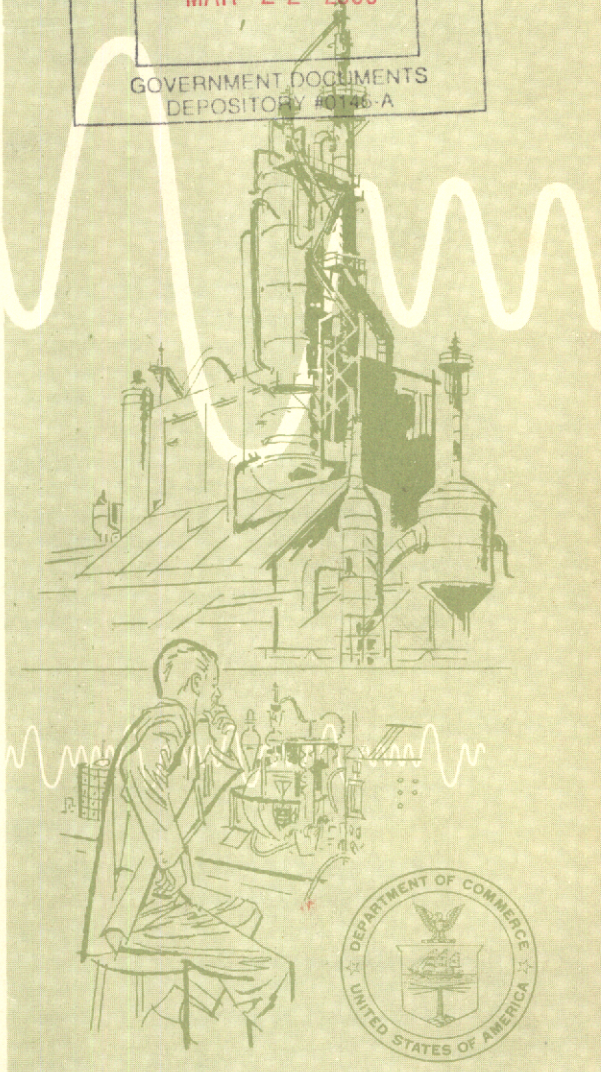
U. S. Government

RESEARCH REPORTS

December 14, 1956
Vol. 26, No. 6

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

In this issue:



U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

The PB Reports . . .

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

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

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

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

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

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

How To Order

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

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

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

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

U. S. GOVERNMENT RESEARCH REPORTS

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

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

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

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

U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

U. S. Government RESEARCH REPORTS

Vol. 26, No. 6 December 14, 1956

Contents

Printed Reports Available from OTS Announced in This Issue

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Alizarin sulfonate complexes of zirconium and hafnium, by Edwin M. Larsen and Stanley T. Hirozawa. Wisconsin. University. Dept. of Chemistry, Madison, Wis. Aug 1955. 16p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122958

Based on a thesis by Stanley T. Hirozawa. Technical report no. 10.
1. Zirconium compounds - Spectrophotometric analysis 2. Hafnium compounds - Spectrophotometric analysis 3. Alazarin sulfonate - Complexes - Reactions 4. Zirconium - Reactions 5. Hafnium - Reactions 6. Contract N7 onr-28504, T. O. 4.

Method for the study of the hydrolysis of organic fluorine and chlorine compounds submitted for use as non-inflammable hydraulic oils, by Kenneth L. Temple and John K. Wolfe. U. S. Naval Research Laboratory. Feb 1943. 12p drawings. Order from LC. Mi $2.40, ph $3.30. PB 120612

Date of tests, Oct 1942-15 Feb 1943.
1. Hydrolysis - Methods 2. Chlorine compounds, Organic - Hydrolysis 3. Fluorine compounds, Organic - Hydrolysis 4. Hydraulic fluids - Non-inflammable 5. NRL P 2009.

Thermal decomposition of organic nitrates. U. S. Naval Ordnance Laboratory, White Oak, Md. Order separate parts described below from OTS, giving PB number of each part ordered.

Part III: Effect of additives on the thermal decomposition of ethyl nitrate, by Joseph B. Levy.

Aug 1953. 34p graphs, tables. $1. PB 121167

The optical techniques developed earlier for the study of the vapor phase thermal decomposition of nitrate esters have been applied to the study of the effects of various additives on the thermal decomposition of ethyl nitrate. The results of these studies have been interpreted in terms of a revised mechanism proposed in preliminary form in an earlier report and in completed form here. These results give strong support to the revised mechanism. For Parts I-II see PB 110898 and PB 112300. NAVORD 2897.

Part IV: Isopropyl nitrate, secondary butyl nitrate, normal butyl nitrate and ethylene glycol mononitrate, by Joseph B. Levy and Hugh C. Anderson. Jun 1955. 31p graphs, tables. $1. PB 121179

Studies of the vapor phase thermal decomposition of nitrate esters have been extended to the cases of isopropyl, secondary butyl, normal butyl and ethylene glycol mononitrates. The results of these studies have been interpreted in terms of the mechanistic ideas developed in the earlier work. NAVORD 3966.

Plastics and Plasticizers

Defects of importance in the specification of reinforced plastics products, by F. Robert Barnet. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1953. 53p photos, diagrs. Order from OTS. $1.50. PB 121277

Many military specifications exist for the purchase of laminated plastics materials for government use. These documents adequately specify physical properties at ambient conditions but leave to the procuring agency the details as to what is to be considered acceptable workmanship in quality in regard to the classification of defects. This report supplements those specifications by picturing common flaws and defects and by discussing each and its possible effect on laminated items under various conditions of service usage as encountered with Naval Ordnance. Thus the procuring agency is provided with a basis of specifying workmanship and quality in a more exact fashion. Still remaining to be collected, for full and complete specification purposes, is mechanical and chemical property data on the materials themselves under the many environmental conditions common to the military service. Supplements report no. 2669. NAVORD 2797.

Development of sizings for glass fabric in polyester-resin laminates, by Johan Bjorksten, Karl Guenther and Robert J. Roth. Bjorksten Research Laboratories, Inc., Madison, Wis. Sep 1953. 30p tables. Order from LC. Mi $2.25, ph $4. PB 107770s2

Various functional organo-silicon derivatives were investigated as glass fabric sizing for improving glass fiber laminates made with melamine, phenolic, silicone and epoxide resins. These sizings were compared with commercially available glass finishes and the vinyl trichlorosilane sizing previously developed for polyester-resin glass fiber laminates. The criteria used for evaluation were the dry and wet flexural strengths of the laminates prepared with these components. Supplement to PB 107770. AF TR 6220, Suppl. 2. Contract AF 33(038)-8902.

Effect of chlorinated saturants on the mechanical and electrical properties of polyvinyl chloride type insulation, by J. M. Fogelberg and M. A. Elliott. U. S. Naval Research Laboratory. May 1943. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120549

1. Vinylite 5901 (Trade name) 2. Halowax (Trade name) 3. Insulation, Electrical - Properties 4. NRL P 2062.

F-94 one half scale methylalphachloracrylate canopy, by Frank Evans, M. Elber Latham and John G. Stansbury. Swedlow Plastics Co., Los Angeles, Calif. Sep 1953. 20p photos, drawings. Order from LC. Mi $2.40, ph $3.30. PB 122474

Quarter-inch thick methylalphachloracrylate monolithic cast sheet was satisfactorily fabricated by a "free blowing" technique into a half scale F-94 canopy. The optical quality was excellent and in every way appeared to be easily the equivalent to that of a "free blown" acrylic part. However, some surface degradation was evidenced by a slight darkening. An adequate cement, as well as cementing technique, was established to assemble the edge attaching materials to the formed methylalphachloracrylate canopy. AD 24142. AF WADC TR 53-259.

Investigation of methyl silicone polymer fluids. 1. Applicability as damping liquids, by Charles M. Murphy, Jr. U. S. Naval Research Laboratory. Jun 1943. 31p photos, graphs (part fold), tables. Order from LC. Mi $3, ph $6.30. PB 120521

1. Silicones - Lubricating properties 2. Fluids, Damping - Tests 3. Fluids, Dimethylsilicone polymer - Tests 4. Fluids - Viscosity - Tests 5. NRL P 2101.

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

Part IV: Some performance characteristics in a unilaterally loaded journal bearing, by Richard O. Militz and Jere E. Brophy. Apr 1945. 21p diagr, graphs (1 fold), tables. Mi $2.70, ph $4.80. PB 123386

For parts III and VIII see PB 109545 and PB 107842.

1. Hydraulic fluids, Noninflammable 2. Bearings, Journal - Lubricants 3. Lubricants, High pressure 4. Silicones - Lubricating properties 5. NRL P 2499.

Part V: Performance as hydraulic fluids in piston pumps, by Vincent G. Fitzsimmons, Deets L. Pickett and Richard O. Militz. May 1945. 20p photos, tables. Mi $2.40, ph $3.30. PB 123398

1. Hydraulic fluids, Noninflammable 2. Silicones - Lubricating properties 3. Lubricants, High pressure 4. Pumps, Piston - Lubrication 5. NRL P 2530.

Kunststoff-wälzlagerkäfige: Notlaufeigenschaften von kunststoffen (Plastic roller bearing race separators. Critical operating properties of plastics), by A. Gremer. Translated and edited by F. A. Raven. Nov 1955. 25p drawings, graphs, tables. Order from OTS. 75 cents. PB 121363

In wearing tests, five different plastics were investigated with respect to their suitability as structural materials for the fabrication of roller bearing race separators and compared to the metals, bronze and steel, heretofore used for this purpose. Translated from Zeitschrift des Vereines Deutscher Ingenieure, vol. 97, no. 17, 11 Jun 1955, pp. 509-515. NAVSHIPS T598. STS 227.

Tropical deterioration of materials for electronic equipment. Part I: Plasticizers, by Dorothy M. Molnar and John M. Leonard. U. S. Naval Research Laboratory. Apr 1945. 41p photos, tables. Order from LC. Mi $3.30, ph $7.80. PB 120764

1. Plasticizers - Fungus resistance - Tests 2. Electronic equipment - Fungus proofing 3. NRL P 2492.

Paints, Varnishes and Lacquers

Camouflage of naval ships: Tests at sea November and December, 1935, by Charles Bittinger. U. S. Naval Research Laboratory. Feb 1936. 39p photos. Order from LC. Mi $3, ph $6.30. PB 120470

Unclassified 12 May 1955.
1. Camouflage - Detection 2. Camouflage - Optical aspects 3. Camouflage materials 4. Dyes, Camouflage 5. Paints, Camouflage - Tests 6. NRL H 1239.

Development and evaluation of paint remover used by the United States Air Force, by Sam Collis. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1955. 34p tables. Order from OTS. $1. PB 111921

Paint and lacquer remover formulations containing solvents other than methylene chloride were investigated. Materials evaluated were those submitted by manufacturers, and commonly available solvents and chemicals. A number of solvents were evaluated for their ability to remove paint and lacquer coatings from metal. Materials for use as surface active agents, activating agents, thickeners, and evaporation retardants were evaluated. Supplement to PB 97658. Project no. 7312. AF TR 5713, Suppl. 1.

Development of fire-retardant coatings for fabric covered aircraft, by S. G. Weissberg, G. M. Kline and H. L. Hansberry. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1948. 24p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122304

1. Coatings, Fire resistant 2. Airplanes - Coatings, Protective 3. CAA TDR 86.

Effect of ceramic coatings on the creep rate of metallic single crystal and polycrystalline specimens, by J. R. Cuthill and W. N. Harrison. U. S. National Bureau of Standards. Apr 1956. 53p photos, drawings, graphs, tables. Order from OTS. $1.50. PB 121493

The NBS No. N-143 ceramic coating was found to improve very significantly the creep characteristics of 80Ni-20Cr alloys at 1975F, and to almost completely inhibit the formation of voids, which occurred in uncoated specimens of these alloys. The N-143 ceramic coating is a barium-silicate coating containing cerium oxide to impart increased refractoriness. At 1800F and 1900F the coating imparted little or no improvement to the creep behavior of these alloys at normal strain rates. A detrimental effect was observed at very high-strain rates. The diffusion rate at 1400F of hydrogen through high-purity nickel coated with NBS No. A-418 ceramic coating was found to be less than 5 percent of the diffusion rate through the uncoated nickel, although the ceramic coating applied to the nickel was only about 1/40 as thick as the nickel specimen. However, in tests made at 1400F and 3650 psi, there was no significant difference between the creep behavior in hydrogen of uncoated high-purity nickel and high-purity nickel which had been coated with NBS A-418 ceramic coating. Project 7350, Task 70634. Summarizes work from 15 Jun 1952 through 30 Sep 1955. AF WADC TR 56-85. Contract AF 33(616)-52-19.

