies. Highway Research Board. 1956. 56p photos, diagrs, graphs, tables. Order as HRB Bul 142 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.00. PB 126052

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Motor vehicles - Drivers 2. Impact - Effects 3. Accidents, Traffic - Causes 4. HRB Bul 142 5. NRC 434

Acquisition of land for future highway use, a legal analysis. Highway Research Board. 1957. 94p photos, maps, diagrs, graph, tables. Order as HRB Special report 27 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$3.20. PB 126080

Contents: Appendix A. Summary of statutory and case law concerning acquisition of property for future use, by States. - Appendix B. Digest of important judicial decisions dealing with acquisition for future public or quasi-public use. 1. Road laws 2. Roads - Land acquisition 3. HRB SR 27 4. NRC 484

Flexible pavement design in four states. Highway Research Board. 1956. 63p photos, diagrs, graphs, table. Order as HRB Bul 136 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.00. PB 126077

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Pavements, Flexible - Design 2. Pavements, Flexible - Construction 3. Pavements, Flexible - Materials - Tests 4. NRB Bul 136 5. NRC 427

Glossary of pedologic (soils) and land form terminology for soil engineers. Highway Research Board. 1957. 36p drawings, diagr, table. Order as HRB Special report 25 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 80 cents. PB 126048

1. Land forms - Terminology 2. Soils (Engineering) - Glossaries 3. HRB SR 25 4. NRC 481

Highway administration. Highway Research Board. 1957. 57p. Order as Publication 492 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.00. PB 126063

No attempt has been made to include all possible items in the bibliography. Rather, the items in-

cluded were selected with considerable care, so that each would be representative and would include some new material. In general, the items included cover the period of the last ten years, although a few earlier references are included. HRB B 19. NRC 492.

Joint spacing in concrete pavements. Highway Research Board. 1956. 165p photos, graphs, tables. Order as HRB Research report 17-B from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$2.70. PB 126095

Ten year reports on six experimental projects. 1. Pavements, Concrete - Joints 2. Pavements, Concrete - Construction 3. HRB RR 17-B 4. NRC 417

Soil-testing methods: Moisture, density, classification, soil-cement. Highway Research Board. 1956. 52p photos, map, diagrs, graphs, tables. Order as Publication 409 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 90 cents. PB 125952

Presented at the Thirty-fourth annual meeting Jan 11-14, 1955. Contents: Preparing base-course materials for disturbed soil indicator tests, by Harold S. Gillette. - Rubber-balloon apparatus for measuring densities of soils in place, by R.L. Handy and D.T. Davidson. - Neutron and gamma-ray methods for measuring moisture content and density to control field compaction, by Robert Horonjeff and Donald F. Javete. - Simplified methods of testing soils-cement mixtures, by J.A. Leadabrand and L.T. Norling. HRB Bul 122. NRC 409.

Traffic assignment by mechanical methods. Highway Research Board. 1956. 81p map, diagrs, graphs, tables. Order as HRB Bul 130 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.50. PB 126078

Presented at the Thirty-fifth annual meeting, Jan 17-20, 1956. 1. Traffic control - Methods 2. Traffic surveys - Methods 3. Accidents, Traffic 4. HRB Bul 130 5. NRC 420

INSTRUMENTS

The airdrag anemometer, by W.A. Von Wald, Jr. U.S. Naval Research Laboratory. Dec 1957. 16p photos, diagr. Order from OTS. 50 cents. PB 131533

An airdrag anemometer has been developed for measuring wind speeds from 2 to 100 knots. This anemometer uses differential transformers for

detecting N-S and E-W components of the wind force on a small rod and a computer for combining the two components vectorially to give wind speed and direction on linear scales. At wind speeds above 10 knots, accuracy of 1.5 knots in speed and 5 degrees in direction have been attained. Below 10 knots, the direction errors increase to 10 degrees and speed errors to 2.0 knots. NRL R 5044.

Apparatus and technique for sound velocity measurements, by Preston W. Smith, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Aug 1949. 26p diags, graph. Order from LC. Mi \$2.70, ph \$4.80.

PB 127015

This report discusses the apparatus and technique developed for precision measurement of the velocity of sound in gases at audiofrequencies. An audiofrequency comparator is described whereby the sound frequency can be very accurately measured by comparison with a standard frequency oscillator. An analysis is made of the accuracy of measurements that is expected. Contract N5ori 76, T.O. X, NR 014-903. HU ARL TM 19.

Apparatus and techniques for a study of cavitation, by F.G. Blake, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jun 1949. 56p photos, diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 126564

Apparatus devised for a study of cavitation sonically induced in the body of a liquid is described. The objective is to determine the dynamic tensile strength of the liquid itself, independently of vessel wall effects. Threshold sound pressures for acoustic cavitation in various liquids are to be observed as functions of such variables as temperature, mean hydrostatic pressure, dissolved gas content, and time of excitation. Contract N5 ori 76, T.O. X. HU ARL TM 11.

Automatic pressure measuring systems used with high-speed wind tunnels. Carl F. Frederick Associates, Bethesda, Md. Jun 1955. 59p photos, drawings, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 127163

A brief review is given of high-speed wind tunnel characteristics with particular reference to instrumentation needs. This is followed by a survey of the major elements of pressure measuring systems. Representative pressure measuring systems in actual use in the United States are described. AD 77895. AGARDograph 10.

"BETA", a special purpose computer for studies in the human control of complex equipment, by Bryce O. Hartman and John K. Wetherbee. U.S. Army Medical Research Laboratory, Ft. Knox, Ky. Apr 1956. 57p photo, diags, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 126644

This report describes a special-purpose computer, which is designed to study human performance in controlling complex equipment and systems. The instrument is a research tool featuring a considerable amount of automation. It generates target courses, displays them, receives and displays response signals, computes "error", and feeds the error signal to clocks, counters, and graphic recorders, all on a predetermined schedule. Project no. 6-95-20-001. AMRL R 236.

Calibration of a beta-ray spectrometer, by Alfred J. Moses and Roger P. Vancour. U.S. Arsenal, Watertown, Mass. May 1955. 17p photo, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 127061

O.O. project TB 2-0001. D/A project 599-01-004. 1. Spectrometers, Beta ray - Tests 2. Spectrometers, Beta ray - Calibration 3. WAL R 844/18-1

Counterflow heat exchanger transient studies, by Earl R. McMinn. General Motors Corp. Allison Division, Indianapolis, Ind. Jun 1956. 91f diags, graphs, tables. Order from LC. Mi \$5.40, enl pr \$16.80. PB 126221

Summary report, E.D.R. no. 841. Appendix E is Columbia University analog studies, report by Dr. Victor Paschke. 1. Computers, Digital - Uses 2. Circuits, Electric - Analogies 3. Heat exchangers - Design 4. Contract NOas-56-411

Dead weight pressure balance, by Albert E. Schuler. U.S. Army Ballistic Missile Agency, Huntsville, Ala. Apr 1956. 24p photos, diags. Order from LC. Mi \$2.70, ph \$4.80. PB 126636

This report describes and illustrates a deadweight pressure balance which is accurate within 0.5% of measured value. ABMA RR 1R13.

Deltic correlator, by Victor C. Anderson. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jan 1956. 93p photos, diags, graphs, tables. Order from LC. Mi \$5.40, ph \$15.30. PB 128407

1. Autocorrelation - Analysis 2. Correlators, Deltic (Delay line time compressor) 3. Data storage systems 4. Computers - Correlation functions 5. Contract N5 ori 76, T.O. X, NR 014-903 6. HU ARL TM 37

Design of pressure vessels for extreme pressure, by Wayne S. Brown and S.S. Kistler. Utah University. College of Engineering, Salt Lake City, Utah. Jun 1956. 54p photos, drawings, diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125968

The authors conclude that ultimately high pressures

must be retained by tensile members, the design of which can be satisfactorily accomplished for simple cases through elastic theory. Contract Nonr-1288(02), NR 052-357. UU ISRP TR 51.

Development of a miniature mass spectrometer of the omegatron type, by L. R. McNarry. National Research Council of Canada. Radio and Electrical Engineering Division. Dec 1956. 33p photo, drawings, diagrs, graphs, table. Available from the National Research Council of Canada, Ottawa 2, Canada. 25 cents. PB 126010

The application of the omegatron, which operates on the cyclotron principle, to mass spectrometry is well known. Investigation of the effects of electric and magnetic field inhomogeneities has led to improvement of the practical resolving power. Some data on the nature of the background ion current are included. Construction details of an omegatron which is useful up to mass 100 are given. NRCC ERA 311. NRCC 4259.

Development of a miniature vortex free-air thermometer. Final report, by Jack Beneke. Cornell Aeronautical Laboratory, Inc., Buffalo, N.Y. Nov 1955. 75p photos, drawings, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 126143

The Cornell Aeronautical Laboratory has developed a miniature vortex free-air thermometer suitable for installation on high-speed, subsonic aircraft. According to wind tunnel test data, the A. A. L. thermometer indicates free-air temperature to within $\pm 1^\circ\text{C}$ up to at least 0.9 Mach number. Light weight, small size and consequent low drag, simplicity, accuracy, and rapid response were the guiding objectives in the design of the vortex free-air thermometer. Contract NOas-54-156-C, Final report. CAL 1H-894-P-1.

Development of the type 48-A power-level recorder, by F. G. Miller. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Aug 1949. 47p photos, diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB125973

This memorandum describes the development of a general-purpose logarithmic-scale power-level recorder for application to measurements of voltage or power in the audiofrequency range. Part II of the report includes performance data, application and servicing notes. Contents: Part I: General description of the recorder. - Part II: Operation of the recorder. Contract N5 ori-76, T.O.X, NR 014-903. HU ARL TM 10.

Diffraction. Final project report on Contract N6-onr-263, Task Order V, Project NR 017-604, by I. Fankuchen. Polytechnic Institute of Brooklyn, Brooklyn, N.Y. Dec 1955. 6p diagr. Order

from LC. Mi \$1.80, ph \$1.80. PB 126105

This program was directed in two main channels. One was the design of equipment to facilitate x-ray studies at low temperatures; the other was to use such equipment in the investigation of important materials at low temperatures. Contract N6 onr-263, 263, T.O.V, NR 017-604, Final project report.

High sensitivity ballistic fluxmeter, by Benjamin B. Snavely. U.S. Naval Ordnance Laboratory, White Oak, Md. Nov 1956. 20p drawing, diagrs. Order from LC. Mi \$2.40, ph \$3.30. PB 127499

An instrument has been developed for improving the sensitivity of a conventional magnetic fluxmeter by a factor of 50. The combination of this instrument with a conventional fluxmeter is known as a "ballistic fluxmeter". Its sensitivity makes it feasible to obtain static magnetic properties on computer type cores and other cores of small cross sectional area. The paper discusses the theory of the ballistic fluxmeter and describes the development of the instrument. Details of the circuitry and operation are also given. NAVORD 4444.

Linear lumped parameter analysis of synchros:

VI: Trigonometric identities useful in synchro analysis, by G. H. Weiss. U.S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 24p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 127416

Many of the impedances in a synchro are functions of angle. An analysis of synchros will therefore involve trigonometric relations, which usually simplify greatly because of the symmetries involved. This report contains tabulated the most useful of these identities as well as derivations and suggestions for derivations. For parts 1-3, 5, 7-9 see PB 120921, 120852, 120947, 120836, 120884, 120835, 120990. Part 4 is NAVORD 2173. NAVORD 2346.

Monthly progress report under Contract DA 36-034-ORD-1646, by Herman H. Goldstine. Princeton University. Institute for Advanced Study. Feb 1956. 6p drawings, table. Order from LC. Mi \$1.80, ph \$1.80. PB 126164

Project TB 3-0538. For other monthly reports under this Contract see PB 118659-118660, 119072, 120319, 120321, 123155 and 123170. 1. Computers, Electronic - Algorithms 2. Switches, Electronic - Mathematical analysis 3. Circuits, Electronic 4. Contract DA 36-034-ORD-1646

Multichannel pulse height analyzers. Proceedings of an informal conference, Gatlinburg, Tenn., Sep 26-28, 1956, edited by H. W. Koch and R. W. Johnston. National Research Council. Committee on Nuclear Science. Subcommittee on Instru-

ments and Techniques. Jan 1957. 215p photos, diagrs. Order as NRC Publication 467 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 20, D.C. \$2.00.

PB 126055

Papers presented at the conference are grouped as follows: Group I. Statement of the problem. - Group II. Systems (as used at Harwell, Laboratori CISE, by the French Atomic Energy Commission, at Oak Ridge, at McGill University, at Argonne, Kicksorter developments at Harwell and at Chalk River, at Naval Research Laboratory, at Yale University, and experiences with Hutchinson-Scarrott analyzers). - Group III. Computer techniques. - Group IV. Calibration, XYZ recording, and future trends. NRC 467. NRC NSS 20.

Recording horizontal atmospheric transmission of light by night and day, by T.H. Cosden. U.S. Naval Research Laboratory. Jul 1955. 13p photos, diagrs, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 126603

A transmissometer which uses a modulated source and a tuned photoelectric detector has been constructed and tested. The device will operate over long (10 mi) or short paths and has proven reliable, stable, and accurate for long periods. The device is a relative monitoring system and must be calibrated to give absolute visual transmission. Calibration is carried out by means of visual photometry. NRL R 4570.

Theoretical and experimental evaluation of the rebatron, a relativistic electron bunching accelerator, by Irving Kaufman. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Dec 1956. 376p photos, drawings, graphs (part fold). Order from LC. Mi \$11.10, ph \$56.10.

PB 126692

The development of sources of appreciable RF power in the 1 mm to 0.1 mm wavelength range of the electromagnetic spectrum has yet to be accomplished. A very promising approach to the problem is the coherent interaction with a circuit, or the direct radiation, of a tightly bunched, megavolt electron beam. Work on a device for producing such a beam has resulted in a compact relativistic electron bunching accelerator, designated the REBATRON. One form of rebatron consists of an electron gun, followed by two 10 cm cavities that are powered by a megawatt source. AD 115039. Contract AF 18 (603)-62, Technical note no. 1. AF OSR TN 57-7.

MACHINERY

Analysis of traction pumps, by Friedrich S. Weinig. U.S. Air Force. Air Research and Development

Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, O. Jun 1955. 54p drawings, diagrs, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 129967

The working principles of the traction pump is described and a basic theory developed by which the characteristics and the efficiencies of the pumps are reduced to the influence of basic parameters. The analysis offers some rules to guide the designer which may be exploited by the understanding of the proper mechanism of the traction principle as it is explained. AD 67339. Project no. 3084, Task no. 70145. AF WADC TR 54-554.

Investigation of synthane ball bearing retainers.

Final report, by L.M. Schetky. Massachusetts Institute of Technology. Instrumentation Laboratory, Cambridge, Mass. Apr 1954. 23p drawings, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 127312

Tests made of Synthane bearing retainers used in high-speed ball bearings indicate that the structure is one of continuous capillaries separated by a resin binder. These capillaries may be made to absorb oil by a vacuum impregnation treatment, the absorbed oil amounting to approximately 1.5% of the dry weight of the retainer. DIC Project 7178. AD 35071. Contract AF 33(616)-2039. MIT IL R-72.

MATHEMATICS AND STATISTICAL ANALYSIS

Conformally invariant wave equations for non-linear and interacting fields, by James A. McLennan, Jr. Lehigh University. Institute of Research, Bethlehem, Pa. Nov 1956. 13p. Order from LC. Mi \$2.40, ph \$3.30. PB 126685

Non-linear conformally invariant wave equations for spinors of arbitrary rank are obtained. These include an equation recently proposed by Gursey. In addition, conformally invariant equations for interacting fields are given. AD 115061. Contract AF 18(600)-1462. AF OSR TN 57-26.

Estimation of the location of a discontinuity in density, by Herman Chernoff and Herman Rubin. Stanford University. Dept. of Statistics, Stanford, Calif. Oct 1955. 38p. Order from LC. Mi \$3.00, ph \$6.30. PB 124512

1. Random distribution - Theory 2. Statistical theory 3. Contract N6 onr-251, T.O. III, NR 042-993, Technical report no. 39

Fredholm eigen values of plane domains, by M. Schiffer. Stanford University. Applied Mathe-

mathematics and Statistics Laboratory, Stanford, Calif. Jun 1956. 72p. Order from LC. Mi \$4.50, ph \$12.30. PB 125959

It is the aim of the present paper to study the eigen functions and eigen values of the homogeneous Fredholm equation which is connected with the boundary value problem of two-dimensional potential theory. In particular, a sharp estimate is obtained for the lowest non-trivial eigen value in terms of function theoretic quantities connected with the curve considered. Contract Nonr-225(11), NR 041-086. SU AMSL TR 53.

Mathematical analysis of the sources of error in diffusion studies using tracers, by R.H. Condit. Princeton University. James Forrestal Research Center, Princeton, N.J. Feb 1957. 22p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 125978

A mathematical analysis of the sources of error in solid diffusion studies using radioactive tracers is presented with a table of the accuracies necessary in the experimental variables to achieve some desired accuracy in the diffusion coefficient. Ways are formulated for estimating the amount of tracer required for a diffusion run, and criteria for choosing between sectioning and residual activity methods are suggested. AD 120461. For Metallurgy report no. 2 see PB 118345. Contract AF 18(600)-967. PU FRC MR 11. AF OSR TN 57-109.

Numerical integration of oscillatory systems, by Harry L. Reed, Jr. U.S. Aberdeen Proving Ground. Ballistic Research Laboratory, Aberdeen, Md. Oct 1955. 14p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 126694

It is shown that, for the case of linear differential equations, the behavior of a numerical analogue is determined by the frequencies and damping rates. In particular it is shown that there is a one to one relationship between the eigenvalues of the differential equation and the roots of the analogue, and each relationship is independent of the other. Dept. of the Army project no. 5B0306002. Ordnance Research and Development project no. TB 3-0007. APG BRL R 957.

Plastic bending of an annular plate, by P.G. Hodge, Jr. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics, New York, N.Y. Jun 1956. 18p diagrs, Order from LC. Mi \$2.40, ph \$3.30. PB 125965

The particular problem considered is that of an infinite annular plate, simply supported and subjected to a prescribed moment at its inner edge. The plate material is assumed to be rigid up to the yield limit and to harden according to a linear isotropic law. A complete explicit solution is found for the moments and displacement in each phase. Contract Nonr-839(11), NR 064-416. PIB AL 349.

Power of rank tests, by E.L. Lehmann. Stanford University. Dept. of Statistics, Stanford, Calif. Jul 1952. 33p graphs, table. Order from LC. Mi \$3.00, ph \$6.30. PB 127062

Simple nonparametric classes of alternatives are defined for various non parametric hypotheses. The power of a number of such tests against these alternatives is obtained and illustrated with some numerical results. Optimum rank tests against certain types of alternatives are derived, and optimum properties of Wilcoxon's one and two sample tests and of the rank correlation test for indepenence are proved. Contract N6 onr-251, T.O. 3, NR 042-993. SU DS TR 12.

Proceedings of the conference on differential equations, held at University of Maryland March 17, 18 and 19, 1955, by J.B. Diaz and L.E. Payne. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Sep 1956. 295p graphs, tables. Order from LC. Mi \$11.10, ph \$45.60. PB 126123

AD 110314. Sponsored jointly by the Institute for Fluid Dynamics and Applied Mathematics, University of Maryland and the Air Force Office of Scientific Research, Air Research and Development Command. Contents: I. Differential systems with boundary conditions at more than two points, by W.M. Whyburn. - II. Sturm-Liouville and heat equations whose eigenfunctions are ultraspherical polynomials or associated Bessel functions, by S. Bochner. - III. Repeated branching through loss of stability, an example, by E. Hopf. - IV. Problems related to characteristic surfaces, by M. Riesz. - V. On the Euler-Poisson-Darboux equation, integral operators, and the method of descent, by J.B. Diaz and G.S.S. Ludford. - VI. On partial differential equations of mixed type, by M.H. Protter. - VII. Some applications of Riesz's method, by E.T. Copson. - VIII. Discontinuity and representations of minimal surface solutions, by Y.W. Chen. - IX. Relations between different capacity concepts, by G. Szegö. - X. Some results on generalized axially symmetric potentials, by A. Huber. - XI. On the numerical solution of the Dirichlet problem, by Z. Nehari. - XII. Bounded or almost-periodic solutions of non-linear differential systems, by L. Amerio. - XIII. The extension of the Riemann mapping theorem to elliptic equations, by F.G. Dressel and J.J. Gergen. - XIV. On the eigenfunctions of the membrane equation in a singular case, by A. Pleijel. - XV. An abstract formulation of the method of separation of variables, by B. Friedman. - XVI. The heat equation and the Weierstrass transform, by D.V. Widder. - XVII. Extensions of operational mathematics, by R.V. Churchill. - XVIII. On generalized Sturm-Liouville operators, by W. Feller. - XIX. Heat transfer to Hagen-Poiseuille flows, by K. Millsaps and K. Pohlhausen. Contract AF 18(600)-1380, Final report. AF OSR TR 56-51.

Quasi-Lagrangian system of hydrodynamic equations with potential temperature as an independent variable, by Shih-Kung Kao. Johns Hopkins University. Dept. of Civil Engineering, Baltimore, Md. Jul 1956. 31p. Order from LC. Mi \$3.00, ph \$6.30. PB 126144

In this paper a system of quasi-Lagrangian equations of motion with potential temperature as the material coordinate is developed. It is shown in this new system of coordinates that the equations of motion and vorticity become simpler in many ways, and that in any quasi-static treatment of atmospheric motion it is possible to eliminate density and vertical velocity. The instantaneous state of atmospheric motion may be determined by the instantaneous field of the Montgomery function and the horizontal velocity on the isentropic surfaces. It is also shown that the planetary wave motion in isentropic surfaces gives a more accurate description than that in a barotropic atmosphere. Contract AF 19(604)-916, Scientific report 2. AF CRC TN 56-251.

Sound propagation in horns, by Osman K. Mawardi. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Contract N5 ori-76, T.O. X, NR 014-903. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Generalized solutions of Webster's horn theory. May 1949. 25p diagrs, graphs. Mi \$2.70, ph \$4.80. PB 126814

Webster's equation for the approximate formulation of the propagation of sound waves in horns is solved using two methods of approach. The first method considers a transmission line with variable parameters as the electrical analogue of the horn. This approach is specially useful in yielding generalized solutions for horns of finite length. The second method, based on an investigation of the singularities of Webster's differential equation, leads to the discovery of a great number of new families of horns. HU ARL TM 4.

Part II: Throat impedance of finite horns. Jun 1949. 23p diagr, graphs. Mi \$2.70, ph \$4.80. PB 127004

A generalized relation for the throat impedance of horns of finite length has been derived. The particular case of a family of horns due to Salmon has been discussed in detail. The relation for the impedance is cast in a form which allows the effects of length, cutoff and flare of the horns to be examined separately. Charts are given which will permit the evaluation of the impedance of the horn when the three previously mentioned parameters are given. HU ARL TM 14.

Stochastic basis of Onsager's minimum principle, by Armand Siegel. Boston University. Dept. of Physics, Boston, Mass. Revised. Jan 1956. 23p. Order from LC. Mi \$2.70, ph \$4.80. PB 126133

The phenomenological equations of motion of thermodynamic quantities, and Onsager's minimum principle, are correct only to the extent that fluctuations are neglected. This paper presents a statistical analysis of the problem and gives a criterion for the validity of the phenomenological approximation. Revision of Aug 10, 1955 edition. Contract Nonr 492(02). Contract AF 18(603)-29.

Third order differential equations, by W.R. Utz. Missouri. University, Columbia, Mo. Jul 1955. 8p. Order from LC. Mi \$1.80, ph \$1.80. PB 126683

AD 95834. MoU MRG Report no. 5. 1. Equations, Differential 2. Mathematical equations and solutions 3. Contract AF 18(600)-1108 4. AF OSR TN 55-215

Twisted sphere, by Michael Sadowsky. Rensselaer Polytechnic Institute. Dept. of Mechanics, Troy, N.Y. Dec 1955. 45p diagrs, graph, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 126120

An elastic sphere is twisted by 2 equal opposite torsional moments applied at 2 diametrically opposite surface points N and S. With the exception of the 2 points N and S, the surface of the sphere is free from surface traction. The problem consists in determining in closed form the fields of displacements and stresses within the twisted elastic sphere. ONR proj NR 064-405. For technical reports 11 and 14 see PB 123016 and 124816. Contract Nonr-591(02), Technical report no. 12.

MEDICAL RESEARCH AND PRACTICE

Application of an induced bronchial collateral circulation to the coronary arteries by cardiopneumonopexy, by J.L. Kline, H. Stern, W.E. B. Bloomer and A.A. Liebow. Yale University. School of Medicine. Dept. of Pathology and Dept. of Surgery, New Haven, Conn. n.d. 61p tables. Order from LC. Mi \$3.90, ph \$10.80. PB 124253

Figures 1-10 described in Part II not included in report. Date is 1954 or later. 1. Cardiovascular system - Function tests 2. Blood - Circulation 3. Cardiopneumonopexy 4. Contract N6 ori-44, T.O. XI

Instrumentation in bio-medical research. Report of a survey, by Paul E. Klopsteg. National Research Council. Division of Biology and Agriculture. Biology Council. Dec 1956. 21p. Order as NRC Publication 472 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents.

PB 126051

"Instrumentation," for the purposes of this report, may be used as a catchword for a very broad effort --essentially that of capitalizing on the methodology and conceptual approach of the more exact sciences (mathematics, physics and chemistry), including instrument production and distribution, and procedures for testing. The primary aim of this survey is to see how instrumentation, as thus defined, and "instrumentology," the study and application of physical principles and mathematical operations to designs for the experimental study of specific problems, might logically be expanded and adapted to the service of biological research. Jointly supported by the Directorate of Research and Development, Dept. of the Air Force and the Office of Naval Research and the U.S. Atomic Energy Commission. NRC 472.

Survey of toothbrushing habits of young adults, by William R. Stanmeyer. U.S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Oct 1955. 7p. Order from LC. Mi \$1.80, ph \$1.80. PB 127185

An oral hygiene survey was conducted in which the toothbrushing habits of more than three thousand young adults were studied. The survey was conducted by a carefully administered questionnaire in which an attempt was made to overcome the natural resistance and reluctance of an individual to report in himself deviations from previously known hygienic standards. The questionnaire was followed by a clinical examination to determine the individual's efficiency in using a toothbrush. The times of day utilized in toothbrushing were divided into effective and non-effective times. An analysis of reported times revealed that almost 70 per cent of all persons questioned did not brush their teeth at any time during the day which could be considered as an effective time for the removal of food debris and the control of the initial rise in dental plaque pH. AD 84430. Vol. XIV, no. 10, 31 Oct 1955. Report no. 2 on subtask 61. NMRI Proj NM 003 041. 61. 02. NAV MRL 270.

METALS AND METAL PRODUCTS

Age-hardening characteristics of a cast alloy of copper-6per cent titanium, by N. Hebner, H. McCurdy and R. Edelman. U.S. Frankford Arsenal. Pitman-Dunn Laboratory, Philadelphia, Pa. Jul 1956. 16p photos, diagrs, graph, table. Order from OTS. 50 cents. PB 131297

When heat treated, a cast copper-6% titanium alloy has tensile properties exceeded only by those of beryllium copper. The best heat treatment for the copper-6% titanium alloy, in order to obtain the optimum tensile properties, is to solution treat at 1625°F and age at 800°F. Based on data obtained from this investigation, work has been started to determine the best methods of using titanium scrap as the alloying addition. The following average mechanical properties can be obtained from a heat treated cast copper-5.7% titanium binary alloy; Tensile strength, 121,000 psi; yield strength (0.2% offset) 107,000 psi; elongation (2 in. gage length) 8%; reduction in area, 18%. Also issued in Transactions of the American Foundrymen's Society, 1956. FAL R 1339.

Alloys for high-temperature service. Final report, by R.L. Beck, E.E. Fletcher, A.R. Elsea, A.B. Westerman and G.K. Manning. Battelle Memorial Institute, Columbus, O. Apr 1952. 26p graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 127106

A metallographic and X-ray diffraction study was made to determine the cobalt-chromium binary diagram. The effects of ternary additions of nitrogen, iron, nickel, molybdenum, or tungsten, all components of Vitallium-type alloys, on the reactions which occur in the cobalt-rich terminal solid solutions of this binary system were established also. Contract N5 ori-111, T.O. I, NR 031-003.

Brief study of the suitability of titanium and a titanium alloy as firewall material, by Charles A. Hughes. U.S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Sep 1957. 10p photos, drawing, graphs, tables. Order from OTS. 50 cents. PB 131392

Tests were conducted on several grades of commercially pure titanium and one alloy to determine their strength at elevated temperatures and their resistance when exposed to a 2,000°F Fahrenheit flame. Similar tests of stainless steel were conducted to provide a basis for comparison, since stainless steel has a long record of service in high temperature and fireproof construction. Contract AF 33(616)-54-15, Amendment no. A2 (56-1935). CAA TDR 317.

Cohesive energy of potassium, by Sam Berman, Joseph Callaway and Roger D. Woods. Miami University. Dept. of Physics, Coral Gables, Fla. Nov 1955. 8p. Order from LC. Mi \$1.80, ph \$1.80. PB 124594

The cellular method has been applied to a calculation of the cohesive energy of metallic potassium. The experimental value is 22.6 cal/mole. Physics Dept. Technical report no. 1. Contract Nonr-84006, NR 017-616.

Damping, elasticity and fatigue properties of titanium alloys, high temperature alloys, stainless steels, and glass laminate at room and elevated temperatures, by E. R. Podnleks and B. J. Lazan. Minnesota. University. Dept. of Mechanics and Materials, Minneapolis, Minn. Mar 1956. 93p diags, graphs, tables (1 fold). Order from LC. Mi \$5.40, ph \$15.30. PB 128211

Data on damping, elasticity, and fatigue properties at room and elevated temperatures are presented for four types of materials: titanium alloys, high temperature alloys, stainless steels, and glass fabric laminate. The resonant fatigue properties in form of resonant fatigue curves are determined for several characteristic types of parts by using the above materials. Project 7360, Task 73604. Contract AF 33(038)-20840. AF WADC TR 56-37.

Deposition of cadmium by chemical reduction, by Dwight E. Couch and Harold Smallen. U.S. Naval Ordnance Test Station, China Lake, Calif. Aug 1953. 10p. Order from LC. Mi \$1.80, ph \$1.80. PB 130039

Chromous chloride and sodium formate were found to be effective agents for reducing cadmium ion to the free metal. The reduced metal analyzed 97-98 percent cadmium. Reductions were carried out in three types of baths: (1) aqueous solutions (2) fused-salt solutions, and (3) organic solutions. Project 701. NOTS 740. NAVORD 2048.

Development of 650 pound billets of 3%Al-5%Cr titanium alloy. Summary report, by S. S. Smith, Jr. Menasco Manufacturing Co., Burbank, Calif. Mar 1955. 8p photos, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 127147

The purpose of the work was to successfully manufacture 4 forging billets for landing gears from a titanium alloy containing 3% aluminum - 5% chromium. Includes Research Report of development work done by Mallory-Sharon Titanium Corp. on Contract NOas-51-915-C, covering work from 12 Jun 1951 to 30 Dec 1954. R-371-42. Contract NO as-51-915-C.

Elastic constants of magnesium and magnesium alloys, by T. R. Long. Case Institute of Technology. Dept. of Physics, Cleveland, O. Jan 1956. 26p drawings, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126172

The adiabatic elastic constants of single crystals of magnesium and dilute alloys of magnesium with Ag, In and Sn have been measured by the ultrasonic pulse echo technique. The values obtained for pure magnesium are: $C_{11} = .597$, $C_{33} = .617$, $C_{44} = .164$, $C_{12} = .262$, $C_{13} = .217$ all expressed in units of 10^{12} dyne cm^{-2} . Contract N6 ori-27303, NR 017-611. ONR TR 16.

Electrochemical behavior of tin (Electrochemistry), by Ugo Bertocci and Giovanni Serravalle. Politecnico di Milano. Laboratorio di Elettrochimica, Chimica Fisica e Metallurgia, Milano, Italy. Apr 1956. 40p diags, graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 125980

The electrochemical kinetic behavior of tin has proved to be "normal" in solutions containing fluoride ions as in those containing other anions. In fact the anodic and cathodic ionic exchange over-voltages of tin are always very low, even in fluoride solutions. The deposits are mainly macro-crystalline; often in form of dendrites and plates. The exchange current densities, calculated by keeping a mean of the anodic and cathodic values, which are not very different from each other, are rather high, although being rather lower as those calculated for the solutions of the simple Sn^{II} salts. AD 89-481. Report C. A. TIN 4-56. Contract AF 61(514)-733C. AF OSR TN 56-271.

Ferrite development. Final report under contract DA 36-039-sc-5449 for the period Apr 1951-Mar 1954, by E. Albers Schoenberg. General Ceramics Corporation, Keasby, N.J. 1954. 100p photos, graphs, tables. Order from LC. Mi \$5.70, ph \$15.30. PB 127366

A long and extensive study has been made on the 4-oxide system $\text{NiO-ZnO-CuO-Fe}_2\text{O}_3$. It was known that for the use in low-frequency power applications, a three oxide, nickel-zinc ferrite body often lacks the necessary properties as far as maximum permeability and saturation flux density are concerned. Copper oxide because of its low reaction temperature appeared to be a proper ceramic fluxing agent for promoting the reaction and the formation of a dense and homogenous product. Bodies of this 4-oxide system have proved very useful, and have been taken into regular production: Ferramic G (MF-254) which is an iron deficiency body, Ferramic H (MF-419) which is an iron excess body. Table L-A which follows Section II on magnesium-nickel-copper ferrites gives the compositions and magnetic properties of these two materials. An extension of previous work done under Contract W-36-039-sc-38239 (Apr 1 1949-Mar 1951) with General Ceramics and Seatite Corp. Contract DA 36-039-sc-5449.

Influence of oxygen on the transformation characteristics of some titanium-molybdenum alloys, by George L. Kehl and Alfred E. Riccardo. Columbia University. School of Mines, New York, N.Y. Oct 1955. 83p photos, diags, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 125957

The influence of dissolved oxygen in the titanium-molybdenum alloys investigated was to shorten the time for initiation and completion of isothermal transformation, and to raise the region of rapid transformation of the time-temperature-transformation curve to higher temperature levels. Dept. of

the Army project: 593-08-021. ORD project: TB 4-15. CU-2-55-ORD-1420 Met. Contract DA 30-069-ORD-1420, Final report. WAL R 401/149-20.

Investigation of beta phase "recrystallization" in Ti-3%Al-5%Cr alloy, by K.B. Lloyd and E.J. Chapin. U.S. Naval Research Laboratory. Nov 1957. 22p photos, drawing, graphs, tables. Order from OTS. 75 cents. PB 131338

A study was conducted to explore the possibility of controlling the beta grain size during heat treatment of binary and ternary titanium alloys with aluminum and chromium and to determine the resulting effects on mechanical properties. Beta grain behavior was studied in binary and ternary alloys within the composition ranges of aluminum and chromium normally found in the commercial MST Ti-3Al-5Cr alloy. A preliminary transformation temperature survey was made on the unalloyed titanium and the binary and ternary alloys with aluminum and chromium to determine the optimum heat treatment temperatures for obtaining small beta grains. Networks of small transformed beta grains were obtained in the microstructures of both the binary titanium-chromium series and the ternary titanium alloy series. Chromium promoted the formation of small beta grains at temperatures just below the transus in both binary and ternary series. The tensile strengths of the binary titanium series with chromium were not changed significantly by heat treatment just under or just above the transus; the alloys were brittle whether the microstructure was composed of small transformed beta grains or large transformed acicular beta grains. The presence of small beta grain networks appeared to improve the tensile strength of ternary alloys heat treated just under the transus over the strength of forged material, but with some reduction in elongation. Changing proportions of primary alpha and transformed beta in the microstructures, however, obscured the net effects of the small beta grain networks on the tensile properties. The method of improving mechanical properties by control of beta grain size through heat treatment is sensitive to variations in composition or to inhomogeneity in the alloys and to the interstitial contamination normal in commercial fabrication. This method therefore would not be promising for commercial application. The modulus of elasticity was found to vary with heat treatment in this study, indicating that an improvement of this property in titanium alloys may be possible by heat treatment. NRL R 5034.

Kinetic evidence of phase structure, by H. Eyring, F. Wm. Cagle, Jr. and C.J. Christensen. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jun 1956. 11p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125969

1. Phase transitions - Theory 2. Contract N7 onr-45101, NR 032-168 3. UU ISRP TR 55

Properties of titanium alloys at elevated temperatures, by F.R. Schwartzberg, F.C. Holden, H.R. Ogden and R.I. Jaffee. Battelle Memorial Institute. Titanium Metallurgical Institute, Columbus, O. Sep 1957. 288p diagr, graphs, tables. Order from OTS. \$6.00. PB 121634

The elevated-temperature properties of titanium and its alloys are presented and discussed. An attempt has been made to present the bulk of currently available information on short-time strengths and creep and rupture properties in a convenient form. Also included is a discussion of thermal stability. BMI TML R82.

Quench hardening of pure gold as observed by internal friction methods, by A.E. Roswell and A.S. Nowick. Yale University. Hammond Metallurgical Laboratory, New Haven, Conn. Aug 1956. 25p graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 124559

The effect of heat treatment on the dislocation damping is studied in high purity gold. A quench hardening effect is observed, analogous to that found by previous workers in zinc and aluminum. The differences between quenched and furnace-cooled specimens is observed to anneal out in the range 160° to 200°C. AD 95446. Part of a thesis - Yale University, by A.E. Roswell. R-355-40-14. Contract AF 18(600)-850-4. AF OSR TN 56-330.

Short-time creep properties of structural sheet materials for aircraft and missiles, by John A. Van Echo, W.F. Wirth and Ward F. Simmons. Battelle Memorial Institute, Columbus, O. May 1955. 72p graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 129202

Short-time, high-temperature creep properties are reported for several structural aircraft sheet materials, including a titanium alloy, three Alclad aluminum alloys, four low-alloy steels, and two stainless steels. Each group of materials was tested over a useful temperature range. The time of interest for each material ranged from about 1/2 to 120 minutes. AD 80855. Project 7360, Task 73605. Covers work from 7 Nov 1952-15 Mar 1954. For Parts 2 and 4 see PB 129515-129516. Contract AF 33(038)-8743. AF TR 6731, Part 3.

Statistical formulation for creep of metals, by J. Lambert Bates, Taikyue Ree and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jun 1956. 37p graphs tables. Order from LC. Mi \$3.00, ph \$6.30. PB 125970

A reasonable physical explanation of flow processes is found by means of the use of tensile data. The parameters in the creep equation for a large number of metals and alloys have been evaluated. Contract N7 onr-45101, NR 032-168. UU ISRP TR 56.

Stress corrosion and pyrophoric behavior of titanium and titanium alloys, by D.W. Stough, F.W. Fink and R.S. Peoples. Battelle Memorial Institute. Titanium Metallurgical Laboratory, Columbus, O. Sep 1957. 56p photos, diagr, graph, tables. Order from OTS. \$1.50.

PB 121635

The stress-corrosion behavior of titanium and titanium alloys is reviewed. Titanium is found to be susceptible to stress-corrosion cracking in at least two environments: red fuming nitric acid and hydrochloric acid. Molten cadmium, a special case, causes stress cracking. Recently reported cracking at high temperatures may be stress-corrosion cracking resulting from sodium chloride on the surface of the metal. The reaction of titanium with anhydrous red fuming nitric acid can result in a violent pyrophoric reaction or a sudden failure by stress-corrosion cracking. For Parts 1-2 see PB 121601 and 124566. Contract AF 18(600)-1375. BMI TML R 84.

Structures and properties of the rhodo and erythro complex compounds of chromium, by W.K. Wilmarth, H. Graff and S.T. Gustin. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. n.d. 21p graph, table. Order from LC. Mi \$2.70, ph \$4.80. PB 126126

Issued before Oct 14, 1955. 1. Chromium alloys - Properties 2. Chromium alloys - Crystal structure 3. Contract N6 onr-238, NR 052-106.

Survey of the recovery of damping and modulus changes following plastic deformation, by Akira Hikata and Andrew Granato. Brown University. Metals Research Laboratory and Graduate Division of Applied Mathematics, Providence, R.I. Jan 1957. 27p graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 125954

Measurements of the changes in attenuation and elastic constants with time following plastic deformation are compared with the results of a theory which assumes these changes are a result of dislocation pinning by deformation-induced point defects. A check of the temperature dependence is afforded by recovery measurements of Young's modulus for copper. AD 115093. Contract AF 18 (603)-136. AF OSR TN 57-54.

Thermal decomposition of germane. II: Mechanism, by P.J. Fensham, K. Tamari, M. Boudart and Hugh Taylor. Princeton University. Frick Chemical Laboratory, Princeton, N.J. Feb 1955. 23p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126608

This report shows that the hydrogen-deuterium exchange reaction does not proceed at a measurable rate on a germanium film in a temperature range where germane decomposes readily. Similarly, when germanium hydride is decomposed in the presence of an excess of deuterium, no hydrogen

deuteride can be detected in the reaction product. On the contrary, when mixtures of germanium hydride and germanium deuteride are decomposed together, abundant quantities of hydrogen deuteride are produced although no mixing takes place between germanes. Thus it appears that dissociative chemisorption of gaseous hydrogen molecules on a germanium surface is immeasurably slow as compared to the rate of desorption of hydrogen from a similar germanium surface covered with interacting fragments of partially decomposed germane. These observations impose definite limitations to the possible modes of decomposition of germane, both homogeneous and heterogeneous. Contract N6 onr-27018.

METEOROLOGY AND CLIMATOLOGY

Analytical study of the falling-sphere experiment for upper-air-density measurement, by John W. Peterson. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Nov 1956. 39p diagrs, graphs. Order from LC. Mi \$3.00, ph \$6.30. PB 125554

The falling-sphere method has proved to be a practical system for the measurement of air density in the upper atmosphere. This paper analyzes the physical characteristics of the system in order to establish the limits of its sensitivity. The possibility of approaching these theoretical limits in a practical system are discussed. Contract AF 19(604)-1871, Final report. MU ERI Proj. 2533-2-T. AF CRC TN 56-870.

Arctic meteorology, climatology, miscellaneous studies of polar vortices, by Richard J. Reed and William G. Tank. Washington. University. Dept. of Meteorology and Climatology, Seattle, Wash. May 1956. 48p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 126647

Part I consists of a case study of the factors responsible for the cooling in the core of an intensifying polar vortex. It is shown that during the period of most rapid intensification adiabatic expansion accounted for most of the observed local cooling. Infrared radiation produced a less cooling which was offset by a small warming due to horizontal advection. Part II contains measurements of vertical velocities over a substantial portion of the North American Arctic and sub-Arctic during ten consecutive synoptic periods. Part III compares the pattern of temperature-dew point depression (presumably an indicator of integrated vertical motion) about high-latitude closed lows with the pattern about middle-latitude lows. Occasional report no. 4. Contract AF 19(604)-1298, Scientific report no. 1. AF CRC TN 56-297.

Behaviour of atmospheric potential gradient, vertical atmospheric electric current, electric conductivity of the air, and of atmospheric under various meteorological conditions, and possibilities of a practical application, by Reinhold Reiter. Jun 1956. 193p photos, map, diagrs, graphs, tables. Order from LC. Mi \$9.60, ph \$30.30. PB 125976

The research report was designed to contribute to the cognition and elucidation of relations between atmospheric electric phenomena and meteorological states and processes of most various kinds. The work was based on the principle of the "atmospheric electric synopsis". This principle entails a profound evaluation of atmospheric electric records obtained at more than two or three stations of an observation net during as long a time as possible, numerous meteorological observations and records being included. AD 98753. Contract AF (514)-732-C. AF CRC TR 56-295.

Cloud physics research. Final report under Contract AF 19(604)-618, by H.R. Byers. Chicago. University. Dept. of Meteorology, Chicago, Ill. Jan 1956. 50p graph, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 126121

Measurements of the chemical, physical and meteorological variables in and around cumulus clouds have been carried out in an extensive program of study involving hundreds of cumuli, of all types, both in the tropics near Puerto Rico and in the Central United States. Particular emphasis was devoted to the problem of developing an immediately applicable picture of the processes of precipitation formation in cumulus clouds with a view toward trying to modify these processes and to alter the behavior of the clouds. For Technical notes 1-4 under this Contract see PB 120148, 119763, 119443 and 122351. AF CRC TR 56-250.

Correlation of temperature-humidity tests. Part 6: Summary report, by Michael Frederick and Eugene Fornario. Newark College of Engineering, Newark, N.J. Dec 1953. 107p graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 125983

This report is a summary of parts 1-5 and presents conclusions and recommendations based on data of the individual tests of the four different temperature-humidity tests selected to establish the degree of correlation, deterioration effects, and relative merits of these tests. AD 27882. For parts 1-4 see PB 120688-120691. Some graphs may not reproduce well. Contract AF 33(616)-261. AF WADC TR 53-107, Part 6.

Cumulative list of translations made by the American Meteorological Society. See entry under Bibliography on page 54. PB 126034

Experimental material flown on Aero Medical Field Laboratory balloon flights 46 through 71, by C.H. Steinmetz. U.S. Air Force. Air Research and Development Command. Holloman Air Development Center. Aero Medical Field Laboratory, Holloman Air Force Base, N. Mex. n.d. 17p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 125104

The Aero Medical Field Laboratory conducted 16 balloon flights during the period from 14 July 1954 through 20 September 1955. This note presents a brief description of the nature of the experiments which were conducted on these flights and a record of the material flown on each flight. AD 113031. Date is 1956 or later. AF HADC TN 56-2.

Final report for period 16 Nov 1953-15 Nov 1956 under Contract AF 19(604)-969, by Richard T. Hansen. Colorado. University. High Altitude Observatory, Boulder, Colo. Mar 1957. 24p Order from LC. Mi \$2.70, ph \$4.80. PB 126022

For report no. 2 under this Contract see PB 119183.
1. Solar energy - Research 2. Solar phenomena
3. Solar observatories - Equipment

Influence of solar effects on atmospheric ozone, by W. Nordberg and W.G. Stroud. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Apr 1956. 16p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 126016

Signal Corps Task no. 172A. Dept. of the Army Task no. 3-99-07-021. 1. Solar radiation - Research 2. Atmosphere, Upper - Ozone - Radioactivity 3. SCCL ERE - 1175

Nitrogen, oxygen atmospheric models in photochemical equilibrium, I, by Christopher Gregory and James K.M. Siu. Hawaii. University, Honolulu, Hawaii. Mar 1956. 69p graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 126166

The problem of a nitrogen, oxygen atmosphere is considered on the basis of photochemical equilibrium up to a height of 220 km. using the "fundamental" data of the Rocket Panel and certain "recent" spectroscopic data pertaining to the dissociation of nitrogen and oxygen. The case of a pure nitrogen atmosphere is considered for two sun temperatures 6000°K and 4500°K and various assumed recombination coefficients in the first part of the calculations. In the second part of the numerical work the oxygen-nitrogen mixture is treated for the sun temperature 6000°K. Contract AF 19(604)-1028.