Effect of ceramic coatings on the oxidation and the impact strength of variously heat treated titanium specimens, by W. J. Plankenhorn, Basil Ohnysty and Dwight G. Bennett. Illinois. University, Dept. of Ceramic Engineering, Urbana, Ill. Feb 1953. 24p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 122868

The application of refractory ceramic coatings to commercially pure titanium (Ti-75A) was shown to offer definite advantages. The coating furnished protection against oxidation at temperatures up to and including 1700°F. The degree of protection was determined by the weight increase measured for uncoated and coated specimens variously heat treated. The effect of varied heat treatments on the metallographic structure of the metal was studied. Heating for short periods of time at 1550°F. and at 1675°F. resulted in an increase in impact strength for the base metal. Increasing the time of heating at these temperatures or heating at higher temperatures produced embrittlement. Ceramic coatings tended to reduce the rate at which embrittlement progressed. AD 12019. AF WADC TR 53-84. Contract AF 33-(616)-320.

Evaluation of six experimental anti-fouling coatings, submitted by Goodyear Tire and Ribber Co., by Allen L. Alexander. U. S. Naval Research Laboratory. Dec 1941. 29p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 120510

1. Paints, Anti-fouling - Tests 2. NRL P 1820.

Naval camouflage - tests at sea of May and June 1938, by E. O. Hulburt and Charles Bittinger. U. S. Naval Research Laboratory. Dec 1938. 31p photos, drawings. Order from LC. Mi $3, ph $6.30. PB 123276

1. Paints, Camouflage - Tests 2. Camouflage - Detection 3. NRL H 1496.

Normal outdoor exposure testing of several type organic protective coatings on several metal substrata, by B. G. Brand, E. R. Meuller and E. E. McSweeney. Battelle Memorial Institute, Columbus, Ohio. Apr 1949. 30p graphs, fold table. Order from LC. Mi $2.70, ph $4.80. PB 122858

In the production of weathered films for use in interface studies by modern instruments, accelerated test methods were used. Since there appears to be considerable doubt recorded in the technical literature regarding the validity of accelerated testing methods, a study of the correlation of accelerated and normal exposure results was undertaken, with the aim of authenticating the results obtained in the study of interface conditions. The first Topical Report in this series, dated February 1, 1949, outlined the technical literature on both types of weathering. The second Topical Report, (PB 105567), dated January 7, 1949, presented the results obtained while weathering the panels for interface studies by accelerated methods. This third report presents the results obtained in normal outdoor exposures in Ohio and Florida, and an attempt at correlation of the two test methods. AD 91632. Supplements PB 105567. Contract N5 ori-111, T. O. IV, Report no. 3.

Ship camouflage-reduction of visibility of periscope feather with dye, by E. O. Hulburt. U. S. Naval Research Laboratory. Nov 1935. 22p photos. Order from LC. Mi $2.70, ph $4.80. PB 120469

Unclassified 12 May 1955.
1. Dyes, Camouflage 2. Ships - Camouflage 3. Camouflage - Detection 4. Camouflage - Optical aspects 5. NRL H 1219.

Study of aromatic fuel resistant tank lining compound. Second report, by S. B. Crecelius. U. S. Naval Research Laboratory. Apr 1943. 22p photo, tables. Order from LC. Mi $2.70, ph $4.80. PB 120622

For first report see NRL P 1895 (PB 120515).
1. Coatings, Protective - Corrosion resistance 2. Coatings, Resin - Tests 3. Liners, Corrosion resistant 4. Tanks, Fuel - Liners 5. NRL P 2053.

Study of organic coatings for the camouflage of fleet aircraft, by Allen L. Alexander. U. S. Naval Research Laboratory. May 1941. 58p photos, tables. Order from LC. Mi $3.60, ph $9.30. PB 120687

Color in Appendix F (Color standards) will not reproduce.
1. Paints, Camouflage - Tests 2. Paints, Camouflage - Specifications 3. Airplanes - Camouflage 4. NRL P 1740.

Substitutes for toluidine red pigment, by Peter King. U. S. Naval Research Laboratory. May 1943. 17p tables. Order from LC. Mi $2.40, ph $3.30. PB 120548

1. Pigments, Toluidine red - Substitutes 2. NRL P 2063.

Summary of a literature and patent search on synthetic drying oils, by James S. Strong. U. S. Naval Research Laboratory. May 1943. 32p. Order from LC. Mi $3, ph $6.30. PB 120543

1. Oils, Synthetic - Production 2. Drying oils, Synthetic - Production 3. Drying oils, Synthetic - Patents 4. NRL P 2070.

Test on shatterbond coating, submitted by Wilbur and Williams Co., Boston, Mass., by F. M. Holcomb, Jr. and P. J. Loatman. U. S. Naval Research Laboratory. Jul 1943. 28p photos. Order from LC. Mi $2.70, ph $4.80. PB 120520

1. Coatings, Shatter preventive - Tests 2. NRL B 2105.

Transparent electrically conducting coatings for the reduction of precipitation static in aircraft, by L. Harold Bullis. U. S. Air Force. Air Research

and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1955. 27p. Order from LC. Mi $2.70, ph $4.80. PB 122864

The Wright Air Development Center program for the development of transparent electrically conducting coatings for the reduction of precipitation static in military aircraft is summarized and evaluated. Work carried out by the Air Force contractors and other organizations is reviewed and discussed. Although a coating meeting all of the desired requirements for aircraft application has not been developed, some coatings, such as the Lockheed ATC-1 showed considerable promise. This coating was flight tested and was able to resist the forces of rain erosion for a considerable period of time without undergoing much change. However, additional flight tests have shown that the degree of static elimination which can be expected by the use of conductive coatings on windshields and canopies is small and does not provide a worthwhile operational improvement. In view of this fact, work on this program has been discontinued. Project 4346, Task no. 73699. AF WADC TR 54-452. AD 66444.

Inorganic Chemicals

Additive V centers in potassium iodide and potassium bromide, by Bland Bryan Houston, Jr. Illinois. University. Dept. of Physics, Urbana, Ill. Aug 1955. 100p diagrs, graphs. Order from LC. Mi $5.40, ph $15.30. PB 122961

1. Crystals, Potassium bromide - Photoconductivity
2. Crystals, Potassium iodide - Photoconductivity
3. Contract N6-ONR-07129, NR-017-412 Technical report no. 19.

Evaluation of halogenated hydrocarbon and alkali-earth-metal-salt fire extinguishing agents for low temperatures, by R. J. Zablodil. U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Nov 1955. 41p photos, drawing, graphs, tables. Order from OTS. $1.25. PB 121036

Four vaporizing halogenated hydrocarbon, and five water-base alkali-earth-metal-salt, extinguishing agents were tested. Halon agents were found impractical despite superior extinguishment abilities because of toxicity and density of their pyrolyzed vapors. Fire extinguishing abilities of plain water were enhanced by adding alkali-earth-metal salts. Solutions containing lithium chloride are superior in extinguishment abilities to other earth-metal-salt solutions tested. Project NY 030-019-1. NCEREL M 108.

Liquid density, vapor pressure and critical temperature and pressure of nitrogen trifluoride, by Roger L. Jarry and Henry C. Miller. Pennsylvania Salt Manufacturing Co. Research and Development Dept. Whitemarsh Research Laboratories, Wyndmoor, Pa. Jun 1956. 15p diagr, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122957

As part of a program at this laboratory on the physical properties of fluorine compounds, various properties of nitrogen trifluoride have been measured. The temperature range over which the liquid density had been previously measured has been considerably extended by this study. Vapor pressures were checked against the data of Pierce and Pace, and extended to the critical point. The high vapor pressure and the critical constants have not appeared in the literature heretofore. AF OSR TN 56-32. AD 5430. Contract AF 18(600)-761.

Lithium chloride solution for fire extinguishers exposed to low temperatures, by A. W. Bertschy, H. E. Moran, and R. L. Tuve. U. S. Naval Research Laboratory. Oct 1956. 11p diagrs, graphs, tables. Order from OTS. 50 cents. PB 111913

The use of a 24 percent aqueous solution of lithium chloride for fire extinguishing purposes in low-temperature areas has been investigated. Tests indicate that it can be effectively applied at temperatures down to -54°C (-65°F). Laboratory corrosion tests conducted on a group of common metal test strips indicated that stainless steel is the least affected by the lithium chloride solution when inhibited with sodium chromate. The solid and liquid forms of lithium chloride do not introduce any acute toxicological problems. NRL R 4853.

Oxygen sources: Chemical compounds as a source of oxygen for aviation. Fourth partial report, by R. R. Miller and F. S. Thomas. U. S. Naval Research Laboratory. May 1940. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120504

1. Oxygen - Sources 2. NRL P 1612.

Polarization effects in thin films of lead sulfide, by Robert S. Witte. U. S. Naval Ordnance Test Station, China Lake, Calif. Aug 1955. 27p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122610

When commercially produced layers of photosensitive lead sulfide are subjected to a continuous d.c. bias, they will become polarized. Optical and potential probing experiments show the existence of a rectifying barrier near the negative electrode of a polarized cell. The behavior of the sensitivity and noise level of these layers during the longitudinal polarization process is described. It is also shown that electric fields normal to the surface of the layers give rise to gross changes in the resistance of the layers. This latter effect is termed the transverse field effect. A qualitative explanation of these effects, based on a process of ionic diffusion, is presented and is shown to be in good agreement

with the experimental data. AD 71599. Unclassified 27 Sep 1955. NAVORD 4894. NOTS 1192.

Response time studies in lead telluride photoconductive cells, by Frances L. Lummis and Wayne W. Scanlon. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1954. 36p photos, drawing, diagr, graphs, table. Order from LC. Mi $3, ph $6.30. PB 120945

Transient and frequency methods are used to study the response of lead telluride photoconductive cells to infrared radiation. Both methods are used to study the dependence on the wave length and intensity of the radiation, and the voltage across the cell. The experiment indicated that both monomolecular and bimolecular decay mechanisms are present. Dependence on wave length intensity and bias is evident. The data are fitted by an empirical equation which combines two exponential and one hyperbolic time processes. A simple model satisfying the general features of the data is described. NAVORD 1899.

Solubility and the products of reaction between iron and water at 26°C and 300°C, by V. J. Linnenbom, J. I. Hoover and H. S. Dreyer. U. S. Naval Research Laboratory. Sep 1956. 15p diagrs, tables. Order from OTS. 50 cents. PB 121409

The iron content of saturated solutions resulting from the iron-water reaction in the absence of oxygen was obtained at 300°C using a readioactive tracer technique and at 26°C by spectrophotometric analysis. In both methods it was found necessary to filter the solution to remove undissolved solids. In addition, in the 300°C experiments, reproducibility of results was obtained only when (a) the sample of saturated solution was separated from undissolved solid at the temperature and pressure of the experiment, and (b) the sampling process did not disturb the equilibrium between solid and saturated solution by changes in temperature or pressure during sampling. NRL R 4824.