On the origin of solar radio noise, by Donald H. Menzel and Max Krook. Harvard University. Harvard College Observatory. Solar Dept. n.d. 5p. Order from LC. Mi \$1.80, ph \$1.80. PB 125989

This paper discusses, in a general way, the problem of energy transport when gas-kinetic processes dominate. It discusses the modes of oscillation, the coupling of the different modes, the setting-up of shock waves, and the possible conversion of mechanical energy into the form of radio frequency emission. Scientific report no. 1 is PB 122993. Contract AF 19(604)-1394, Scientific report no. 2. AF CRC TN 56-671.

MINERALS AND MINERAL PRODUCTS

Cation distributions in ferrosilicates. I: Theoretical, by Herbert B. Callen, S. E. Harrison and C. J. Kriessman. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Jul 1955. 19p. Order from LC. Mi \$2.40, ph \$3.30.

PB 124500

The statistical thermodynamics underlying the distribution of cations over the tetrahedral and octahedral sites in ferrosilicates is developed. The temperature dependence of the distribution law is analyzed by invoking the Debye approximation for the vibrational spectrum. For Part 2 see PB 124119. Contract Nonr 69800, Technical report no. 8.

Investigation of the load-deformation characteristics of reinforced concrete beams up to the point of failure, by J. R. Gaston, C. P. Seiss and N. M. Newmark. Illinois. University. Dept. of Civil Engineering, Urbana, Ill. Dec 1952. 267p photos, drawings, diagrams, graphs, tables. Order from LC. Mi \$11.10, ph \$41.10. PB 130031

The tests were made on 33 reinforced concrete beams, 6 in. by 12 in. in cross section, having a span length of 9 ft., and loaded at the third points. The main variables in these tests were the concrete strength, the percentages of tension or compression reinforcement, and the method of tying the compression reinforcement. It was concluded that: (1) Concrete strength has little effect on the energy absorbing capacity of beams failing initially in tension but does have an effect on the energy absorbing capacity of beams failing initially in compression. (2) The ductility of a beam is dependent upon the reinforcing index. (3) The compression reinforcement adds to the ductility of a beam. (4) In order for the compression reinforcement to be the most effective, it must be well tied. AD 1778. Errata sheets attached to cover. Contract N6 onr-07134, T.O. 34, NR 064-372. ILU CES SR 40.

Kinetics of graphite oxidation, by George D. Blyholder and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Aug 1956. 74p drawings, diagrams, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 127133

A description of an apparatus for studying heterogeneous gas-solid reactions in the one to one hundred micron pressure and 600°C to 1300°C temperature range is presented. The data for the graphite-oxygen reaction in this range are presented. AD 96796. Appendix I - Kinetics of oxidation of filaments. Contract AF 33(038)-20839. UU ISRP TN 20. AF OSR TN 56-451.

Properties of materials at high pressures and temperatures, by Francis Birch and Eugene C. Robertson. Harvard University. Dunbar Laboratory, Cambridge, Mass. Mar 1957. 55p drawings, diagrams, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 128556

Report describes the use of an electrically heated pressure chamber to pressures of 30,000 kg/cm² and temperatures to 1500°C. to study equilibrium relations of the minerals jadeite, kyanite, and aragonite and to synthesize pyrope. Covers work from 6 Mar 1951-30 Sep 1955 under Contract N5 ori-07644, NR 032-400 (Final report).

PACKING AND PACKAGING

Evaluation of multiwall sacks as containers for calcium chloride. Interim report, by Kenneth D. Brunelli and Thomas A. Treglia. U.S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Nov 1956. 40p photos, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 126611

Test data and engineering information are presented which favor the use of glass-reinforced multiwall paper shipping sacks for packaging calcium chloride. Construction details are given of sample sacks which proved most successful. Includes two reports from Foster D. Snell, Inc.: Proposed packaging and packing requirements, calcium chloride; hydrated, technical grade, May 4, 1954 and Special report, overseas shipping containers for calcium chloride, hydrated, technical grade, May 17, 1954 (Contract DA 18-108-CMI-5302) CC CRL R 507.

The utilization of chicken feathers as filling materials. National Research Council. Advisory Board on Quartermaster Research and Development. Mar 1956. 186p photos, graphs, tables. Available from Quartermaster Food and Container Institute, 1819 W. Pershing Road, Chicago 9, Ill. PB 126071

A conference sponsored by the Headquarters Quartermaster Research and Development Command, U.S. Army Quartermaster Corps, Natick, Mass. April 26-29, 1955, edited by S. J. Kennedy, Adolf Schubert and Louis I. Weiner. Contents: Statement on the problem and its importance to the Armed Forces, by S. J. Kennedy. The amino acid composi-

tion of feathers and down, by W.H. Stahl. - Possible polypeptide chain configurations in the keratin group of fibrous proteins, by Barbara Low. - The structure of feather keratin, by S. Krimm. - The morphology of feathers and down, by J.D. Loconti. - Physical properties of feathers and down with particular reference to their use as filling material in sleeping bags, by Louis I. Weiner. - Theoretical considerations in the chemical modification of chicken feather keratin, by Robert M. Lollar. - Modification of chicken feathers using the acid-alum process, by Patrick A. Florio. - Modification of chicken feathers by the glyoxal method, by E.R. Frederick. - Analytical control of chemically modified chicken feathers, by Henry B. Merrill and Robert S. Adams. - Alteration of chicken feather geometry by chemical means, by Lawrence E. D'Antonio. - The availability of chicken feathers as a raw material for commercial utilization, by C.H. Koontz.

PERSONNEL APTITUDE TESTING

Methodological study in the development of a training aids selection form, by J.A. Murnin and A. W. VanderMeer. Pennsylvania State University. University Park, Pa. Jun 1956. 45p table. Order from LC. Mi \$3.30, ph \$7.80.

PB 127472

The purpose of this study was to develop a check list for the selection of the best training device for a particular training situation. The check list was to incorporate findings from series of experiments concerning the relative training effectiveness of mockups, charts, models and cutaways. Instructional Film Research Program. NAVTRADEVCEEN Project 20-E-4. Contract N6 onr-269. SDC TR 269-7-104.

Operational feasibility tryout of the experience record, Form X-4, by J. Dean Austin and Robert G. Holloway. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Center, Lackland Air Force Base, San Antonio, Tex. Mar 1957. 13p tables. Order from LC. Mi \$2.40, ph \$3.30.

PB 126032

This study was conducted to evaluate the experience record as compared with certain operational techniques in this selection and classification problem. At the time of this study, the Air Training Command was rigorously de-emphasizing the by-pass specialist program. As a result, the only useful criterion of efficiency was a measure of processing time possibly saved by using the experience record. AD 098937. Project no. 7700, Task 77015. Appendix lists Air Force Knowledge Tests used in this research report. AF PTRC TN 57-32.

Research study of the prediction of adaptability to the Navy, by William A. Gorham, William S. Barker, Thomas E. Hanlon and Harry J. Older. Psychological Research Associates, Washington, D.C. May 1956. 88p tables. Order from LC. Mi \$4.80, ph \$13.80. PB 126642

This is the final report of a research study of relationships between fleet performance and psychiatric prediction. Measures of adjustment to life in the Navy, as described in Technical report no. 1, (PB 124055) are briefly reviewed. Results of a literature survey on psychiatric screening is presented. Development of the multiple factor forced choice personality inventory is discussed, and data is analyzed. For Technical report no. 1 see PB 124055. Contract Nonr-1484 (00). PRA R 56-9.

Research on the development of performance criteria. Technical report VI: Performance under stress, a review and critique of recent studies, by William Harris, Robert R. Mackie, and Clark L. Wilson. Human Factors Research, Inc., Los Angeles, Calif. Jul 1956. 85p. Order from LC. Mi \$4.80, ph \$13.80. PB 127400

The purpose has been to try to achieve some systemization in the wide variety of studies purportedly concerned with performance under stress and to derive implications for future studies in this area. For reports 1-5 see PB 108490, 116085, 116086, 116087 and 118323 on Contract N8 onr-70001, by Management and Marketing Research Corp., Los Angeles, Calif. Contract Nonr-1241(00).

Validity study of the Navy instructor attitude inventory, by Donald K. Ottman, Robert Callis, Kenneth B. Brown, John L. Ferguson and Guy A. Renzaglia. Missouri. University. College of Education, Columbia, Mo. Dec 1955. 35p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 126103

The Navy Instructor Attitude Inventory (NIAI) was developed for measuring those attitudes of instructors believed to be factors in the ability of instructors to effect desirable, harmonious relationships in their classrooms. An account of the development of the NIAI is presented. Contract Nonr 649(00), Technical report 6.

PHYSICS

General

Approximate theory of turbulent boundary layer shock wave interaction, by Andrew G. Hammit. Princeton University. Aeronautical Engineering Laboratory, Princeton, N.J. Apr 1956. 51p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 126680

A theory of the interaction of shock waves with turbulent boundary layers has been formulated. This theory is based on the assumption of no skin friction, no external mixing, and a one parameter boundary layer. The cases of flow through an incident reflected shock wave, in a corner, and over a forward facing step are treated and results are found that agree with experimental data. The differences in experimental results between these various configurations are shown to be caused by the way in which the pressure forces are applied to the boundary layer and not by changes in the basic flow mechanism. AD 86320. Contract AF 18(600)-498. AF OSR TN 56-160. PU AEL R 340.

Computation of the velocity of sound in gases, by Preston W. Smith, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Nov 1952. 33p diagr, graphs, tables. Order from LC. Mi \$3.00, ph \$6.00. PB 126404

A method is summarized for the precise computation of the velocity of sound in a real gas and of its variations with experimental conditions. Specifically, two problems are discussed: (a) the inclusion of the effects of departures of the equations of state from the perfect gas law, and (b) the computation of specific heats from spectroscopic data. Contract N5 ori 76, T.O. X, NR 384-903. HU ARL TM 29.

Directivity of acoustic linear point arrays, by Robert L. Pritchard. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jan 1951. 170p diagrs, graphs, tables. Order from LC. Mi \$7.80, ph \$25.80. PB 126981

This research deals with a theoretical study of linear arrays of acoustic point elements with particular emphasis on the broadside array. A systematic method is presented for analyzing the directive properties of arrays with nonuniform excitation of the elements. Steering of the directivity pattern, including the equal-minor-lobe type, is discussed. An improved method of estimating the beam width and a new method of computing the directivity factor to a very good approximation are described. The performance of ideal arrays under non-steady-state excitation is also discussed. Contract Nori 76, T.O. X, NR 014-903. HU ARL TM 21.

Force and mass balances of the incompressible, isothermal, planar laminar jet issuing from a finite source, by Arthur L. Thomas. Princeton University. James Forrestal Research Center, Princeton, N.J. Dec 1956. 82p photos, diagrs, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 126682

A mathematical solution to the velocity and concentration distributions of an incompressible, isothermal, planar laminar jet issuing from a long rectan-

gular slot into quiescent surroundings of the same density is presented. The present solution for velocity distribution is a modification of that of Okabe who solved for the velocity distribution in a viscous jet for flow from a nozzle which provides a uniform velocity profile at the throat. Previous analyses of the planar, laminar jet assumed the jet to originate from a line source. A few experimental diffusion measurements have been performed along the centerline of the jet. The measurements indicate agreement with theory in the region of the orifice. The data were obtained from an ethylene-into-air jet. AD 115055. PU FRC TN 31. AF OSR TN 57-21.

Gaseous-type cavitation in liquids, by Murray D. Rosenberg. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Aug 1953. 91p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$5.40, ph \$15.30. PB 126405

Experimental data are presented regarding the production and growth of gaseous-type (air-filled) bubbles by means of ultrasonic waves in liquids of different physical properties. Evidence is shown that the most logical sources of cavitation nuclei are foreign surfaces within the liquid, either colloidal (dust) particles or parts of the physical apparatus. Experimental apparatus is described for the focusing of sound waves, and the insertion and agitation of pure liquids in thin-walled flasks at the focus. The threshold for gaseous-type cavitation is measured as a function of viscosity, pulse length, and ambient hydrostatic pressure. Finally a comparison between theoretical calculations and experimental results is presented. Contract N5 ori 76, T.O. X, NR 384-9038. HU ARL TM 26.

Growth and collapse of vapor bubbles, by S. A. Zwick. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. Dec 1954. 106p graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 127308

A theory is developed which describes the behavior of a vapor bubble in a liquid. Its physical basis is the assumption that the heat transfer effects which accompany the evaporation occurring at the bubble wall when the bubble grows, or the condensation that occurs there when the bubble collapses, are dynamically important. The theory is applied to the cases of the growth of a vapor bubble in a liquid below its boiling temperature at the external pressure. A comparison of the theory with experiment is given for the observable range of bubble growth in superheated water, and the agreement is found to be very good. AD 54059. Contract N6 onr-24420(NR 062-059). CIT NL 21-19.

Line shapes of exchange-narrowed paramagnetic resonance lines in weak fields, by R. S. Codrington, J. D. Olds and H. C. Torrey. Rutgers University. Dept. of Physics, New Brunswick, N.J.

n.d. 22p graphs. Order from LC. Mi \$2.70,
ph \$4.80. PB 124906

For other reports under this Contract see PB 124905, 124907 and 124908. To be submitted to the Physical Review for publication. 1. Resonance, Paramagnetic - Tests 2. Resonance, Paramagnetic - Theory 3. Contract N7 onr-45403, Technical report no. 5

Measurement of the velocity of sound in gases, by Preston W. Smith, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Nov 1952. 156p diags, graphs, tables. Order from LC. Mi \$7.50, ph \$24.30.

PB 126403

A careful theoretical analysis is made of a new method for the precise measurement of the velocity of sound in gases at audiofrequencies. The existence of possible systematic errors in the measurement of wavelength is revealed. The analysis is used as a basis for discussion of the size of such errors in this and other techniques for measuring velocity. Experiments are described in which the velocity in air was measured. The velocity in air, reduced to the usual standard conditions, was determined to be 331.45 ± 0.05 m/sec. Contract N5 ori 76, T.O.X, NR384-903. HU ARL TM30.

On the propagation of sound waves in narrow conduits, by Osman K. Mawardi. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. May 1949. 18p photo, diagr, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 126809

An approximate solution of sufficient accuracy for narrow tubes of arbitrary shapes developed in this paper has been applied to a wire-filled tube. The theoretical predictions check satisfactorily with the experimental results. Contract N5 ori 76, T.O.X, NR 014-903. HU ARL TM 5.

On the theory of sound reflection in an open-ended cylindrical tube, by Harold Levine. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Apr 1953. 55p diags. Order from LC. Mi \$3.50, ph \$9.30.

PB 126827

The propagation of plane sound waves within a cylindrical tube having arbitrary cross section and extending indefinitely from an open end is studied theoretically. A quantity of special interest is the end correction, which characterizes the reflection coefficient at wavelengths large compared to the transverse tube dimensions. A brief comparison of the different formulations with reference to the circular tube is included. Contract N5 ori 76, T.O.X, NR 384-903. HU ARL TM 32.

Onset of cavitation in liquids. I: Cavitation thresh-

olds sound pressures in water as a function of temperature and hydrostatic pressure, by F.G. Blake, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Sep 1949. 66p photos, graphs. Order from LC. Mi \$3.90, ph \$10.80. PB 127012

As a result of steady-state measurements of sound pressure at the onset of cavitation in degassed water, a simple empirical formula expressing threshold pressure as a function of temperature and ambient hydrostatic pressure is given. A theoretical interpretation of this cavitation as the mechanical rupture of gaseous nuclei is presented. The sonically induced effervescence observed in gassy water is discussed as a process of "rectified diffusion." ATI 205395. Contract N5 ori 76, T.O. X. HU ARL TM 12.

Propagation of small disturbances in boundary-layers of compressible fluids, by Harold G. Elrod, Jr. Harvard University. Acoustics Laboratory, Cambridge, Mass. Jun 1949. 223p photos, diags, graphs, tables. Order from LC. Mi \$9.30, ph \$34.80. PB 127000

When an airstream passes over a solid body, a boundary-layer is formed in which the air velocity increases from zero at the surface of the body to the full mainstream velocity. All disturbances produced in the mainstream, either by slight movements or protuberances of the solid body, must pass through this boundary-layer. The purpose of the present work is to find its influence on such disturbances. Contract N5 ori 76, T.O.X, NR 014-903. HU ARL TM 13.

Pulsations and growth of gas-filled bubbles in sound fields, by Murray D. Rosenberg. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Aug 1952. 44p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80.

PB 126361

The pulsations of a gas-filled bubble in a sound field are discussed with particular attention to the effect of the viscosity of the external liquid, the irreversible conduction of heat by the gas within the bubble, and the scattering of energy by the bubble. A threshold for bubble growth, called the threshold for gaseous-type cavitation, is defined by the condition that the net flow of gas across the surface of the bubble will be zero. This average rate of gaseous diffusion can also be used to determine in a stepwise fashion the mean change of bubble radius with time. Transient effects are also discussed. Contract N5 ori 76, T.O.X, NR 384-903. HU ARL TM 25.

Research on the physics of air viscosity. Technical report summarizing the research progress for the period of 15th Jan 1956 to 14 Jul 1956, by Markus Reiner. Israel Institute of Technology. Dept. of Aeronautics, Haifa, Israel. Jul 1956.

54p photos, drawings, diagrs, graphs. Order from LC. Mi \$ 3.60, ph \$9.30. PB 129998

Nuclear

The present report forms a continuation of the Technical Note for the period from 15th July, 1955 to 15th January 1956. (PB 122227). This report contains in Part I a revision of Part IV of the Technical Note. In Part II, some more graphs have been added illustrating the experimental results, which have not been included in the paper. An all-metal centripetal airpump is described in Part III. Continues work reported in Technical Note of 15 Jul 1955 - 15 Jan 1956 (PB 122227). AD 82510. Contract AF 61 (514)-871, Technical report. AF OSR TN 56-114.

Sound scattering from thin elastic shells, by Miguel Chaperon Junger. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Jul 1951. 41p diagrs. Order from LC. Mi \$3.30, ph \$7.80. PB 126591

The theory of the scattering of plane sound waves is extended to scatterers in the form of thin elastic shells of cylindrical and spherical shape. A solution is obtained which coincides formally with the solution derived in Technical Memorandum 22 for solid cylinders and spheres. The forced vibrations of these shells in a fluid medium are also studied; expressions are obtained for the amplitude of vibration and for the associated sound radiation. The dynamic characteristics of the submerged shells are determined. The existence of resonance peaks of large amplitude and narrow frequency range may be expected in both the scattering and the radiation problems. Contract N5 ori 76, T.O.X, NR 014-903. HU ARL TM 25.

Synthesis of directivity patterns of acoustic line sources, by Robert Hills, Jr. Harvard University. Acoustics Research Laboratory, Cambridge, Mass. Nov 1951. 121p graphs, tables. Order from LC. Mi \$6.30, ph \$19.80. PB 126831

It is shown that the far-zone directivity pattern of a finite-length acoustic line source can be expressed either as a sum of tabulated functions or as a product displaying the zeros of the directivity pattern. A technique for synthesizing equal-minor-lobe patterns by appropriate relocation of the pattern zeros is developed, and a method for determining the coefficients in the expansion of the corresponding source excitation is given. An alternative synthesis scheme is presented which maximizes the directivity factor or gain of a source when its excitation function is expressed in a finite Fourier series. The values of integrals required for this procedure are tabulated for the cases where the source is an integral number of wavelengths long. Contract N5 ori 76, T.O.X, NR 014-903. HU ARL TM 23.

Tensile strength of liquids, review of the literature. See entry under Bibliography on page 55. PB 126999

Basic theories of infrared spectra, by Alvin H.

Nielsen. U.S. Ordnance Corps. Office of Ordnance Research, Durham, N.C. Dec 1955.

35p photos, diagrs, graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 125955

This discussion is concerned only with those motions which involve energies in the infrared region of the spectrum--i.e., vibration and rotation, the types of spectra which occur, and the explanations of their appearance. Molecules are considered as being of two classes--diatomic and polyatomic. The diatomic case is developed in considerable detail. These notions are then generalized for the more complicated triatomic, tetraatomic, etc., cases. Based on a lecture given at Fisk University Infrared Spectroscopy Institute, Aug 1955. Contract DA 33-008-ORD-1166. ORD OOR TM 55-2.

Calculation of second virial and Joule-Thomson coefficients of gases at very high temperatures, by Edward A. Mason. Maryland. University. Institute of Molecular Physics, College Park, Md. Feb 1957. 12p. Order from LC. Mi \$2.40, ph \$3.30. PB 126699

Formulas are given for the second virial coefficients and zero-pressure Joule-Thomson coefficients of a gas at a temperature high enough that all molecular encounters can be assumed to be controlled only by forces of repulsion. Two forms of molecular interaction energy are considered: inverse powers and exponentials. The results for the inverse power potential are not new, but are for the physically more realistic exponential, for which an asymptotic series is given of which just the first term is almost always sufficient. AD 120427. AF OSR Chem 40-31. IMP OSR 3. Contract AF 18(600)-1562. AF OSR TN 57-81.

Design of a slowing down experiment, by W.G.

Davey. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1956.

9p tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N.Y. 37 cents. PB 126189

S.O. Code no. 91-3-3-5. 1. Atomic power - Research - Gt. Brit. 2. Neutrons - Slowing down - Gt. Brit. 3. AERE R/M 96

Fundamentals of radiological defense. U.S. Naval Academy, Annapolis, Md. 1950. 86p photos, drawing, diagrs, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 127342

This manual, which was originally prepared as a textbook for midshipmen, has been revised and is issued in an unclassified status. It presents a discussion of atomic defense problems and new concepts of defense brought about by atomic power.

It includes preliminary measures to prevent damage, and measures following release of radioactivity. NAVPERS 10870.

List of reports for sale and published papers, A. E. R. E. staff. See entry under Bibliography on page 54. PB 118836s

Negative ion effects in halogen quenched geiger counters, by Harold Sherman. New York University. College of Engineering. Research Division, New York, N.Y. Aug 1956. 102p diags, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 125985

Using pulsed X-rays as a source of ionization, measurements of time lags have been made in Geiger counters filled with the following gases: neon and chlorine; neon, argon, and chlorine; argon and iodine; neon and iodine; and krypton and iodine. The values of time lags observed range from 13 to 0.3 microseconds depending upon the concentration of halogen gas in the counter and overvoltage. It is shown that the delays cannot be due to negative ions, but are probably caused by the relatively long time that it takes for the halogen molecules to de-excite the noble gas metastables formed in the avalanche. AD 95807. Contract AF 18(600)-1460. AF OSR TR 56-32.

Nucleonics for the Navy. U.S. Bureau of Naval Personnel. Feb 1949. 139p photos, drawings, diags, graphs, tables. Order from LC. Mi \$6.90, ph \$21.30. PB 127363

1. Atomic power - Research 2. Bombs, Atomic
3. Instruments, Radiation detection 4. NAVPERS 10850

Pion production in electron-proton collisions, by R. H. Dalitz and D. R. Yennie. Stanford University. Dept. of Physics, Stanford, Calif. Nov 1956. 61p graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 126116

The close relationship between photo-pion and electro-pion production from protons allows an unambiguous first estimate (the standard value) for the ratio of these cross sections, based on assumptions very close to those of the Weizsäcker-Williams method. Deviations of the ratio from this estimate arise from pion production by the longitudinal components of the field of the scattered electron and from the variation of the off-diagonal transverse excitations from their on-diagonal photoproduction values. The dependence of these deviations on the physical processes contributing to the electromagnetic excitation of pions is discussed in terms of matrix elements specified in the pion-nucleon c.m. system, both for various phenomenological contributions and for specific meson theories. The experimental values reported are interpreted as an indication of the smallness of longitudinal produc-

tion, in qualitative accord with the fixed source theory. These features may also be investigated by study of the energy spectrum of inelastically scattered electrons and of the azimuthal variation of pion production relative to the scattering plane, which are also discussed here. Stanford report 545-8. Project R-357-40-3. For technical reports 15, 16 and 19 see PB 122225, 122454 and 124917. Contract AF 18(600)-545, Technical report no. 18. SU DP TR 18. AF OSR TN 56-533.

Some speculations on heavy mesons, by T. D. Lee, and J. Crear. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N.Y. Aug 1955. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 126607

CU-92-55-ONR-110-1-Physics. 1. Mesotrons - Decay schemes 2. Atomic power - Research
3. Contract N6 ori-110, T.O. 1 4. R-112
5. CU-92

Theory of the vibrational relaxation of diatomic molecules, by Elliot W. Montroll. Maryland University. Institute for Fluid Dynamics and Applied Mathematics, College Park, Md. Nov 1956. 14p. Order from LC. Mi \$2.40, ph \$3.30. PB 125597

This report discusses the manner in which systems of polyatomic molecules initially in a non-equilibrium vibrational state relax to their stationary states. Initial non-equilibrium distributions arise during the formation of molecules and upon passage of shock waves through a gas composed of polyatomic molecules. The theory of dissociation of polyatomic molecules is discussed as a type of random walk process. AD 110322. For other reports under this Contract see PB 124910 and 124911. This paper will appear in the Proceedings of the Brussels Conference on Statistical Mechanics of Transport Processes. 3 figures listed on Bibliographical Control Sheet are not included in this report. Contract AF 18(600)-1315. UM BN 85. AF OSR TN 56-507.

Yale natural radiocarbon measurements, II, by Richard S. Preston, Elaine Person and E. S. Deevey. Yale University. Geochronometric Laboratory, New Haven, Conn. Jul 1955. 16p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 124499

AD 71474. 1. Radiocarbon - Measurements
2. Geology - Research 3. Contract Nonr - 609(05), NR 081-186

PHYSIOLOGY

Annual progress report for the period 1 Jun-31 Dec 1955, by Arthur W. Wase. Hahnemann Medical College, Philadelphia, Pa. Jan 1956. 24p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126115

The present work was designed to test the effects of certain cations on a system containing I^{131} (as iodide) and homogenized rat thyroid protein, and if possible to throw some light on the mechanism of action of those cations which produce effects. Contract Nonr 441, NR 115-383.

Influence of positive radial acceleration from head to foot upon the rapidity of maximum voluntary movements of man, by Laurence E. Morehouse, Roy Cochran and Warren Reeves. University of Southern California. Dept. of Aviation Medicine and School of Medicine and Dept. of Physical Education, Los Angeles, Calif. Apr 1948. 10p graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 127497

Following an observation of the effect of 2, 3, 4, and 5 G's upon the maximum rate of voluntary movement (tapping), compared with the rate at 1 G, the following findings were noted: 1. The rate of maximum voluntary movement is depressed during the stress of positive G. 2. The depression in maximum rate of voluntary movement under G is probably due to the dynamic force of gravity upon the skeletal and muscular mass of the parts in motion, rather than to a relaxation of the central nervous system. A G-suit offers no protection against the stress. Recovery of maximum rates of voluntary movement is immediate following the cessation of radial acceleration. 3. As far as the rate of voluntary movement is concerned, the pilot of high speed aircraft does not need to support large parts of his arm in order to make rapid movements with his hand and fingers. AD 204578. Contract N6 ori-77, T.O. 1.

Status of research in underwater physiology. National Research Council. Committee on Undersea Warfare. Panel on Underwater Swimmers. Mar 1956. 31p. Order as NRC Publication 468 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.00. PB 126049

The report discusses respiratory gases (oxygen, carbon dioxide, nitrogen, helium, and toxic inhalants), decompression, respiration, and temperature. Publication authorized under Contract N7 onr-29103. NRC 468.

PSYCHOLOGY

Aspects of simultaneous audio-visual monitoring, by Donald H. Bullock, Susan R. Meyer and Loy S. Braley. Buffalo. University. Dept. of Psychology, Buffalo, N.Y. Nov 1954. 69p tables. Order from LC. Mi \$3.90, ph \$10.80. PB 126646

The present report describes studies in the following areas: (a) simultaneous audio-visual monitoring, (b) visual monitoring as a function of audio complexity, (c) visual monitoring as a function of audio rate, and (d) audio monitoring as a function of visual monitoring. Third and final report under Contract AF 30 (602)-574.

Behavior in groups. Technical report I: Outline of a theory of leadership and group behavior, by Bernard Bass. Louisiana State University, Baton Rouge, La. Apr 1955. 14p. Order from LC. Mi \$2.40, ph \$3.30. PB 126159

The purpose of this paper is to present the bare framework of definitions, postulates and theorems of a theory of leadership which is consistent with both empirical evidence and with the psychology of perception, learning and motivation. For Technical reports 2-4 see PB 122311, 123044 and 124342. Contract N7onr 35609.

The child and his family in disaster: A study of the 1953 Vicksburg tornado, by Stewart E. Perry, Earle Silber and Donald A. Bloch. National Research Council. Division of Anthropology and Psychology. Committee on Disaster Studies. 1956. 64p. Order as Publication 394 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. \$1.50. PB 126066

This report is concerned with the emotional impact of disaster on children and their reactions to it as seen by their parents. The study attempts to differentiate emotional responses of children to the disaster in terms of types of involvement. Areas are suggested for further research such as changes in the emotional structure of the family following traumatic disaster experiences, suppression of emotional expression about the experience, parent-child relationships during the experience, and the role of peer group relationships in helping children express their feelings about the experiences. Recommendations are given on the handling of children after a disaster. Contract DA 49-007-md-256. NRC 394.

Effects of city familiarity on size estimation, by Eugene L. Gaier and Bernard M. Bass. Louisiana State University, Baton Rouge, La. Nov 1955. 7p graphs, table. Order from LC. Mi \$1.80, ph \$1.80. PB 124596

1. Psychology, Applied 2. Population - Estimates
3. Contract N7 onr-35609

Effects of sequence upon the reception of related and nonrelated message elements, by Henry M. Moser, John J. Dreher, H.J. Oyer and John O'Neill. Ohio State University Research Foundation, Columbus, O. Aug 1956. 42p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 126119

This study evaluates the effects of word order on the reception of short identification sequences of related and nonrelated elements. Its three phases involved 295 American listeners and five American speakers. Project 7681. Contract AF 19(604)-1577, Technical report 35. OSURF Proj 664. AF CRC TN 56-55.

Introduction to methodological problems of field studies in disaster, by Lewis M. Killian. National Research Council. Committee on Disaster Studies. Division of Anthropology and Psychology. Dec 1956. 40p. Order as NRC 465 from NAS-NRC Publications Office, 2101 Constitution Ave., N.W., Washington 25, D.C. 75 cents. PB 126050

An introduction to the special problems of conducting field studies in disaster-stricken communities. Problems in selection of events to study, research design, selection of subjects, data collection and analysis, timing, retrospective interviewing, entrance into the community, and reporting of findings are discussed. Disaster study no. 8. NRC 465.

Isolation by factor analysis of personality traits in the domain of military leadership, by J.W. Holley. U.S. Air Force. Air Force Personnel and Training Research Center. Air Research and Development Command. Crew Research Laboratory, Randolph Air Force Base, Tex. Jun 1956. 34p tables. Order from LC. Mi \$3.00, ph \$6.30. PB 126112

On the premise that individual differences in personality account in part for variability in military leadership proficiency, this study sought to identify, by the use of personality questionnaires, traits hypothesized to be related functionally to leadership. Project 505-039-0001. ARDC project 7731. Contract AF 18(600)-468. AF PTRC TN 56-70.

Learning and performance in a complex tracking task as a function of visual noise, by George E. Briggs, Paul M. Flitts and Harry P. Bahrack. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Interceptor Pilot Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Jun 1956. 21p diags, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 127130

Performance at all stages of practice was found to be markedly degraded by the presence of visual noise on the steering error dot. At the end of training when all groups were transferred to the mixed noise condition, no significant difference was found in the performance of the different groups. This indicates that, in spite of the marked performance differences, learning has progressed at approximately the same rate under the four different training conditions. Project 7716, Task 77292 and 57050. Contract AF 18(600)-1201. AF PTRC TN 56-67.

Motivational factors in productivity. Final technical report for the period Sep 1951 - Dec 1954 under Contract Nonr-233(09). California. University. Institute of Industrial Relations. Human Relations Research Group, Los Angeles, Calif. Apr 1955. 29p. Order from LC. Mi \$2.70, ph \$4.80. PB 124480

The work of the Human Research Group focused upon a variety of aspects of interpersonal relations. The aim was primarily to develop and test hypotheses of general significance rather than to answer specific questions. Research methodologies were devised whose future application may provide a greater understanding of interpersonal relations. Training methods related to some of the research findings were developed. Most of the studies were conducted in a local Naval Research and Development Laboratory and at the Western Training Laboratory in Group Development at Idyllwild, California. AD 71438.

Periodic status report XXVII, for the period 16 Nov 1955-15 May 1956, under Contract N5 ori-76, Project order II, Project NR 142-201. Harvard University. Psycho-Acoustic Laboratory, Cambridge, Mass. May 1956. 24p. Order from LC. Mi \$2.70, ph \$4.80. PB 126620

Summarizes reports completed and prepared during this period. A complete list of PNR reports 1-184 is included. PNM-67.

Report of research on detection of deception, by D.G. Ellison and others. Indiana. University, Bloomington, Ind. Sep 1952. 166p diags, graphs, tables. Order from LC. Mi \$7.80, ph \$25.80. PB 126180

The aim of this research has been to investigate techniques for the detection of deception in which the contribution of the human operator to the administration of questions and the interpretation of response records is reduced to a minimum and repeatable routine. As far as possible these techniques of administration were selected in such a way that the relevant measures of the responses of the persons being examined could be converted to unambiguous scores and analysed singly or in combination by available types of automatic equipment. When this is done it is possible to measure the success of detection of deception which is at-

tributable to the techniques rather than to the unique skills of the particular operators who interpret the records. ATI 168902. Contract N6 onr-18011.

Research on problem solving and creative thinking.

Final report under Contract N6 onr-25125 (NR 150-149), by Donald W. Taylor. Stanford University. Dept. of Psychology, Stanford, Calif. Jan 1956. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 126982

Purpose of the research was to conduct experimental and field studies designed primarily to increase basic knowledge of problem solving and creative thinking, and secondarily to make possible more effective training of individuals in such processes. For 8th-11th technical reports see PB 119980, 120030, 127117 and 123125.

Similarity of interest and attitude measures as a

predictor of interpersonal relationships in a medium-bomber crew, by Seymour Rosenberg. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Aug 1956. 28p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 127026

This report describes a study of the usefulness of interest and attitude similarity in the prediction of sociometric choices between 44 crew position-pairs in the B-29 crew. Similarity between pairs of persons was defined as the correlation between their scores on a 108-item inventory administered to each crew before crew training. The sociometric measure, based on 5 items, was obtained after the crew has been in training for at least two months. A total of 494 men including from 2 to 11 members of 68 B-29 crews at Randolph Air Force Base, participated in the study. AD 098878. Project 7713, Task 77226. AF PTRC TN 56-103.

Study of the relationship of attitudes to success in a

technical training course, by Richard W. Highland. U.S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Maintenance Laboratory, Lowry Air Force Base, Colo. Jul 1956. 40p graphs, tables. Order from LC. Mi \$3.00, ph \$6.30. PB 127025

This study was designed to investigate the extent to which pre-academic attitudes predict success in radio operator training and the extent to which actual contact with radio operator training induces attitudes related to eventual success or failure in this training. AD 098875. Project 7714, Task 77246. AF PTRC TN 56-99.

RUBBER AND RUBBER PRODUCTS

Synthesis of rubber by microorganisms. Status report for the period 1 Jan-31 Mar 1956. Atlantic Research Corporation, Alexandria, Va. Apr 1956. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 126485

For previous report see PB 125593. 1. Rubber - Synthesis 2. Bacteria - Culture media 3. Bacteria - Effects of radiation 4. Microorganisms - Culture 5. Mycelium - Growth 6. Contract Nonr-1233(00), NR 330-033

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Aircraft structures research at elevated temperatures, by John E. Duberg. Advisory Group for Aeronautical Research and Development. Sep 1955. 29p photos, graphs. Order as Agard report 3 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124302

A review of the test techniques developed and used at the NACA. Presents experimental results and discusses model scaling for testing of structures at high temperatures. Presented at the second meeting of the Structures and Materials Panel, from 5-9 Sep 1955, in London, Eng. Summary also in French. AG 3.

High-strength dielectric materials for very fast aircraft, by Henry J. Sang. Stanford Research Institute, Menlo Park, Calif. Jan 1957. 41p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 128738

This report discusses the state of the art of high-strength dielectric materials for very fast aircraft of (1) long-range Mach 3 manned airplanes, (2) Mach 6 pilotless interceptors, and (3) intercontinental ballistic missiles. High-strength dielectrics currently available for high-speed applications include reinforced plastics and ceramics. Contract AF 19(604)-1296. SRI Proj 1197. SRI TR 59. AF CRC TN 57-161.

Recent research on the determination of natural modes and frequencies of aircraft wing structures, by John M. Hedgepeth. U.S. National Advisory Committee for Aeronautics. Apr 1956.

28p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. (Free) PB 124251

Presented to Structures and Materials Panel of Advisory Group for Aeronautical Research and Development. 1. Wings - Vibration - Theory 2. Wings-Stress analysis 3. Stress analysis - Methods

Report of presentations and general discussions at the mid-air collision symposium. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. 1955. 145p. Order from LC. Mi \$7.20, ph \$22.80. PB 127094

The informal talks covered operation experiences, technical reviews of problems and remedial measures. Held at Indianapolis, Ind. Nov 8 and 9, 1955. Recorded and transcribed by CAA-TDEC.

Thermal problems in aircraft structures, by N.J. Hoff. Advisory Group for Aeronautical Research and Development. Jun 1956. 31p photos. Order as Agard report 2 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124301

A summary of problems in structural design and analysis of aircraft when high supersonic speeds cause elevated temperatures in the structure. Describes experimental methods and equipment being used by various U.S. research organization. Presented at the first meeting of Structures and Materials Panel, held from 13-17 Jun 1955 in Ottawa, Canada. Summary also in French. AG 2.

Wind tunnel models, by R.P. Davie. Advisory Group for Aeronautical Research and Development. Aug 1956. 61p photos, diagrs. Order as Agard report 19 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124304

This paper deals with wind tunnel models, their design, and construction. It is based on experience gained by the Model Design Group of North American Aviation, Inc., Los Angeles Division, as observed by the author and his associates. Only unclassified material is included. Summary also in French. Presented at the Eighth Meeting of the Wind Tunnel and Model Testing Panel, held from February 20th to 25th, 1956, in Rome, Italy. AG 19.

Automatic indicating and recording data systems for wind tunnels, by J.B. Andrea. Advisory Group for Aeronautical Research and Development. 1956. 45p photos, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124355

Describes the more simple and relatively less expensive systems for the rapid and accurate recording of raw data in tabulated, punched card and/or tape, and plotted form. A particular system described is that used in the 10 ft. Transonic Wind Tunnel at the Wright Air Development Center, and a review is included of other types of instrumentation and recording equipment that could be similarly used. Summary in French and English. Report presented at the Eighth meeting of the Wind Tunnel and Model Testing Panel, held from Feb 20-25, 1956 in Rome, Italy. AG 16.

Condensation effects and air drying systems for supersonic wind tunnels, by J.J. Smolderen. Advisory Group for Aeronautical Research and Development. Jul 1956. 91p diagrs, graphs, table. Order as Agardograph 17 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 130181

Part one is devoted to a study of condensation effects and a criterion is presented for the complete removal of these effects. Conditions under which disturbances are sufficiently small are also indicated. The second part studies drying processes in use and the third part surveys measuring devices for the determination of humidity. Summary also in French. AG 17.

Development of a radiation type fuel gage. Phase 1, by Donald F. Howard, John D. Mack and George E. Modesitt. North American Aviation, Inc. Atomic Energy Research Dept., Downey, Calif. Jul 1954. 85f photos, diagrs, graphs, tables. Order from LC. Mi \$4.80, enl pr \$15.30. PB 128355

This report describes a method of gaging fuel quantity in aircraft tanks by measuring the attenuation of gamma radiation resulting from passage through the fuel. Several different gamma ray sources were employed and the signal from a scintillation detector was displayed on conventional indicators. Detailed discussions are given of the basic features of attenuation and detection of gamma radiation, advantages and disadvantages of scintillation counters, effects of cosmic radiation and other external radiation sources and the effects of fuel density variations on the accuracy of float, capacitance and radiation type fuel gages. The design, construction and performance of the various components of a laboratory model of a radiation gage suitable for a single aircraft tank are described, and results are

given of experiments performed to investigate the attenuation of cobalt and cesium gamma rays by jet fuels, optimum number and location of sources and detectors, methods of linearizing the gage response and effect of aircraft attitude on gage accuracy. Contract NOa(s) 53-294C. NAA AER 1000.

Quantitative evaluation of an aircraft control system, by R.R. Duddy. Advisory Group for Aeronautical Research and Development. Feb 1956. 7p. Order as Agard report 29 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 124303

An introduction to the problem of making a quantitative assessment of the ability of an aircraft-pilot system to perform a given task. Two examples are given to illustrate the inadequacy of simple measurements of the accuracy with which a task can be performed. Summary also in French. Presented at the Eighth meeting of the Flight Test Panel, held from 20-25 Feb 1956 in Rome, Italy. AG 29.

Engines and Propellers

Results of systematic investigations on secondary flow losses in cascades. Part III: Secondary flow losses of a turbine cascade for different shapes of blade tip and blade foot, by E.G. Feindt, Braunschweig. Technische Hochschule. Institut für Strömungsmechanik. May 1956. 36p drawings, (part fold), graphs (1 fold). Order from LC. Mi \$3.00, ph \$6.30. PB 125982

Measurements on a turbine cascade have been carried out to investigate the influence of the shape of the blade foot and the blade tip on the secondary flow losses in incompressible flow. The solidity ratio, the ratio of blade chord, and the gap were kept constant. The blade profile was NACA 8410. Three different shapes of the blade tip and of the blade foot have been investigated. The main results of these investigations are: 1) For the gap used here, the secondary flow losses at the tip and at the foot are nearly of the same magnitude; 2) The secondary flow losses at the foot depend very little on the blade loading; 3) The secondary flow losses depend very little on the shape of the blade tip and the blade foot. AD 90014. Report 54/32a. Contract AF 61 (514)-650-C. AF OSR TN 56-301.

Service failures of turbine buckets, by I. Perlmuter and H. Adenstedt. U.S. Air Materiel Command, Wright-Patterson Air Force Base, Dayton, O. Jul 1948. 56p photos, drawings, diagrs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 125948

Turbine buckets in varying stages of failure, from J-35 and J-33 jet engines, were subjected to general

examination, metallographic studies, hardness tests, fluorescent penetrant method of inspection, and tolerance measurements. On the basis of these data the probable mechanisms of failure were deduced, and compared to the characteristics of the bucket alloy and certain design factors. ATI 30793. Unclassified 11 Jan 1957. AF TR 5716.

Training and Training Devices

Aleutian sense. U.S. Office of Naval Operations. Aviation Training Division. Jul 1944. 31p drawings. Order from LC. Mi \$3.00, ph \$6.30. PB 129857

1. NAVAER 00-80Q-11 2. OPNAV 33-49

Carrier cold weather flying sense. U.S. Office of Naval Operations. Aviation Training Division. 1948. 28p drawings. Order from LC. Mi \$2.70, ph \$4.80. PB 129851

1. Cold - Physiological effects 2. Flying - Hazards 3. NAVAER 00-80Q-32

"G" sense. U.S. Office of Naval Operations. Aviation Training Division. 1944. 31p drawings. Order from LC. Mi \$3.00, ph \$6.30. PB 129850

1. Gravity - Physiological effects 2. NAVAER 00-80Q-12 3. OPNAV 33-3

Night vision for airmen. U.S. Office of Naval Operations. Aviation Training Division. Aug 1944. 16p photos, drawings. Order from LC. Mi \$2.40, ph \$3.30. PB 129856

1. Night vision 2. NAVAER 00-80T-17 3. OPNAV 33-NY-13

Night vision sense. U.S. Office of Naval Operations. Aviation Training Division. 1950. 31p photos, drawings. Order from LC. Mi \$3.00, ph \$6.30. PB 129849

1. Night vision 2. NAVAER 00-80Q-36

Shark sense. U.S. Office of Naval Operations. Aviation Training Division. Mar 1944. 24p drawings. Order from LC. Mi \$2.70, ph \$4.80. PB 129855

1. Sharks - Behavior 2. NAVAER 00-80Q-14 3. OPNAV 33-6

Shoot seat sense. U.S. Office of Naval Operations.
1951. 32p drawings. Order from LC. Mi
\$3.00, ph \$6.30. PB 129854

1. Seats, Airplane - Ejector
2. NAVAER 00-80Q-37

Vertigo sense. U.S. Office of Naval Operations.
Aviation Training Division. 1949. 32p drawings. Order from LC. Mi \$3.00, ph \$6.30.
PB 129852

1. Vertigo, Aerial
2. NAVAER 00-80Q-33

Airports and Airways

Operational requirements for ATC displays, by
Fred S. McKnight. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Sep 1957. 16p photos, diags. Order from OTS. 50 cents.
PB 131387

The material in this report is based on: (1) recommendations contained in the reports listed in the bibliography; (2) the results of experimental tests and evaluations conducted at the CAA Technical Development Center; and (3) analysis and recommendations of experienced air traffic controllers. Prepared for submission to the Air Navigation Development Board under Project no. 1.4. CAA TDR 308.

Aerodynamics

An experimental hydrodynamic investigation of the inception of vortex ventilation, by John A. Ram-
sen. U.S. National Advisory Committee for Aeronautics. Apr 1957. 31p photos, diags, graphs. Order as TN 3903 from National Advisory Committee for Aeronautics, 1512 "H" Street, N.W., Washington 25, D.C. PB 125722

1. Reynolds number - Effect
2. Bubbles, Air - Growth - Measurement
3. Vortex motion - Photographic analysis
4. Hydrodynamics - Research
5. Airplanes - Stalling
6. Wings - Rectangular - Lift
7. Wings - Boundary layer
8. NACA TN 3903.