Analytical Chemistry

Determination of stibine in submarine storage battery cases, by Edward J. Peebles. U. S. Naval Research Laboratory. Jul 1942. 16p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120516

1. Stibine - Determination - Methods 2. NRL P 1903.

Miscellaneous Chemicals

Development of a non-corrosive soft solder flux, by A. J. Clear. U. S. Picatinny Arsenal, Dover, N. J. Mar 1945. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 122089

It has been reported that an excessive number of ammunition containers soldered with the use of non-acid flux, Specification No. 83-12A, have undergone serious corrosion during storage. Since it is known that this flux is highly corrosive, it was considered advisable to develop a non-corrosive flux for use in the assembly and packing of ammunition. Flux No. II is considered an active all-purpose flux being suitable for all of the metals with which the non-acid flux is now used. Although Flux No. II is markedly less corrosive to metals than the non-acid flux (Spec. 83-12A), flux No. I is even less corrosive. Since Flux No. I is such a mild flux, it is suitable for only tin-plate and copper. Both fluxes Nos. I and II are easily applied and removed and are as efficient as the non-acid flux when used with the metals for which they are designated. First and final report. PA TR 1502.

Marking devices for the rescue of personnel forced down at sea. 1. Metallic powders. 2. Dyes, by R. L. Tuve, W. A. Zisman and D. L. Pickett. U.S. Naval Research Laboratory. Nov 1941. 20p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 122672

This report covers (1) the investigation of metallic powders for use as sea markers; and (2) a progress report of experiments with dyes for the same purpose. Laboratory tests are described permitting a rapid comparison of the various makes and colors of such powders. It is shown that many commercial bronze powders are very satisfactory substitutes for aluminum powders. Of the numerous dyes tested to date, several fluorescent ones have been found to produce good sea markers. It is found that the use of polaroid glasses is of considerable value in locating sea markers, especially during conditions of strong sunlight. NRL P-1804.

Solubility of water in hydrocarbons and gasolines, by Jerome I. Burtle. U. S. Naval Research Laboratory. Nov 1939. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123256

Date of test, Jun - Sep 1939.
1. Water - Solubility 2. NRL P 1573.

ELECTRICAL MACHINERY

Communication Equipment

Certain aspects of coherence, modulation and selectivity in information transmission systems, by Stanford Goldman. Syracuse University Research Institute. Electrical Engineering Dept., Syracuse, N. Y. Nov 1955. 41p diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123439

A general analysis is given of certain features of signals and how information can be extracted from

them in the presence of noise. The report deals particularly with the coherence properties of signals and the processes of selectivity that can be used to extract the signal from the noise. It is found that there are two general types of selectivity, which are specified as types I and II, respectively. Type I selectivity operates by getting direct addition of the coherent signal components, while noise combines only as the square root of the sum of the squares. On the other hand, type II selectivity depends on the use of a modulating method which will transform the signal into a characteristic waveshape with more or less elaborate detail with the aid of which the signal can be distinguished from and separated from the noise. S.U.R.I. Report no. EE 312-5511P. AF CRC TN 56-181. Contract AF 19(604)-1179.

Data transmitter-receiver system for AFMTC Patrick Air Force Base, Florida. Quarterly progress report for period ending 15 Mar 1956, by M. H. Sander. Electronic Engineering Company of California, Los Angeles, Calif. Mar 1956. 9p drawings, table. Order from LC. Mi $1.80, ph $1.80. PB 122381

1. Data - Transmission equipment 2. Data - Receiver equipment 3. Receivers, Electronic - Design 4. Transmitters, Electronic - Design 5. Contract AF 08(606)-925 6. AF MTC TN 56-25.

Single - sidebands in communication systems, a bibliography compiled by Mildred Benton. U. S. Naval Research Laboratory. Sep 1956. 105p. Order from OTS. $2.75. PB 111837

This bibliography represents an attempt to record the classified and unclassified literature on the subject, including periodical articles, books and research reports. The period covered is 1921-July 1956. Some articles, with emphasis on high-frequency crystal units and crystal lattice filters, are cited, due to the fact that development in single-sideband tuning has depended on advances in the quartz crystal manufacturing art. Part II covers classified items and is not available for general distribution. NRL B 9, Part I.

Test of head telephone receivers, type 49016; head bands, type 49028; diaphragms, type 49033; telephone cord and plug, type C-49064, by Maury I. Hull. U. S. Naval Research Laboratory. Aug 1943. 12p graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120619

1. Telephones - Receivers - Components - Tests 2. Telephones - Cords - Tests 3. Telephones - Diaphragms - Tests 4. Telephones - Headsets - Tests 5. NRL R 2049.

Tests for information telegraph equipment CEE 17641 captured German equipment, by W. E. Chadwick. U. S. Naval Research Laboratory. Apr 1946. 32p photos, fold diagr. Order from LC. Mi $3, ph $6.30. PB 120721

1. CEE 17641 (Telegraph equipment) 2. Communication systems - Models - Tests - Germany 3. NRL B 2795.

Electronics

A-J video filters for the radar Mark 12 receiver, by L. Riebman. U. S. Naval Research Laboratory. May 1945. 26p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122645

Appendix I by L. Riebman and M. P. Gaffney.
1. Mark 12 (Radar) 2. Filters, Radio frequency - Design 3. Radar - Receivers (A/J) 4. NRL R 2535.

AN/ARW-17 receiver, by C. H. Smith, Jr., M. W. Rosen, C. H. Hoeppner. U. S. Naval Research Laboratory. Dec 1941. 44p photos, drawings, diagrs (part fold), graphs. Order from LC. Mi $3.30, ph $7.80. PB 123268

Unclassified 15 Dec 1953.
1. AN/ARW-17 (Radio receiver) 2. Radio receivers, Remote control - Parts 3. Missiles, Guided - Components 4. NRL R 2421.

Analysis and operational characteristics of Japanese airborne radar equipment captured at Saipan. Problem No. A-127. OR-C(A), by P. F. O'Neill, George S. Kan and Carl M. Russell. U. S. Naval Research Laboratory. Feb 1945. 69p photos, drawings, diagrs (part fold), graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 123265

Unclassified 15 Dec 1953.
1. CEE 5989 (Radar transmitter) 2. Radar, Airborne - Transmitters - Japan 3. Radar equipment - Operation - Japan 4. NRL R 2442.

Analysis of radar model SP receiver and indicator equipment, by H. J. Peake and H. H. Judson. U.S. Naval Research Laboratory. Jan 1946. 29p. Order from LC. Mi $2.70, ph $4.80. PB 123366

1. Radar, Search - Receivers 2. Radar, Search - Indicators 3. SP (Radar equipment) 4. NRL R 2714.

Antenna pattern measurements on USS Dade (APA-99), by Martin Katzin. U. S. Naval Research Laboratory. Jun 1945. 52p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122651

1. Antennas, Shipborne - Radiation patterns - Measurement 2. NRL R 2553.

Antenna pattern measurements on USS Mendocino (APA-100), by Martin Katzin. U. S. Naval Research Laboratory. May 1945. 54p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122646

1. Antennas, Shipborne - Radiation patterns 2. NRL R-2542.

Antenna studies for radio astronomy. Scientific report no. 2 covering the period 15 Sep-15 Dec 1955 under Contract no. AF 19(604)-1503, by James W. Warwick and Palmer W. Carlin. Colorado. University. Research Service Laboratories, Boulder, Colo. Mar 1956. 19p drawings, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122374

The search for compact, high-gain, broad-band antennas continues through the report period. Tests of 90 and 120 degree corner reflectors, possessing sides 3/4 wavelengths long, show that these wider antennas have more favorable E-plane patterns than the 60 degree reflector studied during the first report period under this contract. The improvements lie in a better front-to-back ratio and somewhat reduced minor lobes. Forward gain, however, did not change appreciably from the value of seven decibels, already measured for a 60 degree corner. The final project involved construction of a matching stub network, and determination of a provisional H-plane pattern for the two-element array. AF CRC TN 56-360.

Antennas for ionospheric "forward scatter" propagation. Final report, Part II under Contract AF 19(604)-1531. Ohio State University. Dept. of Electrical Engineering. Antenna Laboratory, Columbus, Ohio. Dec 1955. 7p. Order from LC. Mi $1.80, ph $1.80. PB 122371

Final report, 648-2. Supplement to Final report 648-1 (PB 120221).
1. Antennas - Design 2. Waves, Electromagnetic - Scattering - Ionosphere 3. Waves, Electromagnetic - Propagation - Ionosphere 4. Contract AF 19(604)-1531, Final report, Part 2 5. AF CRC TR 56-153.

Bismanol focusing magnets for traveling wave tubes, by William M. Hubbard. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1955. 9p drawing, graphs, table. Order from LC. Mi $1.80, ph $1.80. PB 120986

1. Magnets, Permanent - Materials 2. Tubes, Traveling wave - Focusing 3. Bismanol (Trade name) 4. Electron beams - Focusing 5. NAVORD 3918.

Calibration of towed fish transducer Mark II, by P. C. Rand and S. F. Ferebee. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1954. 13p diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 120845

1. Transducers, Electromechanical - Radiation patterns 2. Transducers, Electromechanical - Calibration 3. NAVORD 3648.

Characteristic impedance of strip transmission lines with parallel thin inner conductors, by Robert L. Pease. Tufts University. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Jun 1955. 22p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122369

The following expressions are derived for a strip transmission line with parallel thin inner conductors: (1) an exact lower and an approximate upper bound to the characteristic impedance (the upper bound valid in the low-impedance range), and an approximate estimate based upon these bounds; (2) a universal formula, exact for zero inner conductor width, for computing characteristic impedance approximately but explicitly for any geometry; (3) an approximate expression (valid in the low-impedance range) for the difference in inner-conductor width between a line of the above type and a line with rectangular inner conductor of the same inner-conductor thickness, the same plate separation, and the same characteristic impedance. Interim report no. 9 under Contract AF 19(604)-575. For Reports no. 7-8 see PB 122377-122378. AF CRC TN 55-568.

Criteria for docile behavior of feedback amplifiers, by Samuel J. Mason. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Jun 1954. 10p diagrs, table. Order from LC. Mi $1.80, ph $1.80. PB 122849

A docile amplifier is one that remains stable when connected to an arbitrary passive network of a specified type. Docility criteria are developed for end-loading, for ideal-transformer feedback, and for an arbitrary passive feedback network. MIT RLE TR 258.

Comparison of noise AM jamming with "Dina" noise jamming, by Oliver D. Sledge. U. S. Naval Research Laboratory. Feb 1945. 18p diagr, graph. Order from LC. Mi $2.40, ph $3.30. PB 123364

1. Radar - Jamming equipment - Tests 2. NRL R 2470.

Delay line oscillators, by William S. Carley. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 13p drawings, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120896

A delay line oscillator is described the frequency of which is controlled by varying the termination resistance of a delay line. The frequency of oscillation is linear within $\pm 1\%$ over a 22.8% bandwidth with output voltage variations of ± 0.75 db at a center frequency of 212 kc. Similar performance should be attainable up to at least 20 mc. NAVORD 3809.

Design of feedback systems, by Edward J. Angelo, Jr. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jan 1956. 25p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 123159

The purpose of this study is to examine the relationship between system configuration and system performance with the objective of establishing practical guides to aid in choosing the configuration to be used. AD 86305. PIB 379. PIB R 449-55. AF OSR TN 56-146. Contract AF 18(600)-1505.

Development of a high power wide band noise modulator, by Rosario S. Badessa and Bernard W. Graham. U. S. Naval Research Laboratory. May 1945. 10p diagr, graph. Order from LC. Mi $1.80, ph $1.80. PB 123263

1. Radar - Jamming - Research 2. Noise - Modulation 3. Radar - Modulation 4. Radar - Noise - Effects 5. NRL R 2460.

Development of a portable radar simulator, by Tirey K. Vickers. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. Sep 1956. 12p photos, diagrs. Order from OTS. 50 cents. PB 111847

This report describes the development of a portable training device for the basic training of air traffic controllers in radar-vectoring and aircraft-spacing procedures. Initial results indicate that such a device will speed up radar-training operations, provide more thorough training, and result in sizable economies in the over-all program. CAA TDR 289.

Development of an improved impedance measuring box, by Henry I. Metz. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1940. 14p photos, diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123559

Reprinted 1941.
1. Impedance - Measurements - Equipment 2. CAA TDR 25.

Development of electronic receiving switches for the 225 to 390 megacycle frequency range, by M. Heusinkveld. U. S. Naval Research Laboratory. Jan 1946. 27p photos, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 123365

1. Antennas - Radiation patterns - Mathematical analysis 2. Switches, Electronic - Design 3. Switches, Antenna - Design 4. NRL R 2715.

Development of techniques for the utilization of VHF radio in light aircraft, by F. Gehres, E. C. Gregory and James O. Martin. Electronics Research, Inc., Evansville, Ind. Jun 1950. 87p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 123568

The aircraft installation problems, which occur in new aircraft and in transition from low frequency to VHF radio apparatus in aircraft now flying, are the major consideration of this report. The VHF aircraft radio flight standards used for the purposes of evaluating this report establish a gauge which may be used by the pilot and by technical personnel. After the final implementation of the omnirange ground station program, aircraft VHF installations complying with these minimum flight standards will be capable of receiving continuous navigation and communication signals for all geographic positions of aircraft flying above 1,000 feet. CAA TDR 116.

Development of the Mark 12 A-J receiver, by T. H. Chambers. U. S. Naval Research Laboratory. Nov 1945. 40p diagrs (part fold), graphs. Order from LC. Mi $3, ph $6.30. PB 120714

Unclassified 20 Nov 1945.
1. Radar - Receivers (A-J) 2. Mark 12 (Radar receiver) 3. NRL R 2507.

Dielectric spectroscopy of ferromagnetic semiconductors, by A. von Hippel, W. B. Westphal and P. A. Miles. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Jul 1955. 119p photo, drawings, diagrs, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 123028

A broad-band dielectric spectroscopy of the ferrites is attempted. The objective of such a research is defined, the language of dielectric spectroscopy is formulated and the experimental techniques for d.c. to the ultraviolet are described. Sections 3-11 discuss the physics of the situation, outlining the existing information on the frequency dependence of ferromagnetic response, and reformulating in our language the gyroscopic effects in magnetization phenomena, the behavior of domain walls, and the possible resonance and relaxation-type responses that may be expected in polarization and magnetization processes. The criteria for distinguishing between these responses are considered. Measurements in the optical and infrared ranges show the contributions to the low-frequency dielectric constant of the electronic and atomic polarizabilities, the latter showing sensitivity to cation distribution in ferrites. Conductivity measurements at microwave frequencies indicate a loss mechanism differing from the normal semiconducting behavior observed at lower frequencies. Boundary-layer effects predominate in the kilocycle range. The magnetization, in contrast, varies with frequency only in the electrical range. Two main dispersion regions can be distinguished and the uncertainty of their interpretation as domain-wall or spin-orientation processes is partly resolved by evidence from the nickel-zinc ferrite system and from temperature and time effects. MIT LIR TR 97. Contract N5 ori-07801. Contract AF 33(616)-2191.

Effectiveness of the AN/APQ-2 ("RUG" jamming transmitter using modification kit MX527/APQ-2 for frequency modulation), by K. M. Watson. U.S. Naval Research Laboratory. May 1946.

13p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120725

1. Radar - Jamming equipment - Tests 2. AN/APQ-2 (Radar transmitter) 3. MX527/APQ-2 (Frequency multiplier) 4. Multipliers, Frequency - Tests 5. NRL R 2839.

Effects on a Doppler waveform of transmission through a filter network, by Robert C. Ender. U.S. Naval Ordnance Laboratory, White Oak, Md. Sep 1955. 42p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120825

Using methods of Fourier analysis this paper presents a study of how a voltage waveform of a special type is affected when it is transmitted through a low pass filter having idealized characteristics. The voltage waveform arises as a result of the Doppler effect in an electromagnetic system in which there is relative motion between the transmitting and receiving antennas. The mathematical equation of the waveform is stated as the definition of a Doppler function. In an actual system the Doppler waveform must be passed through a low pass filter for noise-limiting purposes, however, in so doing undesirable distortion in the waveform may result. NAVORD 4098.

Effects on shipboard HF DF, radar and homing performance of installing of their antennas on a common mast, by A. G. Loveberg. U. S. Naval Research Laboratory. Dec 1943. 14p drawings, graphs. Order from LC. Mi $2.40, ph $3.30. PB 123270

Unclassified 15 Dec 1953.
1. Antennas, Radar - Mounts 2. Antennas - Location on ships 3. Antennas - Supports - Installation 4. Antennas, Direction finding 5. NRL R 2099.

Electronic device for use in studying the response time of a magnetic amplifier, by Cleo V. Thrower. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 16p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120838

1. Amplifiers, Magnetic - Testing equipment 2. NAVORD 2573.

Equipment and techniques for sector-type radio direction finder bearing data computing, recording, and reduction, by Albert D. Bailey. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Radio Direction Finding Section, Urbana, Ill. Aug 1955. 57p diagrs (part fold), graphs. Order from LC. Mi $3.60, ph $9.30. PB 122982

A sector-type radio direction finder bearing computer-recorder, a bearing integrator, related equipments, and techniques are described. The computer samples the intermediate frequency outputs of a twin-channel RDF system at a 25 cps rate, calculates the indicated bearing for each sample via a logarithmic analog, and (sample for sample) delivers at the output a stretched pulse the amplitude of which is proportional to the bearing deviation from a preset reference zero. The effective linear azimuthal range of the computer is limited to a $\pm 15^{\circ}$ sector centered on reference zero. However, a bearing shifter is incorporated which, within limits, effectively shifts the apparent azimuth of the arriving signal into the linear range of the computer. Immediate statistical reduction of the sampled-bearing data is available by means of an electronic bearing integrator of the long time constant RC type. A root-mean-square bearing deviation computer may be used for obtaining an estimate of the standard deviation, and a "least-squares" technique may be used in finding the best estimate of the mean when the equipment is used as an operational direction finder device. ILU EES TR 22. Contract N6 ori-71, Task XV, ONR Proj. 076-161.

Exact quantum theory solution for the damped harmonic oscillator, by J. Weber. Maryland. University. College of Engineering. Glenn L. Martin Institute of Technology, College Park, Md. Aug 1955. 3p. Order from LC. Mi $1.80, ph $1.80. PB 123101

1. Oscillators, Harmonic - Theory 2. Quantum theory 3. Contract Nonr-879(00).

Examination and test of RCA Victor Company model CXC frequency direction finder (Serial No. 2), by S. A. Greenleaf. U. S. Naval Research Laboratory. Oct 1933. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122729

1. CXC (Direction finder) 2. Radio direction finders - Tests 3. Radio direction finders (HF) 4. NRL R 1001.

Experimental methods for measuring electrode overvoltages, by Roberto Piontelli and Ugo Bertocci. Politecnico di Milano. Laboratorio di Elettrochimica, Chimica Fisica e Metallurgica, Milan, Italy. Jun 1955. 43p diagrs. Order from LC. Mi $3.30, ph $7.80. PB 122406

Some general remarks on the measurements of electrode overvoltages are developed. Theory of systematic errors involved by usual devices is discussed. New types of tensiometric devices eliminating these errors are described. The supply conditions and the main methods for measuring and recording overvoltages are briefly discussed. Technical note no. 1. AD-82508. AF OSR TN 56-112. Contract AF 61(514)-733-C.

Gamma irradiation of germanium and silicon transistors, by Ralph J. Panos. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1956. 110p graphs, tables. Order from OTS. $2.75. PB 121490

Two-hundred transistors were exposed to a gamma source, Co^{60}, for various periods of time varying from 25 hours to approximately 200 hours. These units were electrically tested before radiation and at the following intervals after radiation: zero hours, 25 hours, 50 hours, and 100 hours. One-hundred units were germanium and the other one-hundred were silicon transistors. More data and tests must be made in order to conclude which type of transistor, silicon or germanium, is less susceptible to radiation. Also neutron radiation, which has not been covered by this report, must be taken into account in the final analysis. Project no. 4156. Supersedes WADC TN 55-639. AF WADC TN 56-115.

Geographical separation of radio range stations operating on the same or adjacent frequencies in the 200-400 kilocycle band, by A. E. Harrison. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jan 1938. 8p graphs, tables. Order from LC. Mi $1.80, ph $1.80. PB 122287

Reprinted 1940.
1. Radio ranges - Location 2. Radio communication - Equipment - Location 3. CAA TDR 4.

German ground radar equipment transmitter T-106 (Freya) C. E. E. 3443 captured on Ventotene Island Gaeta Gulf, Italy, by C. A. Debel and L. V. Blake. U. S. Naval Research Laboratory. Sep 1944. 32p photos, drawings, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 120705

Unclassified 15 Dec 1953.
1. T-106 (Radar transmitter) 2. Radar - Transmitters - Tests - Germany 3. NRL R 2361.

Helical coupling system, by Allan J. Lichtenberg. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Oct 1954. 29p drawings, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122976

A theory of power coupling between concentric, contra-wound sheath helices has been presented by Kompfner and further amplified by Wade. In Section I of this report a modification of this theory is presented in the light of experimental results, in order to give a more accurate picture of the conditions for complete power transfer from one helix to the other. In Section II the problem of matching a helix to a coaxial line is investigated. A procedure is developed by which the impedance of a helix within a shield may be matched to a coaxial line. With these data and the material developed in Section I, a complete coupling, capable of use on a traveling-wave tube or backward-wave oscillator, is designed and tested. Based on a thesis submitted to MIT in 1954. MIT RLE TR 290.

High resolution cathode ray tubes applicable for traffic control, approach and landing systems, by William G. Stryker. U. S. Air Force. Air Research and Development Command. Wright Air Development Center, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1956. 15p graphs. Order from LC. Mi $2.40, ph $3.30. PB 122471

To give results of experimental tests using the General Electric Z4300, Z4303, Z4309 and Z4335 cathode ray tubes in comparison to the present CRT used in Radar Set AN/CPN-18. This improved indicator program is designed to provide techniques and equipment which will increase the radar information content appearing on the CRT scope. The military application of high information content radar PPI is two fold; the ability to more accurately predict the appearance of a selected target on the radar scope and the ability to recognize a selected target appearing on the scope. AF WADC TN 55-628.

High stability mixer. Preliminary report, by E. F. McClain. U. S. Naval Research Laboratory. Feb 1945. 8p photos. Order from LC. Mi $1.80, ph $1.80. PB 123262

1. Mixers, High stability - Operation 2. Mixers, High stability - Performance 3. NRL R 2459.

Improved antenna for model YL(XBC) radio beacon equipment, by Oscar Norgorden. U. S. Naval Research Laboratory. Mar 1944. 44p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120742

1. Antennas, Radio (Airborne) - Design 2. Radio beacons - Equipment 3. YL(XBC) (Radio beacon equipment) 4. NRL R 2253.

Instruction book for radar equipment Mark 32 Mod. 1. Wilcox Electric Co., Kansas City, Mo. Aug 1945. 134p photos, drawing, diagrs (9 fold), tables. Order from LC. Mi $6.90, ph $21.30. PB 122613

OP 1784.
1. Radar - Operation 2. Mark 32 Mod 1 (Radar) 3. NAV SHIPS 350 4. Contract Nord 6134.

Instruction book for radiac set AN/PDR-4. Victoreen Instrument Co., Cleveland, Ohio. Apr 1948. 43p photo, drawings, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122907

1. AN/PDR-4 (Radiac set) 2. Meters, Radiation - Operation 3. Meters, Radiation - Maintenance and repair 4. Gamma rays - Detection 5. Gamma rays - Measurements 6. NAVSHIPS 91018.

Intercept ranges against the SD radar, by T. H. Chambers. U. S. Naval Research Laboratory. Mar 1944. 5p. Order from LC. Mi $1.80, ph $1.80. PB 120741

1. Radar - Receivers - Japan 2. NRL R 2252.

Investigation of irregular keying of radar to reduce interception, by T. H. Chambers. U. S. Naval Research Laboratory. Dec 1944. 41p photos, diagrs (part fold), graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123274

Unclassified 15 Dec 1953.
1. Radar - Interception 2. Radar - Signals - Detection 3. Radar - Keyers - Specifications 4. NRL R 2418.