Partial cavitation of flat plate hydrofoils, by A. J.
Acosta. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. Oct 1955. 10p diags, graphs. Order from LC.
Mi \$1.80, ph \$1.80. PB 124514

Recently Tulin and Wu have treated the problem of fully developed cavitation on flat plate and cambered foils. In these treatments, the length of the cavity

is always greater than the chord of the hydrofoil and the cavity is assumed to start at the leading edge of the plate. The purpose of this note is to extend Tulin's work to account for partial cavitation, i.e., when the cavitation bubble is less than hydrofoil chord. Contract N6 onr-244, T.O. II. CIT HL E 19.9.

Preliminary study of the details of the flow field about a flat plate at hypersonic speeds, by A.G.
Hammit. Princeton University. Dept. of Aeronautical Engineering, Princeton, N.J. Nov 1955. 33p photos, drawings, graphs. Order from LC.
Mi \$3.00, ph \$6.30. PB 126537

A detailed survey was made of the hypersonic flow field about the forepart of a flat plate. Large static pressure gradients were found between the shock wave and the plate surface. There were no signs of a uniform inviscid flow region between the boundary layer and shock wave. The flow near the shock wave could be constructed by using rotational characteristics and a small leading edge wedge angle. The boundary layer displacement thickness, calculated by momentum integral method, was only half the thickness required to give the effective body shape found by the characteristic construction. A flow model using an attached shock wave seems to be inadequate to explain the phenomenon, and consideration of the finite leading edge thickness is required. AD 81596. Project 54-610-185. For earlier report see PB 125623. Contract AF 33(616)-2547. PU AEL R 327. AF WADC TN 55-538.

Princeton helium hypersonic tunnel and preliminary results above M=11, by S.M. Bogdonoff and A.G.
Hammit. Princeton University. James Forrestal Research Center, Princeton, N.J. Jul 1954. 57p photos, drawings, graphs. Order from LC.
Mi \$3.60, ph \$9.30. PB 127278

This report describes the development, construction and operation of a small research tunnel using helium as a working fluid. Mach numbers as high as 15 have been attained in a 3 1/4 inch diameter test section and Mach numbers of the order of 20 seem practical with further development. Some preliminary results at M=12.7 are presented in the form of pressure distributions on a flat plate and Schlieren photographs. Some results on the effect of leading edge radius are also included. The experimental equipment is small, relatively simple and inexpensive, and seems to provide an excellent method for fluid dynamics studies at very high speeds. AD 55668. Project no. 1363-70114. Contract AF 33(038)-250. AF WADC TR 54-124.

Reynolds number effect on drag of cone cylinders in free flight, by T.J. Williams and W.R. Witt,
Jr. U.S. Naval Ordnance Laboratory, White Oak, Md. May 1956. 16p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 126015

Experiments were performed in the NOL Pressurized Ballistics Range with 0.30 caliber, 25-degree cone cylinders to determine the effect of Reynolds number changes on the drag coefficient. The results show that at a fixed Mach number the drag coefficient decreases with increasing Reynolds number until transition occurs, then increases through transition and eventually becomes constant at higher Reynolds numbers throughout the range of Reynolds numbers covered. NOL ARR 287. NAVORD 4007.

Schlieren system for perforated wall type transonic wind tunnels, by Eugene Behun. United Aircraft Corp., East Hartford, Conn. Dec 1954. 43p photos, drawings. Order from LC. Mi \$3.30, ph \$7.80. PB 126323

Discussion of a multiple-source schlieren, with perforated glass wall. Successful tests were completed on the optical bench in transonic wind tunnels and experiments on converting the system to a color schlieren. AD 80857. Project 1363. Contract AF 18(600)-171. AF WADC TR 54-511.

Some problems in aerodynamics and their solutions by electrical analogy, by D. Kuchemann and S. C. Redshaw. Gt. Brit. Royal Aircraft Establishment, Farnborough, England. Aug 1954. 20p. Order from LC. Mi \$2.40, ph \$3.30. PB 127262

Some purely aerodynamical phenomena, which might profitably be investigated by means of electrical analogue computers, are described. No attempt has been made to furnish a complete catalogue of problems but rather to present current issues, the solution of which would aid the development of practical aerodynamics. AD 46070. RAE TN Aero 2323.

Marine Transportation

Behavior of a proposed oceanographic research vessel in waves, by F.V. Reed. U.S. David W. Taylor Model Basin. Aug 1956. 12p photos, diagrs, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 127411

A 5-foot model of a proposed oceanographic research vessel was tested for seaworthiness. Measurements of speed, pitch, and heave were made in a variety of wave conditions with the model heading into the waves, and qualitative observations were made in several wave conditions with the model in following seas. DWTMB R 1055.

Marine borers, a preliminary bibliography. See entry under Bibliography on page 54. PB 131481

On the diffusion of tides into permeable rock of finite depth, by R.C. DiPrima. Harvard University, Cambridge, Mass. Mar 1956. 22p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 126604

It has been observed in the irrigation wells of the Hawaiian Islands that the water-level fluctuations have frequency components corresponding to those of the ocean tides. This phenomenon was analyzed by Carrier and Munk, assuming the observed ground-water fluctuations to represent a diffusive transmission of the tidal disturbances through the porous volcanic structure of the island. The purpose of the investigation was to use the results in estimating the permeability of the porous medium. Contract N5 ori-07666.

Some evidence for specular bottom reflection of 24 KC sound, by R.R. Carhart. California. University. Div. of War Research, Berkeley, Calif. Jun 1944. 10p diagrs (1 fold), graph. Order from LC. Mi \$1.80, ph \$1.80. PB 126554

This report presents a small amount of data indicating that sound of echo ranging frequency is reflected approximately specularly from a coarse sand bottom, the reflection loss at a 30° grazing angle being of the order of 3db, corresponding to an energy reflection coefficient of 0.5. UC DWR I A17. NDRC 6.1-2546.

MISCELLANEOUS

Arctic facts (Geography of the Arctic), by Herbert C. Frankel. Revised. U.S. Signal Corps Engineering Laboratories, Fort Monmouth, N.J. Mar 1957. 141p. Order from LC. Mi \$7.20, ph \$22.80. PB 127489

Originally published Apr 1951, this has been revised on the basis of information published in "Arctic" from 1951 to 1956. It includes chapters on history of arctic exploration, climate, water areas, land areas, life in the Arctic, regional geography, and unique phenomena. Signal Corps project no. 2008C. DA project no. 3-91-02-809. SCEL TM M 1402.

Engineering College Research Review. American Society for Engineering Education. Engineering College Research Council. Available from Secretary, Engineering College Research Council, New York University, University Heights, New York 53, N.Y. \$2.00.

For each institution listed, gives mail address, research officers, policies, personnel, expenditures, income and projects. Formerly issued as Review of Current Research and Directory of Member Institutions.

Report of NRL progress. U.S. Naval Research Laboratory. Jan 1958. 61p. Order from OTS. \$1.25. Also available at annual subscription rate of \$10.00 a year in the U.S.A., foreign rate \$13.00 a year. PB 131531

Contents: Articles: Highly directive antennas used in NRL's radio astronomy program. Part I: The fifty-foot paraboloid, by J. E. Sees. - The IGY solar flare program in NRL's radio astronomy branch, by S. Edelson. - Scientific program: Problem notes: Applications research; Sweep reference voltage generator for PPI displays... Investigation of tracking parameters yields index useful in predicting man-machine system error. - Astronomy and astrophysics: Extreme ultraviolet radiation in the night sky... The use of radiation absorption and fluorescence in upper-air density measurements... Performance summary of the last seven rockets in the Aerobee-Hi development program. - Chemistry: Sorption and transport of a fungicide (phenylmercuric acetate) by spores of *Aspergillus niger*... Basic studies of lead acid storage batteries... De-

termination of the phases of the crystal structure factor. - Mathematics: Analog computer calculations yield amplitude profiles of waves reflected in a transmission channel... New computer routine eliminates conjectural elements in calculating satellite trajectories... Recent mathematical analyses for NMI lead to new insight into the electrical properties of biological membranes. - Mechanics: Mechanical impedance determined experimentally by new technique... A contribution to the theory of the tripartite mechanical resonator... Elastic constants (C_{11} and C_{44}) of germanium... Instrumentation for measuring the velocity of high-speed projectile fragments... Hypervelocity evacuated ballistic range. - Metallurgy and ceramics: Crack sensitivity of high-strength sheet steels... Effect of metals... Radiation effects in some permanent magnet ferrites... Carbon dioxide-sodium silicate process for bonding foundry sands. - Radio: Point-light-source projection display for air-traffic control... Electrical properties of thermionic cathode materials. - Solid-state physics: Single crystals of alkali halides grown in controlled atmospheres... Magnetostriction of a cobalt rondel... Traversal of the intermediate state of a superconductor by adiabatic magnetization. - Sound: Joint probability amplitude distribution analyzer employed in basic sonar signal studies. - Papers by NRL staff members. - Patents. - Index of unclassified reports (January - December 1957).

ATOMIC ENERGY COMMISSION REPORTS

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

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

Biology and Medicine

Radium and mesothorium poisoning and dosimetry and instrumentation techniques in applied radioactivity. Annual progress report. Radioactivity Center. Massachusetts Institute of Technology. Cambridge, Mass. May 1957. Contract AT-30-1-952. 94p. Order from OTS. \$2.50. AECU-3504

Retention and elimination of radium isotopes produced by the decay of thorium parents within the body -- calculations and comparison with experimental findings, by John C. Reynolds, Philip F. Gustafson, and Leonidas D. Marinelli. Argonne National Lab., Lemont, Ill. November 1957. Contract W-31-109-Eng-38. 43p. Order from OTS. \$1.25. ANL-5689

Beta and gamma dose rates from terrestrially distributed sources, by Keran O'Brien, Wayne M. Lowder and Leonard R. Solon. Health and Safety Lab. New York Operations Office. New York, N. Y. October 1957. 16p. Order from OTS. 50 cents. HASL-3

Turnover and tissue distribution of radioruthenium oxide in the lungs of mice. Biology operation. By D. H. Willard, L. A. Temple, and W. J. Bair. Hanford Atomic Products Operation. Richland, Wash. October 1957. Contract W-31-109-Eng-52. 17p. Order from OTS. 50 cents. HW-52286

Hematological investigation of the atomic bomb sufferers in Hiroshima and Nagasaki City, by Takehiko Kikuchi and Gyoichi Wakisaka. Kyoto University. Japan. (Reprinted from the Acta Scholae Medicinalis, Universitatis in KIOTO, Vol. 30, Fasc. 2, 1952). 1952. 34p. Order from OTS. \$1.00 NP-6435

Isotopes in medicine--are they worth the trouble? By Marshall Brucer, M. D. Oak Ridge Institute of Nuclear Studies, Inc. Oak Ridge, Tenn.

May 1957. Contract AT-40-1-Gen-33. 41p. Order from OTS. \$1.25. ORINS-17

Agricultural research program. Semi-annual progress report for January 1, 1957 to June 30, 1957. University of Tennessee, Knoxville, Tenn. October 1957. Contract AT-40-1-Gen-242. 54p. Order from OTS. \$1.50. ORO-169

Chemistry—General

Formation fields and current efficiencies in the anodic oxidation of zirconium: A direct comparison of high-potential formation fields with those derived from low-potential charging curves, by George B. Adams, Jr., Tien-Shuey Lee and Pierre Van Bysselberghe. University of Oregon, Eugene, Oregon. 1957. Contract AT-45-1-535. 38p. Order from OTS. \$1.00. AECU-3500

An X-ray spectrometric method for determination of plutonium in solution, by D. S. Flikkema and R. V. Schablaske. Argonne National Lab., Lemont, Ill. November 1957. Contract W-31-109-Eng-38. 11p. Order from OTS. 50 cents. ANL-5804

The determination of fission product ruthenium, by R. P. Larsen, L. E. Ross and Gwendolyn Kesser. Argonne National Lab., Lemont, Ill. December, 1957. Contract W-31-109-Eng-38. 7p. Order from OTS. 50 cents. ANL-5810

Trip report on the symposium on thermogravimetry and differential thermal analysis held in Dallas, Texas, April 10, 1956, in conjunction with the ACS Convention, by L. M. Ferris. Oak Ridge National Lab., Tenn. May 1956. Contract W-7405-Eng-26. 6p. Order from LC. \$1.80, ph \$1.80. CF-56-5-17

Decontamination of product by adsorption on tailor-made inorganic adsorbents, by E. R. Russell and others. Chicago. Univ. Metallurgical Lab. March 1943. Decl. Mar. 21, 1957. 23p. Order from LC. Mi \$2.70, ph \$4.80. CN-508

Vapor pressure measurements on plutonium metal and plutonium compounds, by T. E. Phipps, R. L. Seifert, and O. C. Simpson. Chicago Univ. Metallurgical Lab. September 1945. Decl. with deletions Feb. 15, 1957. Contract W-7401-Eng-37. 209p. Order from LC. Mi \$9.30, ph \$31.80. CN-3223 (Del.)

Tritium separation factor in the calcium-water reaction, by Daniel A. Brown. E. I. du Pont de Nemours & Co. Technical Div. Savannah River Laboratory. May 1957. Contract AT-07-2-1. 8p. Order from OTS. 50 cents. DP-217

Sampler for powdered material, by William R. Kennedy, Jr. E. I. du Pont de Nemours & Co. Technical Div. - Savannah River Laboratory. August 1957. Contract AT(07-2)-1. 8p. Order from OTS. 50 cents. DP-231

Polarographic determination of uranium in the presence of molybdenum, by R. C. Propst. E. I. du Pont de Nemours & Co. Technical Div. Savannah River Laboratory. September 1957. Contract AT(07-2)-1. 22p. Order from OTS. 75 cents. DP-236

Densities and boiling points of uranyl nitrate-nitric acid solutions, by R. H. Perkins. American Cyanamid Co. Atomic Energy Div. Idaho Falls, Idaho. May 1953. Decl. Mar. 14, 1957. Contract AT-(10-1)-177. 14p. Order from LC. Mi \$2.40, ph \$3.30. IDO-14246

Determination of boron in aluminum-uranium fuel elements, by Kenneth W. Puphal and others. Phillips Petroleum Co. Idaho Falls, Idaho. October 1957. Contract AT (10-1)-205. 10p. Order from OTS. 50 cents. IDO-14418

Spectrophotometric determination of zinc and other metals with $\alpha, \beta, \gamma, \delta$ -tetraphenylporphine, by Ramon Edward Bisque and Charles V. Banks. Ames Laboratory. Iowa State College, Ames, Iowa. June 1956. Contract W-7405-Eng-82. 30p. Order from OTS. \$1.00. ISC-781

Solubility of carbon in sodium at elevated temperatures, by J. G. Gratton. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 13p. Order from OTS. 50 cents. KAPL-1807

Application of pulse column to recovery of uranium in waste solutions, by R. P. Webb and others. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Engineering Practice School. June 1950. Decl. Mar. 4, 1957. (For Carbide and Carbon Chem. Div.). Contract W-7405-Eng-26, subcontract 70. 13p. Order from LC. Mi \$2.40, ph \$3.30. KT-79

Separation of zirconium-hafnium using solutions containing tributylamine, by R. G. Shaver and others. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Engineering Practice School. October 1952. Decl. Mar. 4, 1957. (For Carbide and Carbon Chemical Div.). Contract W-7405-Eng-26, subcontract 70. 33p. Order from LC. Mi \$3.00, ph \$6.30. KT-148

Distribution of bismuth nitrate from aqueous solutions to ethers and methyl isobutyl ketone (hexone), by Arno H. A. Heyn and Gurupada Banerjee. Boston University. Boston, Mass. July 1957. Contract AT(30-1)1873. 25p. Order from OTS. 75 cents. NYO-7567

Chemistry Division annual progress report for period ending June 20, 1957. Oak Ridge National Lab. Oak Ridge, Tenn. 1957. Contract W-7405-Eng-26. 152p. Order from OTS. \$4.00. ORNL-2386

Radioactive waste disposal report on seepage pit liquid waste - shale column experiment, by William J. Lacy. Oak Ridge National Lab. Oak Ridge, Tenn. 1957. Contract W-7405-Eng-26. 22p. Order from OTS. 75 cents. ORNL-2415

Grand Junction Operations Office Analytical Laboratory handbook of analytical methods. Compiled and edited by R. W. Langridge. Western Uranium Project. Lucius Pitkin, Inc. Grand Junction, Colorado. February 1957. Contract AT (05-1)-636. 53p. Order from OTS. \$1.50. RMO-3001

Neutron absorption methods of analysis, by L. S. Myers, Jr. Manhattan District, Oak Ridge, Tenn. (1945?). Decl. Mar. 19, 1957. 21p. Order from LC. Mi \$2.70, ph \$4.80. TID-5201

Engineering record book--zirconium chloride plant. Job 1788. Bechtel Corp., San Francisco. Nov. 1951. Decl. Feb. 13, 1957. (For Northwest Electrodevelopment Lab.). 210p. Order from LC. Mi \$11.10, ph \$53.30. TID-7005

Master Analytical Manual. Prepared by ORNL Analytical Chemistry Div. Oak Ridge, Tenn. Nov. 1957. 298p. Order from OTS. \$6.50. TID-7015 (Section 2)

Modern approaches to isotopic analysis of uranium.

A Conference held at Chicago, February 5-7, 1957. Division of Nuclear Materials Management, AEC. Washington, D. C. and Chicago Operations Office, AEC. Lemont, Ill. October 1957. 180p. Order from OTS. \$4.75.

TID-7531 (Pt. 1)

The isolation of americium - 241 in 100-milligram quantities from large amounts of impurities,

by Fritz Weigel. University of California. Radiation Lab., Berkeley, Calif. September 1957. Contract W-7405-Eng-48. 32p. Order from OTS. \$1.00. UCRL-3934

Energy transfer in ordered and unordered photochemical systems, by Gordon Tollin, Power B. Sogo, and Melvin Calvin. University of California. Radiation Lab., Berkeley, Calif.

October 1957. Contract W-7405-Eng-48. 27p. Order from OTS. \$1.00. UCRL-3942

Chemistry Division Quarterly Report - June, July, and August 1957. University of California. Radiation Lab., Berkeley, Calif. Sept. 1957.

Contract W-7405-Eng-48. 113p. Order from OTS. \$3.00. UCRL-3950

Nuclear reactions of uranium induced by 5.7-Bev protons; radiochemical yields of light elements,

by Chalon Lucius Carnahan (Master's thesis). University of California. Radiation Lab., Berkeley, Calif. October 1957. Contract W-7405-Eng-48. 33p. Order from OTS. \$1.00. UCRL-8020

Air density corrections for reduction of weighings to vacuo, by Eric E. Johnson. Union Carbide Nuclear Co., a division of Union Carbide Corp., Oak Ridge, Tenn. December 1957. Contract W-7405-Eng-26. 15p. Order from OTS.

50 cents. Y-1181

Chemistry—Radiation and Radiochemistry

Chemistry Division, Section C-1 Summary Report - April, May, and June 1952, by D. W. Osborne, ed. Argonne National Lab., Lemont, Ill.

August 1952. Decl. with deletions Feb. 12, 1957. Contract W-31-109-Eng-38. 64p. Order from LC. Mi \$3.90, ph \$10.80.

ANL-4942 (Del.)

ORNL RaLa and MTR RaLa process development.

Quarterly report for period August 10-November 10, 1951. Chemical Technology Div. By R. E. Blanco. Oak Ridge National Lab., Tenn. November 1951. Decl. Apr. 2, 1957. Contract W-7405-Eng-26. 25p. Order from LC. Mi \$2.70, ph \$4.80. CF-51-11-161

Preparation of radioactive barium-lanthanum.

Progress report - April 15, 1944 to September 15, 1944. Problem assignment No. 263-X60C, by D. S. Webster. Clinton Labs., Oak Ridge, Tenn. November 1944. Decl. Feb. 15, 1957. Contract W-7405-Eng-39. 26p. Order from LC. Mi \$2.70, ph \$4.80. CN-2196

Terminal report on the radiolanthanum laboratory.

I. Laboratory and laboratory equipment design, by J. K. Figenshau. Hanford Works, Richland, Wash. July 1950. Decl. with deletions Feb. 19, 1957. Contract W-31-109-Eng-52. 141p. Order from LC. Mi \$ 6.90, ph \$21.30. HW-17769 (Del.)

Bibliography on uses of radioactive and stable isotopes in industry. A list of selected references. Compiled by J. A. McCormick.

Technical Information Service Extension. Oak Ridge, Tenn. July 1957. 24p. Order from OTS. 75 cents. TID-3511

Chemistry—Separation Processes for Plutonium and Uranium

Determination of zirconium and total fluoride ion

in zirconium-hydrofluoric acid solutions, by Seymour Vogler, Richard C. Vogel, and Roberta W. Shor. Argonne National Lab., Lemont, Ill. February 1953. Decl. with deletions Mar. 6, 1957. Contract W-31-109-Eng-38. 22p. Order from LC. Mi \$2.40, ph \$3.30. ANL-4988 (Del.)

A continuous flow pilot plant for the separation of bromine-fluorine compounds and light end fission product fluorides from uranium hexafluoride, by W. R. Page and others. Brookhaven National Lab. Upton, N. Y. March 1952.

Decl. April 27, 1955. 37p. Order from OTS. \$1.00. BNL-174

ORNL 25 recovery process development: Material balance for enriched uranium used in process verification, by A. M. Rom. Oak Ridge National Lab., Tenn. April 1950. Decl. Apr. 1, 1957. Contract W-7405-Eng-26. 13p.

Order from LC. Mi \$2.40, ph \$3.30. CF-50-4-2

Comparison of Purex process results in mixer settlers and pulse columns, by D. O. Darby.

Oak Ridge National Lab., Tenn. August 1951. Decl. with deletions Feb. 13, 1957. Contract W-7405-Eng-26. 15p. Order from LC. Mi \$2.40, ph \$3.30. CF-51-8-67 (Del.)

Application of volatility processes to uranium recovery, by R. E. Leuze. Oak Ridge National

Lab., Tenn. April 1952. Decl. Feb. 16, 1957.
12p. Order from LC. Mi \$2.40, ph \$3.30.
CF-52-4-64

Calculations of decontamination of MTR materials
by the 25 process, by F. R. Bruce. Oak Ridge
National Lab., Tenn. July 1953. Decl. Mar.
7, 1957. Contract W-7405-Eng-26. 8p.
Order from LC. Mi \$1.80, ph \$1.80.
CF-53-7-45 (Rev.)

25 process assistance. Period of October 29-Novem-
ber 12, 1954, by Floyd L. Culler. Oak Ridge
National Lab., Tenn. November 1954. Decl.
with deletions Feb. 14, 1957. Contract W-7405-
Eng-26. 10p. Order from LC. Mi \$1.80, ph
\$1.80. CF-54-11-148(Del.)