Investigation of model MJ aircraft radio receiver. Preliminary report, by H. F. Hastings and J. J. MacGregor. U. S. Naval Research Laboratory. Dec 1934. 47p photos, drawings, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120499

1. MJ (Radio receiver) 2. Radio receivers - Tests 3. NRL A 1103.

Keying characteristics of station NSS, by John M. Miller, Jr. U. S. Naval Research Laboratory. Apr 1941. 18p tables. Order from LC. Mi $2.40, ph $3.30. PB 123269

Plates are omitted. Unclassified 15 Dec 1953.
1. Oscillograms - Analysis 2. Radio - Signals - Detection 3. Radio - Signals - Distortion 4. NRL R 1714.

Laboratory tests of Japanese Mark 4 Model 3 radar transmitter and power supply units, by L. L. Bonham and E. M. Lonsdale. U. S. Naval Research Laboratory. May 1945. 23p photos, fold drawing, tables. Order from LC. Mi $2.70, ph $4.80. PB 122648

1. Radar transmitters - Tests - Japan 2. Mark 4 Model 3 (Radar) 3. NRL R 2545.

Losses in radio transmission lines at high frequencies, by J. D. Wallace. U. S. Naval Research Laboratory. Apr 1938. 38p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123248

Date of test, 10 Jan-28 Feb 1938.
1. Radio transmission lines - Losses 2. NRL R 1437.

Mark 33 radar system, by M. G. Pawley. U. S. Naval Research Laboratory. Jul 1945. 17p photos, drawing, diagrs (part fold), tables. Order from LC. Mi $2.40, ph $3.30. PB 123264

1. Mark 33 (Radar system) 2. Radar equipment - Design 3. NRL R 2428.

Method of measuring flux-current loops of magnetic materials under pulse excitation, by O. J. Van Sant, Jr. and E. D. Burnside. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1953. 17p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122059

1. Magnetic materials - Electrical properties
2. Magnetic materials - Magnetic properties
3. NAVORD 2970.

Microwave tandem slit diffraction, by L. R. Alldredge. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1955. 111p photos, diagrs, graphs. Order from LC. Mi $6, ph $18.30. PB 122055

The diffraction of a plane electromagnetic wave by two identical slits in tandem is investigated both theoretically and experimentally for normal incidence with the polarization parallel to the edges of the slits. The slits are assumed to be infinitely long thus reducing the problem to one in only two dimensions. As an aid to an understanding of the tandem slit case the single slit is first considered; for this case, simple theoretical expressions are obtained for the transmission coefficient and the scattering cross section coefficient. The stationary forms of these same quantities are next derived in terms of the electric field in the slit. Research also reported as thesis, University of Maryland. NAVORD 3773.

Model II radar performance evaluation: Radar beacon-sharing, by A. E. Hoffmann-Heyden. U.S. Air Force. Air Research and Development Command. Missile Test Center, Patrick Air Force Base, Fla. Jan 1956. 50p diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 122383

In the course of the Model II radar performance evaluation, procedures for beacon-sharing were developed and operationally tested. The method is based on time sequential beacon interrogation programmed by suitably tuning the radars' 82-kc master oscillators, and permits a single beacon to be tracked by several unsynchronized radars without mutual interference. The report describes the underlying principles of the beacon-sharing techniques and indicates their advantages in comparison with the previously used schemes of radar operations at AFMTC. Theoretical considerations, techniques and procedures of controlled beacon-sharing are discussed and results from recent tests reported. Quality control technical note no. 17-A. AF MTC TN 56-2.

Modification and test of the model CXFR jamming transmitter, by W. F. Main, Jr. and L. V. Blake. U. S. Naval Research Laboratory. May 1944. 26p photos, graphs (1 fold). Order from LC. Mi $2.70, ph $4.80. PB 123271

Unclassified 15 Dec 1953.
1. CXFR (Radar equipment) 2. Radar - Jamming equipment - Tests 3. NRL R 2291.

Modification of intermediate-frequency amplifier design in receiver unit of radar transponder beacon AN/CPN-6 to minimize unintended inter-

rogations caused by "Echo stretching", by D. O. Collup, L. E. Clements and J. K. Steckel. U. S. Naval Research Laboratory. Dec 1945. 19p diagrs (1 fold), graphs. Order from LC. Mi $2.40, ph $3.30. PB 123367

1. AN/CPN-6 (Transponder beacon) 2. Radar - Beacons, Transponder - Design 3. Amplifiers - Distortion - Reduction 4. NRL R 2713.

Modification of radar Mark 8 precision sweep and change of bearing lines. Final report, by A. C. Grosvenor. U. S. Naval Research Laboratory. Feb 1945. 17p photos. Order from LC. Mi $2.40, ph $3.30. PB 123259

1. Indicators, Bearing 2. Mark 8 (Radar) 3. NRL R 2461.

Modified M6807 antenna for 2200-3800 megacycle frequency range, by Henry K. Weidemann and Myron Heusinkveld. U. S. Naval Research Laboratory. May 1946. 14p photos, drawing, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120723

1. Antennas, Radar - Design 2. M6807 (Antenna) 3. NRL R 2827.

Models DBB and DXGA direction finding equipments, by P. A. Guarino. U. S. Naval Research Laboratory. Jul 1944. 31p photos, tables. Order from LC. Mi $3, ph $6.30. PB 120748

1. DBB (Direction finder) 2. CXGA (Direction finder) 3. Radio direction finders - Tests 4. NRL R 2327.

National allocation plan for assigning radio-range frequencies in the band 119-126 megacycles, by L. H. Simson. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1941. 8p fold map, tables. Order from LC. Mi $1.80, ph $1.80. PB 123560

1. Radio range stations (UHF) - Frequency allocations 2. CAA TDR 28.

Notes on the calculation of capacity of intermediate frequency antennas, by Carl W. Christenson and Oscar Norgorden. U. S. Naval Research Laboratory. Dec 1940. 32p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123382

1. Antennas - Capacity 2. Antennas - Resistance 3. NRL R 1671.

Notes on the general design of Model XBZ(YN) radio transmitting equipment, by William A. White and Oscar Norgorden. U. S. Naval Research Laboratory. Nov 1943. 17p photos, diagrs. Order from LC. Mi $2.40, ph $3.30.

1. Radio transmitters - Design 2. XBZ(YN) (Radio transmitter) 3. NRL R 2196.

On the statistical design of demodulation systems for signals in additive noise, by John B. Thomas. Stanford University. Electronics Research Laboratory, Stanford, Calif. Aug 1955. 148p diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 122988

The problem investigated is the statistical design of demodulation systems to recover message signals corrupted by additive noise. The ideal demodulation system is one which, for a given input message and noise waveform, presents all possible message waveforms and the probability of occurrence of each. Practically, it is usually desirable to present only a single message. Selection of the message with the highest posterior probability corresponds to use of the method of maximum likelihood estimation. Systems designed on such a basis are discussed in this report and are called optimum systems. It is assumed that the amplitudes of both message and noise have gaussian probability distributions. The optimum system is obtained by maximizing the posterior probability density function of the message and is specified by two integral equations. These equations contain as known functions the autocorrelation functions of message and of noise and the functional form of the modulated wave. Solutions of these equations result in receivers which are optimum on a maximum likelihood basis. For the assumed gaussian statistics, this is equivalent to optimum on a minimum mean-square-error basis. Several properties of the optimum filter are discussed for later use and some examples of specific filter designs are given. SU ERL TR 88. Contract N6 onr 251(07), NR 373 360.

Performance tests and modifications of the model TDY radar jamming transmitter, by K. M. Watson, Carl J. Zaander and L. V. Blake. U. S. Naval Research Laboratory. Dec 1944. 89p photos, drawing, graphs. Order from LC. Mi $4.80, ph $13.80. PB 123267

Unclassified 15 Dec 1953.
1. TDY (Radio transmitter) 2. Radio transmitters - Tests 3. Radar - Jamming equipment - Tests 4. NRL R 2423.

Performance tests of Model TDY-1 radar jamming transmitter, by W. F. Main. U. S. Naval Research Laboratory. Jul 1946. 54p photos, graphs. Order from LC. Mi $3.60, ph $9.30. PB 120726

1. Radar - Jamming equipment - Tests 2. TDY-1 (Radar jamming transmitter) 3. NRL R 2878.

Photoelectric conductivity in semi-conductors, by J. N. Humphrey. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1951. 19p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120946

The equations relating the photocurrent to field strength, intensity of illumination, quantum efficiency, and electron and hole mobilities and concentrations in semi-conductor crystals, are derived for the case when both holes and electrons are present. It is shown that in contrast to the case of induced conductivity in insulators, the measurement of time constant and of deviation from Ohm's Law does not yield sufficient information to determine either hole or electron mobility. NAVORD 2149.

Preliminary investigation of the effects of wave polarization and site determination with the portable ultra-high-frequency visual radio range, by J. M. Lee and C. H. Jackson. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Feb 1940. 35p photos, map, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122279

Originally published in Feb 1940 as Report no. 9, Technical Development Division, Civil Aeronautics Authority. Reprinted 1941.
1. Radio waves - Polarization - Measurements 2. Radio range (UHF) - Radiation patterns 3. Radio range (UHF) - Location 4. CAA TDR 24.

Principles and concepts of reliability for electronic equipment and systems, by William Frederick Luebbert. Stanford University. Electronics Research Laboratory, Stanford, Calif. Contract N6 onr 251(07) NR 073 360. Order separate parts described below from LC, giving PB number of each part ordered.

Part I: Introduction to electronic reliability. Aug 1955. 68p diagrs, graphs, tables. Mi $3.90, ph $10.80. PB 122985

This report provides the introduction to the series and keynotes the general viewpoint to be adopted. It consists of three main sections: (1) the systems approach to reliability, (2) discussion of the meaning of "reliability" and of various figures-of-merit which measure reliability, and (3) reliability vs time relationships. SU ERL TR 90.

Part II: Simple models for failure of complex equipment. Aug 1955. 68p diagrs, graphs, tables. Mi $3.90, ph $10.80. PB 122986

This report deals with simple models for the failure of complex systems. Basically, two types of systems are considered: (1) cascade systems, i.e., systems where the failure of any essential element of the system causes failure of the system; and (2) parallel-redundant systems, i.e., systems where there is duplication of essential elements, so that the system remains successful as long as any of the elements remain successful. Most practical equipment systems can be broken down into combinations of these basic types. The models considered assume either complete success or complete failure of function, and hence are drastic simplifications of reality; yet, when applied realistically, with due attention to their limitations and capabilities, they are quite useful. SU ERL TR 91.

Printed microwave systems, by Martin Schetzen. Massachusetts Institute of Technology. Research Laboratory of Electronics, Cambridge, Mass. Sep 1954. 41p photos, diagrs, graphs, table. Order from LC. Mi $3.30, ph $7.80. PB 122851

The results of a theoretical and experimental investigation of the free modes that propagate on the strip transmission line are reported. A Fourier integral solution is obtained for the free modes. In the course of the discussion, it is proved that the only free modes that may exist on any n-conductor system of arbitrary but constant cross section in homogeneous and simple connected space are TEM modes. Previously known methods for the determination of the guide wavelength and attenuation required that the standing waves of the strip transmission line be known. It was found that these could not be measured directly. Since precedent measuring methods were found to be inadequate, a new simple method for measuring the attenuation of any transmission line through a junction is presented. Thesis - Massachusetts Institute of Technology. MIT RLE TR 289.

Progress report no. 36 covering the period Apr 1-Jul 1, 1955 under Contract no. N5ori-76, T. O. 1 and 28. Harvard University. Cruft Laboratory, Cambridge, Mass. Jul 1955. 43p diagr, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122968

For 14th, 28th - 29th reports see PB 105255, 113575, 114379. Contents: I. Electromagnetic radiation, microwave circuits and random processes. - II. Electron and solid state physics. - III. Wave propagation. Contract N 5ori - 76, T. O. 1 and 28. Contract AF 19(604)-786. Contract AF 19(604)-1084.

Pulse-voltage studies on the conductivity of electrolytes and semiconductors, by F. R. Kotter. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Jul 1955. 47p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 123027

Equipment has been developed for the study of conductivities and of deviations from Ohm's law in highly conducting systems. A differential pulse transformer bridge for Wien-effect measurement similar to that of Gledhill and Patterson has been built, capable of about an order of magnitude higher precision (ca. 0.001%); it was used in conjunction with an improved electrolytic cell. Preliminary measurements at field strengths up to 10^5 v/cm, with 3-μsec. rectangular-voltage pulses on aqueous $MgSO_4$ solutions (0.0002 to 0.004M), show departures from ohmic behavior about 50 percent larger

than predicted by the Onsager-Wilson theory. Contrary to the predictions of the Onsager theory for weak electrolytes, preliminary measurements on acetic acid (0.0006 to 0.3N) show a dependence on concentration. Polarization effects have thus far prevented full exploitation of the high precision of which this equipment is capable. More convenient for Wien-effect measurements, when accuracies not higher than ca. 0.2 percent are required, is an "amplitude discriminator equipment," which also uses rectangular-voltage pulses a few microseconds in length and has provision for viewing oscillographically the top portion of the current pulse for the study of heating and polarization effects. MIT LIR TR 98.

Radiation characteristics of vertical antennas with slanting top sections at intermediate frequencies, by Oscar Norgorden. U. S. Naval Research Laboratory. Aug 1940. 41p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123290

1. Antennas, Vertical - Radiation patterns 2. NRL R 1638.

Radio communication and scatter propagation, by J. D. Mitchell, Jr. Stanford University. Radio Propagation Laboratory, Stanford, Calif. Aug 1955. 54p photos, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 122987

The report discusses the communication capabilities of ground-scattered propagation. It is shown that radio communication may be practical using frequencies several megacycles higher than the conventional great-circle-path maximum usable frequency (MUF). To make use of ground-scattering it will be necessary that transmitting and receiving antennas be directed towards distant scattering areas on the earth's surface which can be commonly illuminated rather than along the great-circle-path between stations. A number of experiments which demonstrate the characteristics of ground scattered propagation are discussed. The scatter-path MUF is calculated and compared with the conventional great-circle-path MUF for a number of different transmission path lengths and orientations. Possible limitations of ground-scatter communications are outlined and recommendations are made for further study of this propagation mode. SU ERL TR 87. Contract N6 onr 251(07), (NR 373 360).

Radiowave propagation, by Ia. L. Al'pert, V. L. Ginzburg and E. L. Feinberg. Translated by Morris D. Friedman from a Russian publication issued in 1953, under Contract AF 19(604)-1476. Order separate parts described below from LC, giving PB number of each part ordered.

Part one: Theory of radiowave propagation along the earth's surface (ground wave). Chapter V: Field over a perfectly reflecting surface. 1953. 31p. Mi $3, ph $6.30. PB 123432

Technical translation no. 12 of pp. 105-125.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-786.

Part one: Theory of radiowave propagation along the earth's surface (ground wave). Chapter VIII: Various methods of treating the problems of radiowave propagation for a plane, homogeneous earth. 1953. 20p. Mi $2.40, ph $3.30. PB 123433

Technical translation no. 13 of pp. 171-183.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-787.

Part one: Theory of radiowave propagation along the earth's surface (ground wave). Chapter IX: Field over an inhomogeneous plane earth. 1953. 49p graphs. Mi $3.30, ph $7.80. PB 123434

Technical translation no. 14 of pp. 184-216.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-788.

Part one: Theory of radiowave propagation along the earth's surface (ground wave). Chapter X: Theory of radiowave propagation over the earth taking its sphericity into account. 1953. 95p diagrs. Mi $5.40, ph $15.30. PB 123435

Technical translation no. 15 of pp. 217-277.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-789.

Part two: Theory of radio wave propagation in the ionosphere. Chapter III: Wave propagation in inhomogeneous isotropic media. 1953. 55p diagrs, graphs. Mi $3.60, ph $9.30. PB 123430

Technical translation no. 10 of pp. 364-400.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-784.

Part two: Theory of radiowave propagation in the ionosphere. Chapter IV: Radio wave reflection from ionospheric layers. 1953. 55p diagrs, graphs. Mi $3.60, ph $9.30. PB 123431

Technical translation no. 11 of pp. 401-439.
1. Radio waves - Propagation - Theory - Russia
2. Radio waves - Propagation - Ionosphere - Russia 3. AF CRC TN 55-785.

Part three: Ionosphere configuration. Experimental data on the ionosphere. Chapter V. Nonregular phenomena in the ionosphere. 1953. 16p graphs. Mi $2.40, ph $3.30. PB 123436

Technical translation no. 16 of pp. 670-682.
1. Radio waves - Propagation - Theory - Russia
2. Radio waves - Propagation - Ionosphere - Russia 3. AF CRC TN 55-790.

Part four: Experimental investigations of radiowave propagation and their comparison with various computational methods. Chapter VI: Radiowave velocity. 1953. 18p graphs,

table. Mi $2.40, ph $3.30. PB 123437

Technical translation no. 17 of pp. 836-850. AF CRC TN 55-791.

Part four: Experimental investigations of radiowave propagation and their comparison with various computational methods. Chapter VII: Methods of experimentally investigating radiowave propagation. 1953. 29p photos, diagrs, graphs. Mi $2.70, ph $4.80. PB 123438

Technical translation no. 18 of pp. 851-871.
1. Radio waves - Propagation - Theory - Russia
2. AF CRC TN 55-792.

Reconditioning of captured Japanese equipment - type 92, Mark 3 low frequency transmitter modification 1 (CEE-5149), by R. R. Zirm. U. S. Naval Research Laboratory. Apr 1945. 15p photos, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 123260

1. Radio transmitters - Japan 2. CEE 5149 (Transmitter) 3. NRL R 2452.

Report on radio assault beacon, by C. B. Okonski. U. S. Naval Research Laboratory. Sep 1944. 24p drawings, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120704

Unclassified 15 Dec 1953.
1. Radio - Signals - Modulation - Theory 2. Antennas, Directive - Radiation 3. NRL R 2366.

Retarding-field oscillator in the frequency range 15,000 to 75,000 megacycles, by E. Milton Boone. Ohio State University Research Foundation, Columbus, Ohio. Dec 1955. 75p drawings, diagrs, graphs, tables. Order from OTS. $2. PB 121251

The results of a theoretical analysis of the retarding-field oscillator and a comparison of this tube with the reflex klystron are provided. The method of power coupling is investigated and measurements to determine an equivalent circuit for the retarding-field oscillator provide a practical means of predicting oscillator characteristics. Structural development and design studies of the 1- to 2-cm retarding-field oscillator led to a low voltage, fixed frequency version of the single cavity tube designed to meet a need of the Naval Ordnance Laboratory, which is capable of producing 40 to 50 milliwatts of power, operating at 400 volts, at a wavelength somewhat less than 1 cm. Theoretical analysis and experimental results with the mixed-field tube indicate a considerable improvement over the purely reflex or purely retarding-field (as herein defined) oscillators. Analysis shows also that the retarding-field oscillator, as already developed, should serve as a highly sensitive velocity-sorting indicator. A considerable effort is reported on progress in measurements, in fabrication techniques and in electron gun modifications leading to improvements in the retarding-field oscillator at millimeter wavelengths. Task no. 41686. Covers research from Oct 1953 to Oct 1955 under Contract AF 33(616)-2225. AF WADC TR 55-481.

Safe handling and storage regulations for 395-A gas triodes manufactured by Chatham Electric Company, by J. J. Hirschfield, D. T. O'Connor and D. Polansky. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1951. 21p photos, diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120940

1. Vacuum tubes, Triode - Handling 2. Vacuum tubes, Triode - Storage 3. NAVORD 1839.

Search radar and IFF antennas with search receivers, by J. W. Fraumann, J. R. Shoemaker, R. E. Davis and P. A. Guarino. U. S. Naval Research Laboratory. Dec 1944. 77p drawing, graphs, table. Order from LC. Mi $4.50, ph $12.30. PB 123275

1. Antennas, Shipborne - Tests 2. Antennas, Radar - Tests 3. Radar, IFF - Tests 4. NRL R 2424.

Self-compensated multilayer distributed constant delay lines, by William S. Carley. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 49p photos, diagrs, graphs, tables (1 fold). Order from LC. Mi $3.30, ph $7.80. PB 122052

The inductance of a line is known to decrease with frequency. The stray capacitance between turns is actually in parallel with the inductance of a turn. This forms a parallel circuit which can help offset the variation of inductance with frequency. In the multilayer case the stray capacitance is increased many times. From these principles, design equations are developed for the multilayer line. NAVORD 3759.

Status report on microwave triodes, by Martin E. Levin. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1955. 17p. Order from LC. Mi $2.40, ph $3.30. PB 122473

Project no. 4156. Covers work from Sep 1953 to Sep 1955.
1. Tubes, Electron - Specifications 2. Vacuum tubes, Triode 3. AF WADC TN 55-651.

Study of radiation patterns of the CW66 AAH antenna (Model FD radar equipment), by R. J. Adams. U. S. Naval Research Laboratory. Nov 1943. 49p photos, diagr, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120737

1. Antennas, Radar - Radiation patterns 2. FD (Radar) 3. CW66 AAH (Antenna) 4. NRL R 2201.

Study of shipboard antenna-trunk systems, by Oscar Norgorden. U. S. Naval Research Laboratory. Mar 1940. 49p diagrs (2 fold), graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122809

1. Antennas, Shipborne - Design 2. NRL R 1603.

Study of the effects of static electricity on low input energy electric initiators of the carbon bridge type, by J. N. Ayres. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1954. 45p photos, drawings, diagrs. Order from LC. Mi $3.30, ph $7.80. PB 120865

1. Electricity, Static - Effects 2. Electro-explosive devices - Handling 3. Explosions - Prevention 4. NAVORD 3670.

Symbolic coding of information on cathode ray tubes and similar displays, by Paul F. Muller, Jr., Raymond C. Sidorsky, Alec J. Slivinske, Earl A. Alluisi and Paul M. Fitts. Ohio State University. Dept. of Psychology, Laboratory of Aviation Psychology and Dept. of Electrical Engineering, Columbus, Ohio. Oct 1955. 134p photo, diagrs, graphs, tables. Order from OTS. $3.50. PB 121468

This report summarizes the results of a series of eleven studies of the feasibility of several different types of symbols for the coding of information on cathode ray tubes (CRT) and similar displays for use in future air traffic control and related systems. The report is divided into two sections. Section I contains specifications and recommendations for engineering applications to CRT-type displays. Section II contains the detailed results of the laboratory investigations, on which the recommendations of Section I are based. Project no. 7192. AF WADC TR 55-375. Contract AF 33(616)-43.

TEA system test, by J. J. Godbey and N. R. Best. U. S. Naval Research Laboratory. Aug 1945. 59p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 123379

1. TEA (Jamming equipment) 2. Missiles, Guided - Jamming equipment 3. NRL R 2643.

Test of effectiveness of shielding of models RAA-1, RAB, and RAG radio receivers against strong local fields from transmitters, by John H. Gough. U. S. Naval Research Laboratory. Jun 1940. 25p diagr, graphs, tables (1 fold). Order from LC. Mi $2.70, ph $4.80. PB 120398

1. RAA-1 (Radio receiver) 2. RAB (Radio receiver) 3. RAG (Radio receiver) 4. Radio receivers - Tests 5. NRL R 1626.

Test of submarine loop antenna cable, by R. B. Owens. U. S. Naval Research Laboratory. Apr 1935. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 122803

1. Cables, Submarine - Tests 2. NRL R 1151.

Test of TBA-1a transmitter including comparative tests of T.B.A. transmitter, by O. C. Dresser. U. S. Naval Research Laboratory. Oct 1933. 132p photos, fold graphs, tables. Order from LC. Mi $5.90, ph $21.30. PB 122728

1. TBA-1a (Transmitter) 2. Radio transmitters - Tests 3. NRL R 1002.

Test of underwater reception of low frequency radio signals, by F. C. Isely. U. S. Naval Research Laboratory. Apr 1941. 50p drawings, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120421

1. Radio - Signals - Intensity measurements 2. Submarines - Communications - Tests 3. Low frequencies - Research 4. NRL R 1717.