Operating procedure for the HRT chemical plant,
by R. B. Lindauer. Oak Ridge National Lab.,
Tenn. March 1956. Decl. Mar. 14, 1957.
Contract W-7405-Eng-26. 9p. Order from
LC. Mi \$1.80, ph \$1.80. CF-56-3-22

HRP-CP: Analytical requirements for the HRT
chemical processing plant, by William L. Car-
ter. Oak Ridge National Lab., Tenn. June
1956. Decl. Mar. 16, 1957. Contract W-7405-
Eng-26. 4p. Order from LC. Mi \$1.80, ph
\$1.80. CF-56-4-101(Suppl. 1)

Thorex pilot plant: Decontamination run IX-16, by
J. H. Walker and G. S. Sadowski. Oak Ridge
National Lab., Tenn. April 1956. Decl. Mar.
14, 1957. Contract W-7405-Eng-26. 14p.
Order from LC. Mi \$2.40, ph \$3.30.
CF-56-4-184

Chemical research--production and extraction of
94. Report - period April 16-April 30, 1943.
Chicago. Univ. Metallurgical Lab. Decl.
Feb. 14, 1957. Order from LC. Mi \$2.70,
ph \$4.80. CN-633

Chemical research--production and extraction of
plutonium report for month ending June 21,
1943. Chicago. Univ. Metallurgical Lab.
Decl. Apr. 2, 1957. Contract W-7401-Eng-37.
79p. Order from LC. Mi \$4.80, ph \$13.80.
CN-728

Equilibrium distribution data for Purex and similar
extraction processes, by T. H. Siddall, III,
S. G. Parker, and W. E. Prout. E. I. du Pont
de Nemours & Co. Technical Div. Savannah
River Lab. July 1957. Contract AT(07-2)-1.
27p. Order from OTS. 75 cents. DP-53

Polarographic analysis of UNH in the 1 AW stream,
by G. J. Alkire and W. N. Carson, Jr. Han-
ford Works, Richland, Wash. January 1949.
Decl. Apr. 1, 1957. Contract W-31-109-Eng-52.
16p. Order from LC. Mi \$2.40, ph \$3.30.
HW-12183

Coating removal waste loss reduction. Final re-
port, by B. E. Kirkendall. Production test
221-B-8. Hanford Works, Richland, Wash.
June 1951. Decl. Mar. 4, 1957. Contract W-
31-109-Eng-52. 12p. Order from LC. Mi
\$2.40, ph \$3.30. HW-21442

Nitration reactions of Shell Spray Base under
Purex waste recovery process conditions, by
R. M. Wagner. Hanford Works, Richland,
Wash. Dec. 5, 1952. Decl. Mar. 4, 1957. Con-
tract W-31-109-Eng-52. 13p. Order from
LC. Mi \$2.40, ph \$3.30. HW-26517

Settling rates of particles in dissolver solution
3002 UM-1Fu, by G. K. Cederberg. American
Cyanamid Co. Atomic Energy Div., Idaho
Falls, Idaho. February 1953. Decl. Mar. 13,
1957. Contract AT(10-1)-177. 9p. Order
from LC. Mi \$1.80, ph \$1.80. IDO-14226

Pulse column studies using STR and SIR feed solu-
tions, by S. L. Friederichs and others.
Phillips Petroleum Co. Atomic Energy Div.,
Idaho Falls, Idaho. September 1954. Decl.
Feb. 28, 1957. Contract AT(10-1)-205. 39p.
Order from LC. Mi \$3.00, ph \$6.30.
IDO-14312

Reprocessing uranium by the deBoer volatile
iodide process, by W. L. Robb. General Elec-
tric Co. Knolls Atomic Power Lab. Schenec-
tady, N. Y. May 1957. Contract W-31-109-
Eng-52. 22p. Order from OTS. 75 cents.
KAPL-1788

Homogeneous reactor processing progress report -
December 1952. Job 57. Vitro Corp. of
America, New York. January 1953. Decl.
Mar. 22, 1957. Contract AT(11-1)-217. 36p.
Order from LC. Mi \$3.00, ph \$6.30.
KLX-1608

Homogeneous reactor processing progress report -
period January 1-31, 1953. Job 57. Vitro Corp.
of America, New York. February 1953. Decl.
Mar. 22, 1957. Contract AT(11-1)-217. 40p.
Order from LC. Mi \$3.00, ph \$6.30.
KLX-1609

Fission product separations study - quarterly progress report - March 1, 1957 - May 31, 1957, by R. A. Keeler, C. J. Anderson, and M. Kibrick. Vitro Laboratories, a division of Vitro Corp. of America. West Orange, N. J. June 1957. Contract W-7405-Eng-26. 18p. Order from OTS. 50 cents. KLX-10078

Pulse-column operating conditions for uranium recovery from waste solutions, by H. A. Larsen and others. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Engineering Practice School. September 1950. Decl. Mar. 8, 1957. (For Carbide and Carbon Chemicals Div.). Contract W-7405-Eng-26, subcontract 70. 19p. Order from LC. Mi \$2.40, ph \$3.30. KT-84

Chemistry Division Quarterly Progress Report for period ending June 30, 1951. Oak Ridge National Lab., Tenn. February 1952. Decl. Mar. 2, 1957. Contract W-7405-Eng-26. 90p. Order from LC. Mi \$4.80, ph \$13.80. ORNL-1116

Pulse pumping: A means for transfer of pulse column fluids, by A. R. Irvine. Oak Ridge National Lab. Oak Ridge, Tenn. 1957. Contract W-7405-Eng-26. 27p. Order from OTS. \$1.00. ORNL-2377

Controlled Thermonuclear Processes

Controlled thermonuclear reactions. A conference held at Berkeley, California February 20-23, 1957. Controlled Thermonuclear Branch, Division of Research, Washington, D. C. September 1957. 44p. Order from OTS. \$1.25. TID-7536 (Pt. I)

Criticality Studies

Permissible fuel concentration in the dump tank of the homogeneous research reactor, by D. R. Gilfillan and C. W. Nestor, Jr. Oak Ridge National Lab., Tenn. April 1956. Decl. Mar. 14, 1957. Contract W-7405-Eng-26. 3p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-4-170

Spherical and cylindrical plutonium critical masses, by Fred A. Kloverstrom. University of California. Radiation Lab., Livermore, Calif. September 1957. Contract W-7405-Eng-48. 17p. Order from OTS. 75 cents. UCRL-4957

Geology and Mineralogy

An investigation of the mineralogy, petrography, and paleobotany of uranium-bearing shales and lig-

nites scope A--shales. Fifth annual report for period of April 1, 1955 to March 31, 1956. College of Mineral Industries. Pennsylvania State University. University Park, Penna. March 1956. Contract AT(30-1)-1202. 111p. Order from OTS. \$3.00. NYO-7411

The Delta mine, San Rafael Swell, Emery County, Utah, by W. Scott Keys. Exploration Division, Grand Junction Operations Office. Grand Junction, Colorado. November 1954. 32p. Order from OTS. \$1.00. RME-59

Annual report for April 1, 1956 to March 31, 1957, by John W. Gruner and James A. Knox. University of Minnesota. Minneapolis, Minnesota. April 1, 1957. Contract AT(30-1)-610. 50p. Order from OTS. \$1.50. RME-3148

Petrographical investigation of the Salt Wash sediments, by John C. Griffiths. Final report. College of Mineral Industries. Pennsylvania State University. University Park, Penn. June 1957. Contract AT-(30-1)-1362. 39p. Order from OTS. \$1.25. RME-3151

Health and Safety

Geologic, radiometric and botanical notes on the zone, "Los Chafnars", province of Mendoza, Argentina. Translated by G. E. Denegar. National Commission of Atomic Energy. Buenos Aires, Argentina. 1957. 13p. Order from OTS. 50 cents. AEC-tr-3004

Efficiency of scavenging devices used in determining fallout, by Jan Rosinski. Scientific Report No. 1. (Report No. 4). Armour Research Foundation. Illinois Institute of Technology. Chicago, Ill. January 1957. Contract AT(11-1)-375. 125p. Order from OTS. \$3.25. AECU-3486

A semi-empirical method of calculating the energy-absorption build-up factor with an application to a uniformly contaminated space having spherical boundaries, by Keran O'Brien, Wayne M. Lowder and Leonard R. Solon. Health and Safety Laboratory. New York Operations Office. New York, N. Y. October 1957. 15p. Order from OTS. 50 cents. HASL-2

Blast effects on an air-cleaning system, by Richard Dennis and C. E. Billings. Operation PLUMB-BOB preliminary report. Harvard University Air Cleaning Laboratory. Cambridge, Mass. November 1957. 46p. Order from OTS. \$1.50. ITR-1475

Radiological development activities in the health physics unit. Semi-annual progress report - January-June 1953. Knolls Atomic Power Lab., Schenectady, N. Y. Changed from Official Use Only June 3, 1957. Contract W-31-109-Eng-52. 34p. Order from LC. Mi \$3.00, ph \$6.30. KAPL-997

Annotated bibliography on long range effects of fallout from nuclear explosions, by Allen G. Hoard. New York Operations Office. New York, N. Y. November 1957. 26p. Order from OTS. 75 cents. NYO-4753 (Suppl. 2)

Summary of analytical results from the HASL strontium program, July through December 1956, by John H. Harley and others. Health and Safety Laboratory. New York Operations Office. New York, N. Y. March 1957. 44p. Order from OTS. \$1.25. NYO-4862

Health Physics Division Annual Progress Report - period ending July 31, 1957. Oak Ridge National Lab. Oak Ridge, Tenn. 1957. Contract W-7405-Eng-26. 131p. Order from OTS. \$3.50. ORNL-2384

The suspended microbiota of the Clinch River and adjacent waters, in relation to radioactivity in the summer of 1956, by J. B. Lackey. Oak Ridge National Lab. Oak Ridge, Tenn. n.d. Contract W-7405-Eng-26. 36p. Order from OTS. \$1.25. ORNL-2410

Liquid-metal smoke abatement, by H. K. LeMAR. Pratt & Whitney Aircraft, a division of United Aircraft Corp. Canel operations. Middletown, Conn. November 1957. 31p. Order from OTS. \$1.00. PWAC-235

A summary of incidents involving radioactive material in atomic energy activities, January - December 1956, by Daniel F. Hayes. Safety and Fire Protection Branch. Division of Organization and Personnel. Washington, D. C. August 1957. 28p. Order from OTS. \$1.00. TID-5360 (Suppl.)

A radiological study of Rongelap Atoll, Marshall Islands, during 1954-1955. Applied Fisheries Laboratory. University of Washington. Seattle, Washington. August 1955. Contract AT(45-1) 540. 71p. Order from OTS. \$2.00. UWFL-42

Survey of radioactivity in the sea and in pelagic marine life west of the Marshall Islands, September 1-20, 1956, by Allyn H. Seymour and others. Applied Fisheries Laboratory. Univ. of Wash-

ington. Seattle, Wash. March 1957. Contract AT(45-1)-540. 60p. Order from OTS. \$1.75. UWFL-47

Biological effects of pressure phenomena occurring inside protective shelters following a nuclear detonation, by C. S. White and others. Lovelace Foundation for Medical Education and Research. Albuquerque, N. Mex. October 1957. 213p. Order from OTS. \$5.50. WT-1179

Exposure of mobile homes and emergency vehicles to nuclear explosions, by Ebe R. Shaw, Project 36.1 and Frank P. McNea, Project 36.2. Federal Civil Defense Administration. August 1957. 50p. Order from OTS. \$1.50. WT-1181

Health Physics Progress Report - November 1, 1950-December 31, 1950, by E. G. Struxness. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. June 1951. Decl. Mar. 7, 1957. Contract W-7405-Eng-26. 40p. Order from LC. Mi \$3.00, ph \$6.30. Y-780

Instruments

Thermal conductance of C-716 (C₇F₁₆) - G-74 (N₂) mixtures, by Joseph Greenspan and others. Kellogg Corp., New York, N. Y. September 1944. Decl. Feb. 12, 1957. 59p. Order from LC. Mi \$3.90, ph \$10.80. A-4035

Fast Geiger-Mueller counters: A literature review to May 1947, by W. Wayne Meinke. University of Michigan. Ann Arbor, Michigan. May 1957. Contract AT(11-1)-70. 37p. Order from OTS. \$1.00. AECU-3484

A flow colorimeter for measuring uranium concentration in process streams, by C. A. Prohaska. E. I. du Pont de Nemours & Co. Savannah River Lab., Augusta, Ga. August 1957. Contract AT(07-2)-1. 20p. Order from OTS. 75 cents. DP-229

Transistor neutron count rate meter, by L. Earl Weisner, Jr. E. I. du Pont de Nemours & Co. Savannah River Lab., Augusta, Ga. August 1957. Contract AT(07-2)-1. 11p. Order from OTS. 50 cents. DP-234

A simple monitor for tritium contamination on surfaces, by D. W. Colvin. E. I. du Pont de Nemours & Co. Savannah River Lab., Augusta, Ga. October 1957. Contract AT(07-2)-1. 12p. Order from OTS. 50 cents. DP-242

A continuous gamma activity monitor for the product stream of the uranium recovery plant, by M. B. Leboeuf, R. E. Connally, and U. L. Upson. General Electric Co. Hanford Atomic Product Operation, Richland, Wash. October 1953. Decl. with deletions Feb. 19, 1957. Contract W-31-109-Eng-52. 16p. Order from LC. Mi \$2.40, ph \$3.30. HW-29348 (Del.)

Rear face monitoring by television, by W. J. Morris. (Supplementary report). General Electric Co. Hanford Atomic Products Operation. Richland, Wash. December 1953. Decl. with deletions Feb. 19, 1957. Contract W-31-109-Eng-52. 4p. Order from LC. Mi \$1.80, ph \$1.80. HW-30198 (Del.)

Chemical processing instrumentation and control research program, by Harry Schneider. Phillips Petroleum Co. Idaho Falls, Idaho. September 1957. Contract AT(10-1)-205. 26p. Order from OTS. \$1.00. IDO-14420

Preparation of thin, uniform sources for a beta-ray spectrometer, by R. L. Blanchard, Bernd Kahn, and R. D. Birkhoff. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 84p. Order from OTS. \$2.50. ORNL-2419

Improved mercury vapor detector, by Thomas S. Ely, M. D. Health Protection Branch. Division of Biology and Medicine. Washington, D. C. October 1957. 6p. Order from OTS. 50 cents. WASH-744

Metallurgy and Ceramics

Tests of special materials, by R. E. Morris. (Final report). Auburn Research Foundation. Auburn, Alabama. March 1957. Contract W-7405-Eng-26. 141p. Order from OTS. \$3.75. AECU-3477

Scaling of zirconium and zirconium alloys, by J. A. Burka, C. S. Crouse, and R. E. Swift. (Technical progress report No. 1). Kentucky Research Foundation. University of Kentucky. Lexington, Kentucky. August 1957. Contract AT(33-3)-1. 43p. Order from OTS. \$1.25. AECU-3661

Metallurgy Division Quarterly Report for January, February, and March 1954. Argonne National Lab., Lemont, Ill. March 1954. Decl. with deletions Feb. 12, 1957. Contract W-31-109-Eng-38. 63p. Order from LC. Mi \$3.90, ph \$10.80. ANL-5257 (Del.)

Arc melting of zirconium metal, by Richard J. Dunworth. Argonne National Lab., Lemont, Ill. October 1957. Contract W-31-109-Eng-38. 31p. Order from OTS. \$1.00. ANL-5519

Constitution of the uranium-rich U-Nb and U-Nb-Zr systems, by A. E. Dwight and M. H. Mueller. Argonne National Lab., Lemont, Ill. (Final report - Metallurgy program 3.1.5). October 1957. Contract W-31-109-Eng-38. 74p. Order from OTS. \$2.00. ANL-5581

The EBR-1 meltdown - physical and metallurgical changes in the core, by J. H. Kittel, M. Novick and R. F. Buchanan. Argonne National Lab., Lemont, Ill. November 1957. Contract W-31-109-Eng-38. 80p. Order from OTS. \$2.25. ANL-5731

Zirconium Progress Report for period - July 15 - August 15, 1953. Bureau of Mines. Northwest Electrodevelopment Lab., Albany, Oregon. Decl. Feb. 12, 1957. Contract AT(11-1)-140. 22p. Order from LC. Mi \$2.70, ph \$4.80. BM-II-72

Additions on the hot water and steam corrosion resistance of zirconium, by G. L. Frederic, R. H. Robertson, and R. L. Carpenter. Bureau of Mines. Northwest Electrodevelopment Lab., Albany, Oregon. July 1954. Decl. Feb. 12, 1957. 18p. Order from LC. Mi \$2.40, ph \$3.30. BM-II-92

Study of aluminum alloys containing up to 45 w/o uranium, by Norman E. Daniel, and others. Battelle Memorial Inst., Columbus, Ohio. April 1957. Decl. June 4, 1957. Contract W-7405-Eng-92. 40p. Order from LC. Mi \$3.00, ph \$6.30. BMI-1183

Vapor deposition of molybdenum and niobium coatings on stainless steel tubes, by Carroll F. Powell and others. Battelle Memorial Inst., Columbus, Ohio. October 1957. Contract W-7405-Eng-92. 9p. Order from OTS. 50 cents. BMI-1228

Reactions between LMFR fuel and its container materials, by W. E. Miller and J. R. Weeks. (Metallurgy memo No. 586). Brookhaven National Lab., Upton, New York. May 1956. Decl. April 12, 1957. 34p. Order from OTS. \$1.00. BNL-2913

Specifications on stainless steel STR irradiation test element, by J. E. Cunningham. Oak Ridge National Lab., Tenn. January 1956. Decl. Feb.

22, 1957. Contract W-7405-Eng-26. 20p.
Order from LC. Mi \$2.40, ph \$3.30.
CF-55-1-113

Corrosion of stainless steel by uranyl sulfate solutions free of stainless steel corrosion products, by A. L. Bacarella. Oak Ridge National Lab., Tenn. February 1956. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 17p. Order from LC. Mi \$2.40, ph \$3.30.
CF-56-2-3

Comparison of various thorium oxides, by R. B. Gallaher and A. S. Kitzes. Oak Ridge National Lab., Tenn. Feb. 1956. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 8p. Order from LC. Mi \$1.80, ph \$1.80.
CF-56-2-110

HRP dynamic corrosion studies. Summary of run E-57: Descaling loop E with chromous sulfate solution, by J. C. Griess, R. S. Greeley, and S. R. Buxton. Oak Ridge National Lab., Tenn. February 1956. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 7p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-2-134

HRP dynamic corrosion studies. Summary of run H-84 - defilming run with chromous sulfate, by J. C. Griess, R. S. Greeley, and S. R. Buxton. Oak Ridge National Lab., Tenn. February 1956. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 6p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-2-146

Solution corrosion group quarterly report for period ending April 30, 1956, by J. C. Griess and others. Oak Ridge National Lab., Tenn. April 1956. Decl. Mar. 14, 1957. Contract W-7405-Eng-26. 38p. Order from LC. Mi \$3.00, ph \$6.30. CF-56-4-138

Corrosion testing of tuballoy (uranium)-columbium alloys, by Frederick Nelson, W. W. Binger, and Joyce M. Hopkins. Chicago. Univ. (Metallurgical Lab.). June 1945. Decl. Feb. 18, 1957. Contract W-7401-Eng-37. 36p. Order from LC. Mi \$3.00, ph \$6.30. CT-3052

Progress report in metallurgy for April 1, 1948 to September 30, 1948, by F. H. Spedding. Ames Lab., Ames, Iowa. Dec. 1948. Decl. Mar. 28, 1957. Contract W-7405-Eng-82. 40p. Order from LC. Mi \$3.00, ph \$6.30. ISC-36

Quarterly summary research report in metallurgy for July, August and September, 1952. Ames Lab., Ames, Iowa. December 1952. Decl. with deletions Feb. 26, 1957. Contract W-7405-Eng-

82. 33p. Order from LC. Mi \$3.00, ph \$6.30. ISC-300 (Del.)

Quarterly summary research report for October-December 1952, by P. Chioti and O. N. Carlson. Ames Lab., Ames, Iowa. January 1953. Decl. with deletions, Feb. 26, 1957. Contract W-7405-Eng-82. 26p. Order from LC. Mi \$2.70, ph \$4.80. ISC-314 (Del.)

Quarterly summary research report in metallurgy for April, May, and June 1954. Ames Lab., Ames, Iowa. December 1954. Decl. with deletions Feb. 26, 1957. Contract W-7405-Eng-82. 25p. Order from LC. Mi \$2.70, ph \$4.80. ISC-506 (Del.)

Semi-annual summary research report in metallurgy for July - December, 1956, by Ames Laboratory Staff. Ames Lab. at Iowa State College, Ames, Iowa. August 1957. Contract W-7405-Eng-82. 57p. Order from OTS. \$1.50. ISC-835

Griscom-Russell two-tube evaporator, by C. F. Barrett, Jr. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 11p. Order from OTS. 50 cents. KAPL-1826

The corrosion behavior of various stainless steel boron alloys in 680°F water for use as a possible burnable poison element, by Donald C. Belouin. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 13p. Order from LC. Mi \$2.40, ph \$3.30. KAPL-M-DCB-2

Brazing of Zircaloy 3 for temperature instrumented probes, by J. M. Gerken. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 11p. Order from LC. Mi \$1.80, ph \$1.80. KAPL-M-JMG-9

Diffusion bonding of Zircaloy to stainless steel tubing, by J. M. Gerken. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 16p. Order from LC. Mi \$2.40, ph \$3.30. KAPL-M-JMG-10

Macroscopic examination of Zircaloy 3A and Zircaloy 2 primary extrusion billet material, by R. F. Lupi. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. 14p. Order from LC. Mi \$2.40, ph \$3.30. KAPL-M-RFL-8

Tensile properties and metallographic study of Zircaloy 3 strip, by R. L. Mehan. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 56p. Order from LC. Mi \$3.60, ph \$9.30.

KAPL-M-RLM-12

Report on the decontamination of KAPL 120 loop, by F. C. Steiner. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 19p. Order from LC. Mi \$2.40, ph \$3.30.

KAPL-M-SMS-67

A comparison of cathodic discharge and chemical etching and the use of replication techniques for metallographic samples, by T. E. Fisher. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 13p. Order from LC. Mi \$2.40, ph \$3.30.

KAPL-M-TFF-1

Friction and wear of steels in high temperature water, by W. V. Johnston, D. G. Groleau, and A. K. Elkum. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 15p. Order from LC. Mi \$2.40, ph \$3.30.