Test on AN connectors, by S. Riccobone. U. S. Naval Research Laboratory. Apr 1941. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123306

1. Connectors, Electric - Tests 2. NRL R 1718.

Test on experimental unit projection plan position indicator repeater, model VG-2, serial No. X2, type CG-55AFL, by C. C. Mezger and E. N. Munzer. U. S. Naval Research Laboratory. Jun 1945. 25p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122647

1. VG-2 (Position indicator) 2. Indicators, Position - Tests 3. NRL R 2547.

Test on model TC 67 (T-105) aircraft radio transmitting equipment, by J. J. MacGregor. U. S. Naval Research Laboratory. Mar 1940. 30p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122808

1. T-105 (Radio transmitter) 2. Radio transmitters - Tests 3. NRL R 1597.

Test procedure for short-life rating of composition resistors, by D. B. J. Bridges, J. H. Graham and W. T. Sackett, Jr. Battelle Memorial Institute, Columbus, Ohio. Jul 1953. 95p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 122120

A short-life-rating procedure is given for composition resistors operated abnormally. Conditions of

abnormal operation considered are high ambient temperature, altitude, load, humidity, and vibration. Details of equipment, methods of measurement and mounting of samples are described. The rating procedure utilizes sequential sampling, preconditioning of resistors, and statistical treatment of the data. Theoretical and experimental considerations leading to the procedure are given. The applicability of the rating procedure to other electronic components is indicated. AD 18756. AF WADC TR 53-349. Contract AF 33(038)-1229.

Test of captured German Wanze G-2 panoramic receiver and circular-dipole antenna, by G. J. Perlow, L. E. Shoemaker and D. Wilson. U. S. Naval Research Laboratory. Oct 1944. 47p photos, diagrs (1 part fold), graphs. Order from LC. Mi $3.30, ph $7.80. PB 120751

1. G-2 (Receiver) 2. Antennas, Circular-dipole - Tests 3. Radar - Receivers - Tests 4. NRL R 2390.

Tests of model AVR-6, aircraft receiver equipment, by G. C. Schleter. U. S. Naval Research Laboratory. Jul 1935. 90p graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 122662

1. Radio receivers, Airborne - Tests 2. AVR-6 (Aircraft receiver) 3. NRL R-1180.

Tests of model DK direction finder receiver to determine signal-noise characteristics and make recommendations as to any corrective action required on model DK receivers in the service, by S. A. Greenleaf. U. S. Naval Research Laboratory. Aug 1937. 11p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123277

1. DK (Direction finder) 2. Radio direction finders - Tests 3. NRL R 1386.

Tests of model GM radio transmitting equipment, by G. C. Schleter. U. S. Naval Research Laboratory. Dec 1934. 74p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 120500

1. Oscillographs, Cathode ray - Tests 2. Radio transmitters - Tests 3. NRL A 1104.

Tests of model "GO" patrol plane transmitting equipment, by M. H. Schrenk. U. S. Naval Research Laboratory. May 1934. 29p photos, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120482

1. GO (Transmitter) 2. Radio transmitters - Tests 3. NRL A 1065.

Tests of model TDY radar-jamming transmitter Z-666 magnetron and CAKZ-66AJT antenna, by K. M. Watson and L. V. Blake. U. S. Naval Research Laboratory. Feb 1945. 17p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 123261

1. TDY (Transmitter, Radar-jamming) 2. Z-666 (Magnetron) 3. CAKZ-66AJT (Antenna) 4. Radar - Jamming equipment - Tests 5. NRL R 2455.

Tests of the first manufactured fan marker, by W. E. Jackson, P. D. McKeel and H. I. Metz. U.S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jul 1938. 21p photos, map, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 123556

1. Reprinted 1941. Formerly Report no. 17, Safety and Planning Division, Bureau of Air Commerce. 1. Radio beacons - Transmitter equipment - Design 2. Radio beacons - Transmitter equipment - Tests 3. CAA TDR 15.

Tests of type NES-2 radio homing device, by M. H. Schrenk. U. S. Naval Research Laboratory. Oct 1934. 15p photos. Order from LC. Mi $2.40, ph $3.30. PB 120480

1. NES-2 (Radio homing device) 2. Radio - Homing devices 3. NRL A 1077.

Theory of absorption spectra of molecular crystals, by A. S. Davydov. Translated by M. Kasha. Feb 1949. 17p drawing, table. Order from LC. Mi $2.40, ph $3.30. PB 123648

A general theory is given for the energy states of electrons in molecular crystals. The theory developed is applied to the interpretation of several peculiarities in the absorption spectra of monoclinic crystals of the type of naphthalene and anthracene. It is shown that in crystals of this type there occurs a displacement and splitting of non-degenerate energy levels into two components, having different polarization. AD 209273. Translated from J. Exptl. Theoret. Phys. (U.S.S.R.), 18, 210(1948) under Contract N6ori-211, T. O. 3.

Theory of switching. Bell Laboratories' report no. 12 covering the period 1 Mar - 1 Jul 1955. Harvard University. Computation Laboratory. Jul 1955. 147p photos, diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 122952

For reports no. 1-8, 10-11, 14-15 see PB 122812-122821, 122115-122116. Contents: 1. Etched lattice matrix, by Robert C. Minnick. - 2. Core groups in magnetic storage systems, by Robert C. Minnick. - 3. Automatic fabrication of magnetic matrices, by Robert C. Minnick. - 4. Switching applications of the nonlinear resistance of silicon carbide, by Albert Hopkins. - 5. Summaries of Czechoslovak papers. - 6. Synthesis of relay net-

works, by Antonin Svoboda translated by Robert Ashenhurst and Zdenek David: Synthesis of relay networks, by Antonin Svoboda translated by Zdenek David and Robert Ashenhurst. HU BL 12.

Tropospheric variations of refractive index at microwave frequencies, by Charles F. Campen and Allen E. Cole. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Programs and Requirements Branch, Bedford, Mass. Oct 1955. 86p graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 122366

The effect of gross variations in tropospheric refractive index on the accuracy of radio guidance systems for high altitude vehicles is discussed. Refractive index profiles prepared from radiosonde observations taken for three summer and three winter days at stations in different geographical locations in North America and representing various types of air masses are compared with a Standard Index of Refraction curve derived from the ICAO Standard Atmosphere. Sample calculations of refraction errors were made which show us of the index data for correction of these errors. AF GRD SG 79. AF CRC TN 55-226.

Two-channel low frequency recording system, by C. E. Kelly and A. Z. Robinson. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1953. 15p photos, drawings, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120783

1. Recorders, Frequency - Design 2. NAVORD 2820.

Type installation of RDO receiver search antennas, by David Williams and P. A. Guarino. U. S. Naval Research Laboratory. Dec 1944. 33p photos, graphs, table. Order from LC. Mi $3, ph $6.30. PB 123273

Unclassified 15 Dec 1953.
1. RDO (Antenna) 2. Antennas, Radar - Interception 3. Receivers, Search 4. Antennas, Receiving - Theory 5. Antennas, Stub - Radiation patterns 6. NRL R 2415.

Type test AN/APS-19. Interim report, by M. L. Burnett and I. W. Fuller. U. S. Naval Research Laboratory. Oct 1946. 17p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 122642

1. AN/APS-19 (Radar) 2. Radar, Airborne - Tests 3. NRL R-2997.

Type test model YE-1 homing beacon equipment, serial 53, by C. B. Okonski and H. R. Johannessen. U. S. Naval Research Laboratory. Feb 1945. 156p graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 123266

Unclassified 15 Dec 1953.
1. YE-1 (Radio beacon) 2. Radio beacons - Transmitter equipment 3. NRL R 2425.

Van der Pol relaxation oscillator as a sensitive trigger circuit, by J. F. Peoples. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1952. 19p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120843

1. Circuits, Trigger - Design 2. NAVORD 2664.

Variable frequency pulsed transmitter for antenna calibration, by T. E. Hanley. U. S. Naval Research Laboratory. Aug 1945. 15p photos, diagr. Order from LC. Mi $2.40, ph $3.30. PB 122790

1. Radio transmitters (VF) 2. Targets - Radio control 3. NRL R 2614.

Generators, Motors, Transmission

Application of a magnetic amplifier to a 60 cycle indicating servo system, by P. W. Barnhart, E. T. Hooper, C. W. Lufcy and A. E. Schmid. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1951. 14p diagrs, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120944

1. Amplifiers, Magnetic - Design 2. Amplifiers, Magnetic - Uses 3. Servomechanisms - Components 4. NAVORD 1892.

Circuit for generating very short pulses with a large harmonic content for use in the XCU-1, by L. D. Hindall. U. S. Naval Research Laboratory. Jun 1945. 16p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122643

1. XCU-1 (Communications equipment) 2. Generators, Pulse - Design 3. NRL R-2525.

Comparison of the bridge and differential half-wave magnetic amplifier circuits, by Gerald A. McMorrow. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1955. 25p photos, drawings, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120890

1. Circuits, Bridge 2. Circuits, Differentiating 3. Amplifiers, Magnetic - Circuits 4. Amplifiers, Magnetic - Gain measurements 5. NAVORD 3855.

Development of a switch and method for A.V.C. measurements, by F. C. Isely and W. C. Whitmer. U. S. Naval Research Laboratory. Dec 1941. 14p photos, drawing, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120509

1. Generators, Signal - Operation 2. Switches, Electronic - Operation 3. NRL R 1819.

Industrial preparedness study for silicon power rectifiers. Quarterly progress report for the period Jul 1-Oct 1, 1955 under Contract no. DA-36-039-sc-46638, by D. Bakalar, H. G. Rudenberg, R. Hall and L. Huff. Transitron Electronic Corp., Melrose, Mass. Oct 1955. 49p photos, drawing, diagrs, graphs. Order from OTS. $1.25. PB 121274

Significant improvements in the electrical characteristics of silicon power rectifiers have been made during this quarter. The yield of rectifiers having high peak inverse voltage ratings has been increased, and the average forward voltage drop is lower than in previous report periods. Increased control of the crystal-growing process and refinement of the junction forming process have improved rectifier production to the extent that over 70 per cent of the units made draw in excess of 500 milliamperes at 2.5 volts, and approximately 50 per cent draw over 1,000 milliamperes at 2.5 volts. For earlier reports see PB 117641-117642.

Magnetic amplifiers in fire-control computers, by Edward T. Hooper. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1955. 16p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120823

The general requirements of magnetic amplifiers for use in fire-control computers are presented. The feasibility of meeting these requirements with the present state of the magnetic amplifier art is demonstrated. Vacuum-tube and transistor preamplifiers are utilized to provide input impedances of at least one megohm. Future computer applications of "operational amplifiers" in addition to servo amplifiers are discussed. NAVORD 4034.

Noble metal film variable resistors. Final report for the period Nov 1, 1951-Sep 15, 1953 under Contract no. DA 36-039-sc-5568, by Lawrence B. Krauss and Irving G. Patterson. Fairchild Camera and Instrument Corp., Hicksville, Long Island, N. Y. Sep 1953. 126p photos, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 123209

Research on the properties of various noble and base metal and alloy films deposited on plate or vycor glass by means of organosols, evaporated or sputtered films. The object was to produce hard films of both high and low controlled resistances with good thermal stability to 225°C, good adhesion to the glass, and resistant to wear by a contact wiper. Dept. of the Army project no. 3-26-00-600. Signal Corp project no. 32-2006-31. Report no. 103E-5.