KAPL-M-WVJ-3

Development of a batch process for the production of a ZrO₂-UO₂ solid solution, by S. W. Hayter and R. J. Bard. Los Alamos Scientific Lab. of the Univ. of California. Los Alamos, N. M. November 1957. Contract W-7405-Eng-36. 14p. Order from OTS. 50 cents. LA-2138

Atomic Power Development Associates Progress Report, by R. Evans and others. (Final report covering work through December 31, 1955). Nuclear Metals, Inc. Cambridge, Mass. June 1956. Decl. January 25, 1957. 31p. Order from OTS. 25 cents. NMI-1148

Ductility in beryllium related to grain orientation and grain size, by Jacob Greenspan. Nuclear Metals, Inc. Cambridge, Mass. August 1957. Contract AT(30-1)-1565. 35p. Order from OTS. \$1.25. NMI-1174

Niobium-uranium alloys as container material for molten uranium eutectic alloys, by G. W. Powell. Nuclear Metals, Inc. Cambridge, Mass. August 1957. Contract AT(30-1)-1565. 17p. Order from OTS. 75 cents. NMI-1183

On the determination of twin indices, by E. J. Rapoport and W. L. Lees. Nuclear Metals, Inc. Cambridge, Mass. September 1957. Contract AT(30-1)-1565. 32p. Order from OTS. \$1.00 NMI-1189

Corrosion of beryllium in 600°F water, by D. S. Kneppel. Nuclear Metals, Inc. Cambridge, Mass. September 1957. Contract AT(30-1)-1565. 18p. Order from OTS. 75 cents. NMI-1190

The aqueous corrosion of Zircaloy-clad thorium, by S. Isserow. Nuclear Metals, Inc. Cambridge, Mass. September 1957. Contract AT(30-1)-1565. 22p. Order from OTS. 75 cents. NMI-1191

Effect of radiation on dynamic properties of high polymers, by J. A. Sauer. (Progress report - July 1, 1956 to June 30, 1957). Pennsylvania State Univ., University Park, Pa. July 1957. Contract AT(30-1)-1858. 25p. Order from LC. Mi \$2.70, ph \$4.80. NYO-7498

The adaptation of new research techniques to mineral engineering problems, by Project Research Staff. Massachusetts Inst. of Technology. Dept. of Metallurgy. Cambridge, Mass. July 1957. Contract AT(30-1)-956. 46p. Order from OTS. \$1.25. NYO-7708

Applications of ultrasonic energy. Progress report No. 5 covering period from June 16, 1957 to August 15, 1957. Aeroprojects, Inc., West Chester, Penna. August 1957. Contract AT(30-1)-1836. 56p. Order from LC. Mi \$3.60, ph \$9.30. NYO-7919

Self-diffusion in dilute binary solid solutions. III. Diffusion in silver-germanium and silver-thallium solutions, by R. E. Hoffman. General Electric Co. Research Lab., Schenectady, N. Y. July 1957. Contract W-31-109-Eng-52. 13p. Order from LC. Mi \$2.40, ph \$3.30. SO-2051

Unclassified U. S. Atomic Energy Commission reports on the metallurgy of zirconium and hafnium. Compiled by Richard J. Smith. Technical Information Service Extension. Oak Ridge, Tenn. June 1957. 37p. Order from OTS. \$1.40. TID-3508

Non-destructive testing. A literature search, compiled by Richard J. Smith and Thomas W. Scott. Technical Information Service Extension. Oak Ridge, Tenn. November 1957. 11p. Order from OTS. 50 cents. TID-3521

Electrical studies of surface films. Report No. 2 on measurement of thickness of thin oxide films, by John M. Kopper. Johns Hopkins Univ., Baltimore. Inst. for Cooperative Research. Oct. 1953. Decl. Mar. 6, 1957. Contract AT-11-1-Gen-14. 19p. Order from LC. Mi \$2.40, ph \$3.30. TID-5364

Development and properties of uranium-base alloys corrosion resistant in high temperature water.
Part IV - Radiation stability of uranium-base alloys, by M. L. Bleiberg and others. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. May 1957. Contract AT-11-1-Gen-14. 116p. Order from OTS. \$3.25.
WAPD-127-Part IV

Contamination of zirconium-uranium by recycling of scrap, by L. F. Cochran and J. C. Szurley. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. January 1957. Contract AT-11-1-Gen-14. 14p. Order from OTS. 50 cents.
WAPD-179

Résumé of uranium oxide data. IX, by J. Belle and L. J. Jones. Westinghouse Electric Corp. Pittsburgh, Penna. March 1957. Decl. May 3, 1957. Contract AT-11-1-GEN-14. 110p. Order from OTS. \$3.00. WAPD-TM-44

Calculation of fission product activity in PWR from a seed plate failure, by P. W. Frank. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. November 1957. Contract AT-11-1-GEN-14. 24p. Order from OTS. 75 cents. WAPD-TM-83

Final report of explosion in Oak Ridge, Tennessee, Y-12 salvage yard adjacent to building 9929-1. Union Carbide Nuclear Co. Y-12 Plant, Oak Ridge, Tenn. July 1956. Changed from Official Use Only June 24, 1957. Contract W-7405-Eng-26. 38p. Order from LC. Mi \$3.00, ph \$6.30. Y-1137A

Particle Accelerators and High-Voltage Machines

On a method of increasing the density of an external proton beam from the six-meter synchrocyclotron, by V. I. Danilov, V. P. Dmitrievsky and I. V. Chestnoi. Laboratory of Nuclear Problems. Joint Institute for Nuclear Research, (USSR). Translated from Priroda i Tekh. Eksperimenta, No. 3, 9-(?) (1956). 1956. 12p. Order from OTS. 50 cents. AEC-tr-3021

Particle Accelerator Division Summary Report - April through September 1957. Argonne National Laboratory. Lemont, Ill. October 1957. Contract W-31-109-Eng-38. 68p. Order from OTS. \$2.00. ANL-5803

Experimental determination of some characteristics of packed sphere beds, by J. W. Shortall. California Research and Development Co., Liver-

more, Calif. August 1953. Decl. Feb. 27, 1957. 25p. Order from LC. Mi \$2.70, ph \$4.80. LWS-22702

Physics and Mathematics

Measurements of the intensity of cosmic radiation in three latitudes of Argentina. Translated by G. E. Denegar. Laboratory of Cosmic Radiation. National Commission of Atomic Energy, Argentina. Translation date: August 8, 1957. 7p. Order from OTS. 50 cents. AEC-tr-3002

On the absorption of the nucleonic component of the cosmic radiation at -15° geomagnetic latitude, by Juan G. Roederer. Translated by G. E. Denegar. National Commission of Atomic Energy. Buenos Aires, Argentina. Translation date: August 8, 1957. 5p. Order from OTS. 50 cents. AEC-tr-3003

Statistical weight of a system of particles with arbitrary spins, by V. S. Barashnikov and B. M. Barbashev. Laboratory of Theoretical Physics. Joint Institute for Nuclear Research, (USSR). November 1957. Translated from a publication of the Joint Institute for Nuclear Research, USSR. 14p. Order from OTS. 50 cents. AEC-tr-3009

Negative K-meson production threshold, by M. Danyasz and B. Pontecorvo. Joint Institute for Nuclear Research, (USSR). Translated from Zhur. Eksptl' i Teoret. Fiz. 32, 398-9 (1957) February. Reported at the Conference of High-Energy Physics, Tbilisi, October 1956. November 1956. 7p. Order from OTS. 50 cents. AEC-tr-3019

On the production of mesons in nucleon-nucleon collisions and the nucleon structure, by E. G. Bubelev. Laboratory of Theoretical Physics. Joint Institute for Nuclear Research (USSR). 1956. Translated from a publication of the Joint Institute for Nuclear Research, USSR. 17p. Order from OTS. 50 cents. AEC-tr-3024

When does weak interaction become strong? By D. Blokhintsev. Joint Institute for Nuclear Research (USSR). 1957. Translated from Uspekhi Fiz. Nauk 62, 381-3 (1957) July. 8p. Order from OTS. 50 cents. AEC-tr-3025

Reverse dispersion relations, by V. Blank and D. Shirkov. Laboratory of Theoretical Physics. Joint Institute for Nuclear Research (USSR). 1957. Translated from a publication of the above. 9p. Order from OTS. 50 cents. AEC-tr-3026

Elastic scattering of 307 MeV negative pions by hydrogen, by S. M. Korenchenko and V. G. Zinov. Joint Institute for Nuclear Research (USSR). March 1957. Submitted for publication in the Zhur. Eksptl' i Teoret. Fiz. 10p. Order from OTS. 50 cents.
AEC-tr-3027

Remarks on the role of strangeness in slow elementary particle processes, by L. Okun and B. Pontecorvo. Laboratory of Nuclear Problems. Joint Institute for Nuclear Research (USSR). 1957. Translated from Zhur. Eksptl' i Teoret. Fiz. 32, 1587-8(1957) June. 7p. Order from OTS. 50 cents.
AEC-tr-3029

Polarized particle reactions, by M. I. Shirokov. Laboratory of Theoretical Physics. Joint Institute for Nuclear Research (USSR). 1957. Translated from Zhur. Eksptl' i Teoret. Fiz. 32, 1022-35(1957) May. 29p. Order from OTS. \$1.00.
AEC-tr-3030

Mesonium and antimesonium, by B. Pontecorvo. Laboratory of Nuclear Problems. Joint Institute for Nuclear Research (USSR). 1957. Submitted for publication in the Zhur. Eksptl' i Teoret. Fiz. 8p. Order from OTS. 50 cents.
AEC-tr-3032

Preliminary design study of a food irradiation reactor. Phase 2, by D. T. Bray and others. Internuclear Company, Inc. Clayton, Missouri. July 1956. Report Number INTERNUC 3. 99p. Order from OTS. \$2.50.
AECU-3320

A theoretical analysis of heat transfer in turbulent convection, by Yan Po Chang. University of California. Los Angeles, Calif. 1956. Contract AT(11-1)-34. 30p. Order from OTS. \$1.00.
AECU-3551

Physics Division Quarterly Report for September, October and November, 1951. Argonne National Lab., Lemont, Ill. December 1951. Decl. Apr. 4, 1957. Contract W-31-109-Eng-38. 96p. Order from LC. M1 \$5.40, ph \$15.30.
ANL-4746

The multigroup method as used by the ANP Physics Group, by D. K. Holmes. Oak Ridge National Lab., Y-12 Area, Tenn. February 1951. Decl. Feb. 12, 1957. Contract W-7405-Eng-26. 37p. Order from LC. M1 \$3.00, ph \$6.30.
ANP-58

Gamma dose behind iron-water thermal shield of various thicknesses as a function of water reflector thickness. (Investigation for NDA.). By C. E. Clifford. Oak Ridge National Lab., Tenn. May 1952. Decl. Mar. 19, 1957. Contract W-7405-Eng-26. 16p. Order from LC. M1 \$2.40, ph \$3.30. CF-52-5-40(Del.)

Reactor physics at ORNL (Tripartite conference on nuclear constants, Chalk River, Jan 10-12, 1956), by Robert A. Charpie. Oak Ridge National Lab., Tenn. March 1956. 5p. Order from LC. M1 \$1.80, ph \$1.80. CF-56-3-44

Neutron and gamma flux problems associated with the CTD-HRP in-pile loop, by E. D. Arnold. Oak Ridge National Lab., Tenn. August 1956. Decl. Mar. 14, 1957. Contract W-7405-Eng-26. 21p. Order from LC. M1 \$2.70, ph \$4.80.
CF-56-8-169

Beta ray dose calculations, by W. C. Roesch. Hanford Atomic Products Operation. Richland, Wash. October 1957. Contract W-31-109-Eng-52. 12p. Order from OTS. 50 cents.
HW-51318 Rev.

Nuclear Physics Research Quarterly Report - April, May, June 1957, by the Staff of Nuclear Physics Research. Hanford Atomic Products Operation. Richland, Wash. August 1957. Contract W-31-109-Eng-52. 76p. Order from OTS. \$2.00.
HW-51983

Thermal stress analysis of a cylinder of semi-plastic material, by Donald Hunter and Glenn Murphy. Ames Laboratory. Iowa State College. Ames, Iowa. December 1956. Contract W-7405-Eng-82. 35p. Order from OTS. \$1.00. ISC-839

Semi-annual summary research report in physics - for January through June, 1957, by Ames Laboratory Staff. Ames Laboratory. Iowa State College. Ames, Iowa. September 1957. Contract W-7405-Eng-82. 37p. Order from OTS. \$1.00. ISC-901

The problem of Knudsen flow. Part V. Application of the theory of radiative transfer, by W. C. DeMarcus. Oak Ridge Gaseous Diffusion Plant, Tenn. July 1957. Contract W-7405-Eng-26. 19p. Order from LC. M1 \$2.40, ph \$3.30.
K-1302 (Pt. V)

The effect of a thin film on the Knudsen flow of gas through a porous medium, by W. H. Eberhardt and R. B. Bernstein. Oak Ridge Gaseous Diffusion Plant, Tenn. May 1957. Contract W-

7405-Eng-26. 12p. Order from LC. MI \$2.40,
ph \$3.30. K-1316

36. 14p. Order from LC. MI \$2.40, ph \$3.30.
LA-2122

Radiographic inspection of S2G refueling equipment, by D. G. Chappell. General Electric Co. Knolls Atomic Power Laboratory, Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 28p. Order from OTS. 75 cents. KAPL-1805

Theoretical calculation of the attenuation of gamma radiation from a swimming pool type reactor, by R. L. Ashley and D. S. Duncan. Atomic International Division, North American Aviation, Inc. Canoga Park, Calif. August 1957. Contract AT(11-1)-GEN-8. 40p. Order from OTS. \$1.25. NAA-SR-1921

A survey experiment in reactor pulsing techniques, by B. E. Simmons. Knolls Atomic Power Lab., Schenectady, N. Y. January 1957. Contract W-31-109-Eng-52. 12p. Order from LC. MI \$2.40, ph \$3.30. KAPL-M-BES-2

Neutron flux measurements in the mock-up of the uranium converter reactor, by R. A. Laubenstein, W. J. Houghton, and D. H. Martin. North American Aviation, Inc., Downey, Calif. November 1953. Dec. Feb. 28, 1957. Contract AT-11-1-GEN-8. 13p. Order from LC. MI \$2.40, ph \$3.30. NAA-SR-Memo-818

Application of the variational method to the calculation of flux ratios in repeating slab arrays, by L. S. Bohl. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 15p. Order from LC. MI \$2.40, ph \$3.30. KAPL-M-LSB-2

Uranium-235 fission-product production as a function of thermal neutron flux, irradiation time, and decay time. II. Summations of individual chains, elements, and the rare-gas and rare-earth groups, by J. O. Blomeke and Mary F. Todd. Oak Ridge National Laboratory. Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 358p. Order from OTS. \$6.50. ORNL-2127 Part 2 Vol. 1

Bout and Bout II: Three-group burnout codes for use with PROD II, by O. A. Sappington and others. Knolls Atomic Power Lab., Schenectady, N. Y. May 1957. Contract W-31-109-Eng-52. 28p. Order from LC. MI \$2.70, ph \$4.80. KAPL-M-MAA-1

Oracle photographic curve plotter and digital-output device, by R. J. Klein and C. H. Schalbe. Oak Ridge National Lab. Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 27p. Order from OTS. \$1.00. ORNL-2290

Flat flux loading, by R. C. Rohr. Knolls Atomic Power Lab., Schenectady, N. Y. April 1957. Contract W-31-109-Eng-52. 22p. Order from LC. MI \$2.70, ph \$4.80. KAPL-M-RCR-5

On the relationship between the charge of an ion and its velocity, by Jacob Neufeld. Oak Ridge National Lab., Tenn. October 1957. Contract W-7405-Eng-26. 48p. Order from LC. MI \$3.30, ph \$7.80. ORNL-2365

Stress analysis of S3G/S4G emergency cooling condenser, by T. H. Glasser. Knolls Atomic Power Lab., Schenectady, N. Y. July 1957. Contract W-31-109-Eng-52. 44p. Order from LC. MI \$3.30, ph \$7.80. KAPL-M-SMS-75

On the relationship between the charge of an ion and its velocity. (Supplement). By Jacob Neufeld. Oak Ridge National Lab., Tenn. October 1957. Contract W-7405-Eng-26. 88p. Order from LC. MI \$4.80, ph \$13.80. ORNL-2365 (Suppl.)

Application of the absorption area method to three group diffusion theory problems, by S. Pearlstein. Knolls Atomic Power Lab., Schenectady, N. Y. July 1957. Contract W-31-109-Eng-52. 21p. Order from LC. MI \$2.70, ph \$4.80. KAPL-M-SP-10

High enrichment of uranium-235, by B. Harmatz and others. Oak Ridge National Lab., Oak Ridge, Tenn. November 1957. Contract W-7405-Eng-26. 25p. Order from OTS. 75 cents. ORNL-2381

A practical manual on the Monte Carlo method for random walk problems, by E. D. Cashwell and E. J. Everett. Los Alamos Scientific Laboratory of the Univ. of California. Los Alamos, N. Mex. December 1957. Contract W-7405-ENG-36. 225p. Order from OTS. \$5.50. LA-2120

Applied nuclear physics division annual progress report - period ending September 1, 1957. Oak Ridge National Lab., Oak Ridge, Tenn. 1957. Contract W-7405-Eng-26. 282p. Order from OTS. \$6.50. ORNL-2389

Fast neutron cross sections. Corrections to LA-1714 and a correlation of 3 mev values, by Richard L. Henkel. Los Alamos Scientific Lab., N. Mex. March 1957. Contract W-7405-Eng-

Solid state division annual progress report for period ending August 31, 1957. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 133p. Order from OTS. \$3.50. ORNL-2413

Report number series used by the Technical Information Service in cataloging reports. Compiled by Charlotte F. Chesnut and Frances E. Stratton. Technical Information Service Extension. Oak Ridge, Tenn. September 1957. 115p. Order from OTS. \$3.00.

TID-85 (1st Rev.)

Production and separation of U²³³ survey. Edited by Glenn T. Seaborg and Leonard I. Katzin. Radiation Lab. Univ. of California, Berkeley, Calif. and Argonne National Lab., Lemont, Ill. 1951. Decl. January 11, 1957. 227p. Order from OTS. \$5.50. TID-5222

Reactor control meeting held in Los Angeles, March 6-8, 1957. Division of Reactor Development, AEC. Washington, D. C. October 1957. 246p. Order from OTS. \$3.00. TID-7532 (Pt. 1)

Control over source and special nuclear material. A symposium held at New York, March 5-7, 1957. Division of Nuclear Materials Management, AEC. Washington, D. C. and New York Operations Office, AEC. New York, N. Y. November 1957. 108p. Order from OTS. \$3.00. TID-7537 (Pt. 1)

Neutron yield in uranium vs. energy of deuterons and protons, by H. Brown. California. Univ., Berkeley. Radiation Lab. October 1950. Decl. Mar. 5, 1957. Contract W-7405-Eng-48. 6p. Order from LC. Mi \$1.80, ph \$1.80.

UCRL-951

III. Two-group approximation to absorbing lattices, by Harold Brown. California. Univ., Berkeley. Radiation Lab. February 1951. Decl. Mar. 21, 1957. Contract W-7405-Eng-48. 4p. Order from LC. Mi \$1.80, ph \$1.80. UCRL-1124

V. Multiplying lattices of the hollow type, by Harold Brown. California. Univ., Berkeley. Radiation Lab. February 1951. Decl. Mar. 21, 1957. Contract W-7405-Eng-48. 4p. Order from LC. Mi \$1.80, ph \$1.80. UCRL-1135

Diffusion equation Green's functions for box problems, by F. Adelman, J. Lepore and M. Rosenblum. California. Univ., Berkeley. Radiation Lab. December 1951. Decl. Mar. 9, 1957. Contract W-7405-Eng-48. 4p. Order from LC. Mi \$1.80, ph \$1.80. UCRL-1620

Flux in a rectangular cavity, by M. Rosenblum. California. Univ., Berkeley. Radiation Lab. February 1952. Decl. Mar. 4, 1957. Contract W-7405-Eng-48. 8p. Order from LC. Mi \$1.80, ph \$1.80. UCRL-1663

Energy spectrum of 320 mev deuterons from He³, by John Ise, Jr. California. Univ., Berkeley. Radiation Lab. July 1953. Decl. Mar. 6, 1957. Contract W-7405-Eng-48. 8p. Order from LC. Mi \$1.80, ph \$1.80. UCRL-2285

Analysis of hyperfragments from strange-particle interactions (thesis), by Fred W. Inman. California. Univ., Berkeley. Radiation Lab. June 1957. Contract W-7405-Eng-48. 64p. Order from LC. Mi \$3.90, ph \$10.80. UCRL-3815

Neutrons from (α, n) sources, by Wilmot N. Hess. California. Univ., Berkeley. Radiation Lab. July 1957. Contract W-7405-Eng-48. 41p. Order from LC. Mi \$3.30, ph \$7.80.

UCRL-3839

On estimating rates of convergence in multigroup diffusion problems, by Richard S. Varga. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. August 1957. Contract AT-11-1-GEN-14. 20p. Order from OTS. 75 cents. WAPD-TM-41

Effect of buckling on the multigroup diffusion theory group constants calculated by the MUFT code, by R. S. Wick. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. November 1957. Contract AT-11-1-GEN-14. 37p. Order from OTS. \$1.00. WAPD-TM-50

PDQ-- an IBM-704 code to solve the two-dimensional few-group neutron-diffusion equations, by G. G. Bilodeau and others. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. August 1957. Contract AT-11-1-GEN-14. 66p. Order from OTS. \$1.75. WAPD-TM-70

Absolute power calibration of a Flexible Survey Assembly, by R. N. Olcott and D. Brown. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. August 1957. Contract AT-11-1-GEN-14. 39p. Order from OTS. \$1.25. WAPD-TM-74

Progress Reports

Semi-annual summary research report in engineering - for January - June, 1957, by Ames Laboratory Staff. Ames Lab. at Iowa State College. Sept. 1957. Contract W-7405-Eng-82. 19p. Order from OTS. 50 cents. ISC-904

Radiation Effects on Materials

Effect of constitution of graphites on their stability under low-temperature irradiation, by Luther D. Loch and others. Battelle Memorial Institute, Columbus, Ohio. September 1955. Decl. Feb. 13, 1957. Contract W-7405-Eng-92. 71p. Order from OTS. \$2.00. BMI-1042 (Del.)

Radiation specimens of a fuel element. Experiments PW-1-9, 1-10, and 1-11, by G. D. Calkins, J. R. Keeler, and D. L. Keller. Battelle Memorial Inst., Columbus, Ohio. February 1954. Decl. with deletions Feb. 22, 1957. 16p. Order from LC. Mi \$2.40, ph \$3.30. BMI-X-116 (Del.)

Small angle x-ray scattering study of radiation damage in graphite, by B. E. Warren and D. R. Chipman. Massachusetts Inst. of Tech., Cambridge. October 1954. Decl. Apr. 11, 1957. Contract W-31-109-Eng-52. 16p. Order from LC. Mi \$2.40, ph \$3.30. KAPL-1204

Proposal for in-pile burnout test at MTR, by H. Dobel and S. J. Green. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Penna. March 1955. Decl. Mar. 9, 1957. Contract AT-11-1-GEN-14. 41p. Order from LC. Mi \$3.00, ph \$6.30. WAPD-TH-40

Radioactive Waste

Development of design criteria for waste stabilization ponds, by E. R. Hermann and E. F. Gloyne. Final report. Sanitary Engineering Laboratories. University of Texas. Austin, Texas. March 1957. Contract AT(11-1)-220. 161p. Order from OTS. \$4.25. AECU-3481

Removal of radioisotopes from contaminated water by organic complexing and adsorption of activated charcoal, by William J. Lacy and Don C. Lindsten. Oak Ridge National Lab., Tenn. May 1956. Contract W-7405-Eng-26. 11p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-5-41

Changes in the Hanford water table - 1944 - 1957, by W. H. Bierschenk and M. W. McConiga. Hanford Atomic Products Operation. Richland, Wash. July 1957. Contract W-31-109-Eng-52. 21p. Order from OTS. 75 cents. HW-51277

Bulk storage of radium cake--preliminary cost estimates. Kellogg Corp., New York. June 1949. Decl. with deletions Feb. 26, 1957. Contract

AT-30-1-GEN-169. 30p. Order from LC. Mi \$3.00, ph \$6.30. KLX-015 (Del.)

Project summary. Decontamination of dilute low activity wastes (24-A3). Job 24-A. Vitro Corp. of America, New York. July 1952. Decl. Mar. 12, 1957. Contract AT(30-1)-850. 74p. Order from LC. Mi \$4.50, ph \$12.30. KLX-1372

Status report on handling and disposal of radioactive wastes in the AEC program. Division of Reactor Development. Washington, D. C. August 1957. 46p. Order from OTS. \$1.25. WASH-742

Reactors--General

Monitoring the MTR canal gamma source--a treatment of reliability, by J. G. Carroll. California Research Corp. Richmond, Calif. August 1957. Contract AT(11-1)-174. 18p. Order from OTS. 75 cents. AECU-3565

Long-lived circulating activity in the Army Package Power Reactor, by W. J. Small, J. L. Zegger, and A. L. Medin. Alco Products, Inc. Schenectady, N. Y. August 1957. Contract AT(11-1)-318. 34p. Order from OTS. \$1.00. APAE-20

LMFR-13 - Liquid metal fuel reactor in-pile fuel processing loop (Loop B), construction, operation, experimental results, by C. J. Raseman, H. Susskind, and C. H. Waide. Brookhaven National Lab. Associated Universities, Inc. Upton, N. Y. January 1957. 45p. Order from OTS. \$1.50. BNL-403 (T-88)

Criticality requirements of proposed "Teapot", by Paul R. Kasten. Oak Ridge National Lab., Tenn. January 1952. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 5p. Order from LC. Mi \$1.80, ph \$1.80. CF-52-1-23

A low cost physics and engineering training reactor. Reactor design and feasibility study, by R. A. Brown and others. Oak Ridge School of Reactor Technology. Oak Ridge, Tenn. August 1956. 200p. Order from OTS. \$5.50. CF-56-8-203

Summary of tests on a production model of a Bryon Jackson, 5-gpm pump in loop DV 9, by D. B. Weaver. Oak Ridge National Lab., Tenn. November 1956. Contract W-7405-Eng-26. 11p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-11-35

Plutonium production reactor. Progress memorandum. Ferguson, (H. K.) Co. Atomic Energy Div., New York, September 1951. Decl. with deletions Feb. 18, 1957. 13p. Order from LC. Mi \$2.40, ph \$3.30. HKF-1492D-41 (Del.)

Rate of burnout of absorbers, by P. R. Gillette. Hanford Works, Richland, Wash. July 1949. Decl. Feb. 25, 1957. Contract W-31-109-Eng-52. 5p. Order from LC. Mi \$1.80, ph \$1.80. HW-13959

The SPERT-II reactor facility preliminary design report, by T. R. Wilson. Phillips Petroleum Co. Idaho Operations Office. Idaho Falls, Idaho. October 1957. Contract AT (10-1)-205. 20p. Order from OTS. 75 cents. IDO-16386

Design and development of a fuel plate surface thermocouple for Special Power Excursion Reactor Tests. RU-124 final report. Period August 1956 through February 1957. Carried out by Detroit Controls Corp. Redwood City, Calif. for Phillips Petroleum Co. Idaho Operations Office, Idaho Falls, Idaho under subcontract C-203. February 1957. Contract AT(10-1)-205. 18p. Order from OTS. 75 cents. IDO-16388

High pressure water loop experiments in the MTR, by D. C. King. Phillips Petroleum Co. Idaho Operations Office - Idaho Falls, Idaho. November 1957. Contract AT(10-1)-205. 26p. Order from OTS. 75 cents. IDO-16426

Revised specifications for MTR-HT-1 defect assemblies. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh, Penna. February 1955. Decl. Mar. 18, 1957. 7p. Order from LC. Mi \$1.80, ph \$1.80. WAPD-M-92

Reactors—Power

A report on the interaction of the nuclear and power plant controls for the SRE steam electric generating station. Southern California Edison Co., Los Angeles, Calif. and Atomics International, a division of North American Aviation, Inc. Canoga Park, Calif. April 1956. 28p. Order from OTS. 75 cents. AI-1612

Four month status summary report on industrial participation program. American Machine and Foundry Co. General Engineering Lab., Greenwich, Conn. November 1954. Decl. Feb. 13, 1957. 54p. Order from LC. Mi \$3.60, ph \$9.30. AMF-GR-3-54

Hazard evaluation report on the fast reactor zero power experiment (ZPR-III), by R. O. Brittan and others. Argonne National Lab., Lemont, Ill. April 1955. Decl. February 13, 1957. Contract W-31-109-Eng-38. 76p. Order from OTS. \$2.00. ANL-FWT-105

Quarterly progress report for July 1-September 30, 1952. Brookhaven National Lab., Upton, N. Y. Decl. Mar. 9, 1957. 25p. Order from LC. Mi \$2.70, ph \$4.80. BNL-223 (Rev.)

The preliminary design of the liquid metal fuel reactor experiment. Brookhaven National Lab., Upton, N. Y. April 1956. 142p. Order from OTS. \$3.75. BNL-3247

Photoneutrons in the HRE, by H. T. Williams. Oak Ridge National Lab., Tenn. December 1951. Decl. Mar. 12, 1957. Contract W-7405-Eng-26. 8p. Order from LC. Mi \$1.80, ph \$1.80. CF-51-12-122

Use of copper as an internal recombination catalyst in the ISHR, by P. N. Haubenreich and M. Tobias. Oak Ridge National Lab., Tenn. April 1953. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 21p. Order from LC. Mi \$2.70, ph \$4.80. CF-53-4-292

A preliminary investigation of power removal from a boiling reactor, by R. V. Bailey and P. C. Zmola. Oak Ridge National Lab., Tenn. November 1953. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 73p. Order from LC. Mi \$4.50, ph \$12.30. CF-53-11-145

Poisoning of the core of the two-region homogeneous thermal breeder, by A. T. Gresky and E. D. Arnold. Study No. 1. Oak Ridge National Lab., Tenn. December 1953. Decl. Mar. 12, 1957. Contract W-7405-Eng-26. 30p. Order from LC. Mi \$3.00, ph \$6.30. CF-53-12-165

Comments on the effect of electrolytes on thorium oxide slurries, by D. G. Thomas. Oak Ridge National Lab., Tenn. June 1955. Decl. Feb. 14, 1957. Contract W-7405-Eng-26. 13p. Order from LC. Mi \$2.40, ph \$3.30. CF-55-6-71

High temperature aqueous homogeneous reactor, by A. Hauspurg and others. (Reactor design and feasibility problem). Oak Ridge School of Reactor Technology, Tenn. August 1955. Decl. Feb. 15, 1957. 147p. Order from LC. Mi \$7.20, ph \$22.80. CF-55-8-191

HRT-CP: Design and operation of the recombiners for the HRT chemical processing plant, by William L. Carter. Oak Ridge National Lab., Tenn. March 1956. Contract W-7405-Eng-26. 20p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-3-139

Design criteria--HRT pressurization control, by M. I. Lundin. Oak Ridge National Lab., Tenn. April 1956. Decl. Mar. 16, 1957. Contract W-7405-Eng-26. 8p. Order from LC. Mi \$1.80, ph \$1.80. CF-56-4-55

HRT corrosion sample data and fabrication--heat exchanger, by D. B. Weaver. Oak Ridge National Lab., Tenn. October 1956. Contract W-7405-Eng-26. 9p. Order from LC. Mi \$2.40, ph \$3.30. CF-56-10-6

A conceptual design study of an Advanced Engineering Test Reactor, prepared by members of the Nuclear Power Dept. Research Division of Curtiss-Wright Corp. Quehanna, Penna. May 1957. Decl. June 24, 1957. Contract AT(30-3)-275. 61p. Order from OTS. \$1.75. CWR-464 (Del.)

Remote controlled milling machine for MTR Hot Cell, by F. L. Petree. Phillips Petroleum Co., Idaho Operations Office. Idaho Falls, Idaho. October 1957. Contract AT(10-1)-205. 14p. Order from OTS. 50 cents. IDO-16278

The Fast Oxide Breeder - reactor analysis. Part I. Neutron yields, cross sections, group constants, and machine routines, by G. A. Baraff and R. G. Mallon. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 49p. Order from OTS. \$1.25. KAPL-1756, Part I.

The Fast Oxide Breeder - reactor analysis. Part II. Reactor calculations, by D. F. Molino and J. K. Davidson. General Electric Co. Knolls Atomic Power Lab., Schenectady, N. Y. June 1957. Contract W-31-109-Eng-52. 25p. Order from OTS. 75 cents. KAPL-1756, Part II.

Report on design status of hold down and thermo-couple plate for 20 $\frac{1}{2}$ " intermediate reactor, by J. S. Blowney. Knolls Atomic Power Lab., Schenectady, N. Y. May 1949. Decl. Mar. 1, 1957. Contract W-31-109-Eng-52. 41p. Order from LC. Mi \$3.30, ph \$7.80. KAPL-M-JSB-1

Approximations to reactivity-burnup relationship of long burning reactors, by W. L. Robb. Knolls

Atomic Power Lab., Schenectady, N. Y. December 1956. Decl. Mar. 4, 1957. Contract W-31-109-Eng-52. 23p. Order from LC. Mi \$2.70, ph \$4.80. KAPL-M-WLR-3

Homogeneous reactor processing progress report for May 1952. Job 57. Vitro Corp. of America, New York. June 1952. Decl. Mar. 25, 1957. Contract AT(11-1)-217. 37p. Order from LC. Mi \$3.00, ph \$6.30. KLX-1601

Fuel costs in single-region homogeneous power reactors, by P. R. Kasten, T. B. Fowler and M. P. Lietzke. Oak Ridge National Lab., Tenn. 1957. Contract W-7405-Eng-26. 63p. Order from OTS. \$1.75. ORNL-2341

Economics of nuclear power. A literature search. Compiled by Richard J. Smith. Technical Information Service Extension. Oak Ridge, Tenn. July 1957. 9p. Order from OTS. 50 cents. TID-3510

PWR fuel element specifications. Atomic Power Div. Westinghouse Electric Corp. Pittsburgh, Penna. 72p. Order from OTS. \$2.00. TID-5302 (Rev.)

Papers presented at the technical briefing session held at Argonne National Laboratory, May 27 and 28, 1957. Boiling water reactor program. Program chairmen: J. M. Harrer, A. H. Barnes, and M. Novick. Argonne National Lab., Lemont, Ill. October 1957. 165p. Order from OTS. \$2.00. TID-7535

Technical progress report - pressurized water reactor (PWR) project - period August 24, 1957 to October 23, 1957. Westinghouse Electric Corp. Bettis Plant. Pittsburgh, Penna. Contract AT-11-1-GEN-14. 80p. Order from OTS. \$2.25. WAPD-MRP-70

Nuclear power for Pittsburgh; final report on Duquesne-Kidde nuclear power study, by James J. Barker. Walter Kidde Nuclear Laboratories, Inc. Garden City, N. Y. November 1955. Decl. May 8, 1957. 51p. Order from OTS. \$1.50. WKNL-49

Stable Isotope Separation

Comparison of different methods applicable to the separation of the uranium isotopes, by Harold C. Urey. Columbia Univ., New York. Div. of War Research. (1942?) Decl. with deletions Feb. 12, 1957. 22p. Order from LC. Mi \$2.70, ph \$4.80. A-49 (Del.)

Technology—Feed Materials

Process engineering report on thorium semi-works plant for the Feed Materials Production Center—Fernald, Ohio. Job No. 3542. Report by: H. H. Bulkowski and others. The Engineering Dept. Catalytic Construction Company, Philadelphia, Penna. January 1952. Decl. Nov. 22, 1957. 79p. Order from OTS. \$2.00. CCCO-422

Some observations on the reactivity of plutonium dioxide, by C. W. Bjorklund. Los Alamos Scientific Laboratory of the Univ. of Calif. Los Alamos, New Mexico. November 1954. Decl. Nov. 22, 1957. Contract W-7405-Eng-36. 20p. Order from OTS. 75 cents. LA-1869

Tentative Chambers Works process for the manufacture of concentrated uranium containing cakes from dilute feeds "concentration process." By F. B. Stilmar. E. I. du Pont de Nemours & Co. Jackson Lab., Wilmington, Del. October 1945. Decl. Mar. 6, 1957. 6p. Order from LC. M1 \$1.80, ph \$1.80. M-2948

Tentative dye works process for the manufacture of C-106 from C-112 paste, by Louis Spiegler. E. I. du Pont de Nemours & Co. Jackson Lab., Wilmington, Dela. April 1943. Decl. Mar. 7, 1957. 13p. Order from LC. M1 \$2.40, ph \$3.30. M-3007

Tentative dye works process for the manufacture of C-106 (purified), by C. W. Maynard. E. I. du Pont de Nemours & Co. Jackson Lab., Wilmington, Dela. May 1943. Decl. Mar. 6, 1957. 7p. Order from LC. M1 \$1.80, ph \$1.80. M-3022

Some factors influencing the distribution of molybdenum complexes and boric acid in ether-water-uranyl-nitrate systems, by R. P. Smith. Mallinckrodt Chemical Works, St. Louis. April 1946. Decl. Feb. 28, 1957. Contract W-14-108-Eng-8. 23p. Order from LC. M1 \$2.70, ph \$4.80. MCW-21 (Rev.)

Experiments aimed at the removal of boron from uranium compounds, by O. J. Buckheim. Mallinckrodt Chemical Works, St. Louis. August 1949. Decl. Feb. 28, 1957. 7p. Order from LC. M1 \$1.80, ph \$1.80. MCW-222

MCW (Mallinckrodt SF) accountability program. Progress report for Apr. 15, 1950 to June 1, 1950, by C. H. Walden. Mallinckrodt Chemical Works, St. Louis. June 7, 1950. Decl. Feb. 28, 1957. 5p. Order from LC. M1 \$1.80, ph \$1.80. NYO-1305

Uranium metal by bomb reduction. V. The reaction of UF_4 and magnesium vapor, by R. M. Paine, A. E. Ruehle, and G. W. Lewis, Jr. Mallinckrodt Chemical Works, St. Louis. June 1952. Decl. Mar. 2, 1957. Contract W-14-108-Eng-8. 17p. Order from LC. M1 \$2.40, ph \$3.30. NYO-1335

The problem of spectrographic boron determinations in XO_2 (UO_2) and X_3O_8 (U_3O_8), by B. D. Field. Mallinckrodt Chemical Works, St. Louis. March 1945. Decl. Mar. 8, 1957. 5p. Order from LC. M1 \$1.80, ph \$1.80. NYO-5096

A study of some interfering elements in the volumetric assay of X_3O_8 (U_3O_8), by J. R. McCoy. Mallinckrodt Chemical Works, St. Louis. April 1945. Decl. Mar. 8, 1957. Contract W-7405-Eng-1. 8p. Order from LC. M1 \$1.80, ph \$1.80. NYO-5106

A study of continuous extraction methods, by Thomas C. Furnas, Jr. Mallinckrodt Chemical Works, St. Louis. May 1945. Decl. Mar. 7, 1957. Contract W-7405-Eng-1. 181p. Order from LC. M1 \$8.40, ph \$28.80. NYO-5113

A study of mannitol in hot aqueous uranyl nitrate solutions, by T. C. Furnas. Mallinckrodt Chemical Works, St. Louis. February 1946. Decl. Mar. 8, 1957. Contract W-14-109-Eng-8. 7p. Order from LC. M1 \$1.80, ph \$1.80. NYO-5165

A report on the reduction of MoO_3 in the ether extract from AAA (pitchblende) ore acid feed solutions, by James Miller. Mallinckrodt Chemical Works, St. Louis. February 1946. Decl. Mar. 7, 1957. Contract W-14-108-Eng-8. 11p. Order from LC. M1 \$2.40, ph \$3.30. NYO-5168

Purification of V-4 salt (uranium bearing ore) by a nitric acid digestion and ether extraction, by James L. Miller. Mallinckrodt Chemical Works, St. Louis. February 1946. Decl. Mar. 8, 1957. Contract W-14-109-Eng-8. 12p. Order from LC. M1 \$2.40, ph \$3.30. NYO-5169

Flow sheets for C-liner project. Supplement. By A. J. Strod. Vitro Mfg. Co., Pittsburgh, Pa. August 1951. Decl. Mar. 7, 1957. 5p. Order from LC. M1 \$1.80, ph \$1.80. TID-5343

Conversion of uranyl ammonium phosphate to uranium hexafluoride in a batch vapor phase reactor, by C. C. Haws. Carbide and Carbon Chemicals Corp. Oak Ridge, Tenn. July 1949. Decl. Mar. 6, 1957. Contract W-7405-Eng-26. 38p. Order from LC. M1 \$3.00, ph \$6.30. Y-467

Technology—Raw Materials

The development of fixed screen resin-in-pulp devices, by W. D. Charles and others. American Cyanamid Co. Atomic Energy Div. Raw Materials Development Lab., Winchester, Mass. August 1954. Decl. Mar. 15, 1957. Contract AT(49-1)-533. 41p. Order from LC. Mi \$3.00, ph \$8.30. ACCO-65

Status of the research program for uranium chemistry of raw materials, by K. B. Brown. Oak Ridge National Lab., Tenn. December 1954. Decl. Mar. 14, 1957. Contract W-7405-Eng-26. 21p. Order from LC. Mi \$2.70, ph \$4.80. CF-54-12-6

Preliminary experiments in gamma-counting flotation pulps, by James H. Pannell. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. January 1949. Decl. Feb. 27, 1957. Contract W-7405-Eng-85. 19p. Order from LC. Mi \$2.40, ph \$3.30. MITG-A39

Production of concentrated leach solution, by D'Arcy R. George. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. October 1949. Decl. Mar. 7, 1957. Contract W-7405-Eng-85. 14p. Order from LC. Mi \$2.40, ph \$3.30. MITG-A88

Phosphorus tracer study of the pyrophosphate process, by James H. Pannell and John J. Brunner. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. September 1950. Decl. Feb. 28, 1957. Contract W-7405-Eng-85. 24p. Order from LC. Mi \$2.70, ph \$4.80. MITG-A99

Materials Chemistry Division, uranium chemistry of raw materials section progress report for April 1, 1952 to June 30, 1952. Oak Ridge National Lab., Tenn. Decl. Mar. 7, 1957. Contract W-7405-Eng-26. 154p. Order from LC. Mi \$7.50, ph \$24.30. ORNL-1384

Progress report on raw materials for August, 1957, by K. B. Brown and others. Oak Ridge National Lab., Oak Ridge, Tenn. n. d. Contract W-7405-Eng-26. 29p. Order from OTS. \$1.00 ORNL-2399

Ore dressing of leached zone, by Harold W. Long, Jr. J. B. Adams, and Roger Bart. International Minerals and Chemical Corp., Chicago. February 1955. Changed from Official Use Only with deletions Feb. 5, 1957. Contract AT(49-1)-545. (IMCC-2216(Del)). 37p. Order from LC. Mi \$3.00, ph \$6.30. RMO-2045 (Del.)

Raw materials development laboratory handbook of analytical methods. Compiled and edited by Michael A. DeSesa. Raw Materials Development Laboratory. National Lead Company, Inc. Winchester, Mass. July 1957. Contract AT(49-6)-924. 138p. Order from OTS. \$3.75. TID-7002 (Rev. 1)

Improvements in the fluorometric determination of uranium, by Frederick A. Centanni and Thomas J. Morrison, Jr. National Lead Co., Inc. Raw Materials Development Lab., Winchester, Mass. April 1957. Contract AT(49-6)-924. 22p. Order from LC. Mi \$2.70, ph \$4.80. WIN-63

Alkaline leach--filtration pilot plant testing of U and I ore, by A. W. Griffith, W. A. Millsap, and Guy Winslow. National Lead Co., Inc. Winchester, Mass. Jan. 1957. Contract AT(49-6)-924. 56p. Order from LC. Mi \$3.80, ph \$9.30. WIN-66

U. S. DEPARTMENT OF COMMERCE FIELD OFFICES

SERVE THE BUSINESS COMMUNITY

The Department of Commerce maintains Field Offices to enable the business community to avail itself locally of Government facilities designed to promote commerce. Working closely with various units in the Department and, when necessary, with other Government agencies, the Field Offices provide business services to manufacturers, wholesalers, retailers, trade publications, trade associations, advertising agencies, research groups, financial institutions, and exporters and importers.

Experienced personnel will gladly assist in the solution of specific problems, explain the scope and meaning of regulations administered by the Department, and provide practical assistance in the broad field of domestic and foreign commerce. Field offices act as official sales agents of the Superintendent of Documents, and maintain an extensive business reference library containing periodicals, directories, publications and reports from official as well as private sources.

Among the many services which businessmen have found of value are:

GENERAL

- Management and business aids
- Establishing a new business

BASIC ECONOMIC DATA

- Census data, with national and often State and regional breakdowns, on manufacturing, wholesaling, retailing, service industries, employment and unemployment, population, housing, agriculture
- Basic records of national income and product, regional trends, balance of payments, foreign aid

MARKETING AND DISTRIBUTION

- Development and maintenance of markets
- Distribution channels, facilities and services
- Marketing and distribution statistics

COOPERATIVE OFFICES

To make the services of the Department of Commerce more widely available, agreements have been entered into with more than 750 Chambers of Commerce, Manufacturers Associations, and similar business groups under which these organizations have become official Cooperative Offices of the Department. If specific information is not on hand in the Cooperative Office, your problem will be referred to the nearest Departmental field office.

PRODUCTION

- Modernization of plant processes and other technological aids
- Development of new products
- Government-owned patents for free license
- Commodity standards

FOREIGN TRADE AND INVESTMENT

- Tariff and exchange regulations
- Import and export quotas, licensing regulations
- Statistics on imports and exports
- Investment and trade opportunities abroad
- Economic conditions in foreign countries

Department Field Offices

ALBUQUERQUE, N. MEX., Post Office Bldg.
ATLANTA 3, GA., 66 Luckie Street NW.
BOSTON 9, MASS., Post Office and Courthouse
BUFFALO 3, N. Y., 117 Ellicott Street
CHARLESTON 4, S. C., Sergeant Jasper Bldg., West End
Broad Street
CHEYENNE, WYO., Federal Office Bldg.
CHICAGO 6, ILL., 226 West Jackson Blvd.
CINCINNATI 2, OHIO, Post Office and Courthouse
CLEVELAND 14, OHIO, 1100 Chester Avenue
DALLAS, TEX., 500 South Ervay Street
DENVER 2, COLO., New Custom House
DETROIT 26, MICH., Federal Bldg.
GREENSBORO, N. C., Post Office Bldg.
HOUSTON 2, TEX., 430 Lamar Avenue
JACKSONVILLE 1, FLA., Federal Bldg.
KANSAS CITY 6, MO., Federal Office Bldg.

LOS ANGELES 15, CALIF., 1031 South Broadway
MEMPHIS 3, TENN., 22 North Front Street
MIAMI 32, FLA., 300 NE. First Avenue
MINNEAPOLIS 1, MINN., Metropolitan Bldg.
NEW ORLEANS 12, LA., 333 St. Charles Avenue
NEW YORK 17, N. Y., 110 E. 45th Street
PHILADELPHIA 7, PA., 1015 Chestnut Street
PHOENIX, ARIZ., 137 N. Second Avenue
PITTSBURGH 22, PA., 107 Sixth Street
PORTLAND 4, OREG., Old U. S. Courthouse
RENO, NEV., 1479 Wells Avenue
RICHMOND 19, VA., 1103 East Main Street
ST. LOUIS 1, MO., New Federal Bldg.
SALT LAKE CITY 1, UTAH, 222 S. W. Temple Street
SAN FRANCISCO 11, CALIF., 555 Battery Street
SAVANNAH, GA., U. S. Courthouse and Post Office Bldg.
SEATTLE 4, WASH., Federal Office Bldg.

For local telephone listing, consult section devoted to U. S. Government

UNITED STATES
GOVERNMENT PRINTING OFFICE

DIVISION OF PUBLIC DOCUMENTS
WASHINGTON 25, D. C.

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, \$300