Preliminary report on the minimization of drift in magnetic control amplifiers, by E. T. Hooper, H. H. Woodson, J. J. Suozzi and C. V. Thrower. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1954. 38p drawings, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 120996

All magnetic control amplifiers exhibit null drift under temperature, supply voltage, and frequency variations. Many applications specify such a low level of drift that special techniques are demanded in the design and construction of the amplifier. Tests, specifications, and procedures for the practical manufacture of drift insensitive magnetic control amplifiers are given. Conservative estimates of the yields on components are made. NAVORD 3595.

Radio interference studies of aircraft generators, by Ernest S. Van Valkenburg, and E. A. White. U. S. Naval Research Laboratory. Apr 1946. 75p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 123368

1. Generators, Aircraft - Radio interference - Elimination 2. NRL E 2807.

Research and development of nitrides of chromium and chromium alloys for new film-type resistance elements, by Earl R. Olson, Edwin H. Layer, Leonard H. Mauk, Joseph O. Morgan and Charles S. Peet. Battelle Memorial Institute, Columbus, Ohio. Mar 1956. 60p photos, diagrs, graphs, tables. Order from OTS. $1.50. PB 121388

Detailed information of this report does not constitute approval by the Air Force of the findings or the conclusions contained therein. It is published only for the exchange and stimulation of ideas. Although the properties of certain chromium-nitride resistors were satisfactory, suitable reproducibility of the desired electrical characteristics, such as low temperature coefficient, was not attained. Task no. 41623. AF WADC TR 56-87, Contract AF 33-(038)-8744.

Servo amplifier for the 25 watt and 50 watt low inertia Diehl servo motor, by H. M. Ikerd. U. S. Naval Research Laboratory. Jul 1946. 10p photo, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 123328

1. Motors, Servo - Components 2. Amplifiers, Servo - Design 3. NRL R 2912.

Study of the inductance and loss properties of transformer core materials in the megacycle range. Remington Rand Univac, Philadelphia, Pa. Oct 1955. 38p diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123440

Radio-frequency bridge measurements were made on 58 assorted ferrite cores and on 10 metallic-tape cores at frequencies between 1 and 30 mc. The object of the study was to obtain qualitative data concerning magnetic cores suitable for use in high-frequency pulse transformers. Values of the magnetic permeability(μ) and the quality factor (Q) were calculated for the ferrite cores and are compared graphically at various frequencies for the different core materials. Results of tests made on 25 cores to determine the variation in properties among

nominally identical cores are presented. In addition, cup cores and toroidal cores of the same material are compared for eight different types of ferrites. Finally, the magnetic materials are broadly classified with respect to permeability and the ferrite cup cores are classified with respect to their specific-inductance values. Scientific report for the period 19 Apr-31 Oct 1955 under Contract AF 19-(604)-1376. AF CRC TN 56-183.

Study of thermistor materials for use as temperature-sensing elements in the high-velocity exhaust gases of jet-type engines, by Harriet R. Wisely, Paul D. Freeze and Ernest F. Fieck. U. S. National Bureau of Standards. Nov 1954. 93p photos, diagrs, graphs, tables. Order from LC. Mi $5.40, ph $15.30. PB 122463

The report describes the development and evaluation of thermally sensitive resistors (thermistors) of semi-conducting materials designed for possible application in the exhaust gases of turbojet engines throughout the approximate range 1000° to 2000°F. Of the wide variety of materials tested at Rutgers, vitrified alkali porcelains appear to best meet the minimum requirements as to resistance, sensitivity, and stability in oxidizing and reducing atmospheres. Project no. 3073-30245. Contents: Part I. Development of the thermistors, by Harriet R. Wisely. - Part II. Performance of the thermistors, by Paul D. Freeze and Ernest F. Fieck. AD 53656. AF WADC TR 54-388. Contract DO 33(616)-53-1. Contract AF 33(616)-241.

Study of voltage-regulating systems for aircraft alternating-current generators. Part 2. Quasi-linearization techniques for transient study of non-linear feedback-control systems, by Kan Chen. Massachusetts Institute of Technology. Servomechanisms Laboratory, Cambridge, Mass. Aug 1954. 244p diagrs, graphs. Order from LC. Mi $11.10, ph $37.50. PB 122472

In Part I (PB 120268), dynamic representations of the components of aircraft a-c generator-regulator systems are derived. An integrated system composed of these components is studied both analytically and on an analog computer. New methods are developed in this part to cope analytically with the basic non-linearities of the aircraft generator-regulator system. As a result of this analytical and computer study, specifications are written for the components of the system. Performance specifications are written using frequency response transfer functions. Steady-state and power specifications are defined and quantitative values are tentatively suggested. AD 66618. For Part I see PB 120268. Thesis - Massachusetts Institute of Technology. AF WADC TR 54-298, Part 2. Contract AF 33(616)-2190.

Variable pulse-width generator, by Loren E. Bollinger. Ohio State University. Dept. of Aeronautical Engineering, Columbus, Ohio. Nov 1954. 22p photos, drawings, diagrs. Order from OTS. 75 cents. PB 111923

A generator was developed to supply, at low frequencies, uniform time signals of variable predetermined pulse widths. Rotation of a slotted disk at a uniform angular velocity between a photocell and light source was the primary pulse former. A thyratron tube together with associated circuitry provided sufficient power to actuate solenoid pens in recorders and various other time interval indicators. The generator described in the report was used to provide time marks on recorded data during rocket experiments; however, the basic equipment can be used in other experiments and tests requiring similar indications of time. AD 51660. Project no. 3058, Final report. AF WADC TR 54-503. Contract AF 33(616)-2078.

Versatile magnetic control amplifier, by Albert D. Krall. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1954. 12p graphs. Order from LC. Mi $2.40, ph $3.30. PB 122053

The application of compensation techniques to half-wave magnetic amplifiers has produced servo controllers of exceptional performance. A display prepared to demonstrate this performance is discussed and the technical reports covering its operation are noted. NAVORD 3766.

Miscellaneous

Alkaline storage batteries, the self-discharge of the positively charged nickel oxide electrode, by A. L. Pitman and G. W. Work. U. S. Naval Research Laboratory. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I: The role of water in the process. Oct 1956. 7p graph, tables. 50 cents. PB 121430

Alakline nickel oxide-iron storage batteries have been charged and put on open circuit. Since the rate of oxygen evolution on open circuit is proportional to the square root of the thermodynamic activity of water in the electrolyte, the oxygen deposited on the nickel sesquioxide requires interaction with water for its evolution. NRL R 4844.

Part II: Potential as a function of time on open circuit and as a function of the active oxygen on the nickel oxide plates. Oct 1956. 17p graphs, table. 50 cents. PB 121483

The potential on decay changes linearly with the quantity of oxygen on the electrode. Adsorption of oxygen on, and desorption from, the Ni_2O_3 is hypothesized. NRL R 4845.

Open circuit and light load characteristics of mercury batteries, by F. W. Christensen and H. R. Irons. U. S. Naval Ordnance Laboratory, White

Oak, Md. Jun 1954. 38p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122048

1. Electrolytic cells, Mercury - Aging 2. NAVORD 3741.

Physical test method for determining the degree of impregnation of asbestos rovings in FP and HF type electric cables, by M. A. Elliott. U. S. Naval Research Laboratory. Mar 1942. 12p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120553

1. Fillers, Asbestos - Tests 2. Cables, Electric - Tests 3. NRL P 1853.

Preliminary investigation of the silver oxide-zinc-alkali primary battery, by T. P. Dirkse. U. S. Naval Research Laboratory. Jul 1943. 32p graphs. Order from LC. Mi $3, ph $6.30. PB 120517

1. Cells, Primary - Silver oxide-zinc-alkali - Tests 2. NRL P 2129.

Properties of dielectric materials at high frequencies, by J. D. Wallace. U. S. Naval Research Laboratory. Mar 1936. 53p diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122760

Supersedes NRL Preliminary report R-1065, Jul 1934.
1. Dielectric research 2. Dielectrics - High frequencies 3. Insulating materials - Dielectric properties 4. NRL R 1257.

Report on storage batteries, WLH-45 and WLH-29, characteristics of at 1280 specific gravity, by E. G. Lunn. U. S. Naval Research Laboratory. Jun 1934. 14p diagr, graphs (part fold). Order from LC. Mi $2.40, ph $3.30. PB 120477

Unclassified 23 May 1947.
1. Submarines - Batteries 2. Batteries, Storage - Tests 3. NRL P 1061.

Report on submarine storage batteries: Charging procedure for wartime, by E. G. Lunn. U. S. Naval Research Laboratory. Apr 1936. 8p. Order from LC. Mi $1.80, ph $1.80. PB 120471

Unclassified 26 Sep 1955.
1. Submarines - Batteries 2. Batteries, Storage - Charging 3. NRL P 1267.

Some characteristics of the silver oxide-zinc-alkali primary cell, by R. T. Pierce and T. P. Dirkse. U. S. Naval Research Laboratory. Jul 1945. 76p photos, graphs. Order from LC. Mi $4.50, ph $12.30. PB 120762

1. Electrolytic cells - Silver oxide-zinc-alkali 2. NRL P 2580.

Storage batteries: Comparison of capacities of WLH-29, WLH-45, and German Tudor type 20-POR-820 submarine storage cells, by E. G. Lunn. U. S. Naval Research Laboratory. Mar 1935. 13p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122798

1. Batteries, Storage - Tests 2. WLH-29 (Storage battery) 3. WLH-45 (Storage battery) 4. NRL P 1136.

Study, standardization of specifications for insulated wire, by Matthew A. Horn and Ralph W. Stoneburner, Jr. Corvey Engineering Co., Alexandria, Va. Feb 1956. 29p tables. Order from OTS. 75 cents. PB 121318

This report deals primarily with the standardization of specifications for single conductor, insulated, copper wire, but the approach used has application in many other fields of standardization. It was also determined that uniform methods of testing should be utilized in determining whether or not a finished wire would satisfactorily meet the minimum requirements desired for its particular application. Project no. 4155, Task no. 41530. AF WADC TR 56-108. Contract AF 33(616)-2811.

FOOD AND KINDRED PRODUCTS

Occurrence of high temperatures in standing boxcars, by William L. Porter. U. S. Army. Quartermaster Research and Development Command. Environmental Protection Division. Quartermaster Research and Development Center, Natick, Mass. Feb 1956. 42p photos, graphs, tables, maps. Order from LC. Mi $3.30, ph $7.80. PB 122894

Research was conducted during five months of summer 1953, to determine the temperature distribution and occurrence of extreme temperatures within the air and the load of a steel boxcar loaded with a typical QM subsistence item at sites favorable to maximum heat accumulation. It was concluded from analysis of the results that highest carton and food temperatures are reached in the top center cartons (between the steel doors). Maximum daily temperature of air in the hottest carton may be reduced 10 to 13 degrees by the use of reflective foil shielding laid on the top layer cartons. Significant coefficients of correlation were developed between free-air mean weekly temperature and top carton or roof air mean weekly temperatures. Prediction of carton air mean temperatures is possible for similar loads and air mass situations. Effective mean temperatures were developed for constant temperature duplication of the fluctuating boxcar temperature cycles. QMC EP TR 27.

Use of chemical additives in food processing, prepared by the Food Protection Committee of the

Food and Nutrition Board. National Research Council. Division of Biology and Agriculture. Food and Nutrition Board. Food Protection Committee. Feb 1956. 92p. Order from National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. $2. PB 122544

The Food Protection Committee of the National Research Council has undertaken a study of the use of chemicals in foods for the purpose of evaluating the technological benefits arising from such use and of appraising the significance of associated public health problems. This report deals only with a survey of the extent of use and technological benefits of use of intentional chemical additives, including transient chemicals and naturally occurring substances used as additives. NRC 398.

FUELS AND LUBRICANTS

Determination of ignition characteristics of hydraulic fluids, Part I: Simulated flight and crash conditions, by J. J. Gassmann. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1951. 12p photos, diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 123564

The relative ignitability of various hydraulic fluids has been determined qualitatively under simulated flight and crash conditions. The ignition characteristics of the fluids, under practical aircraft conditions, were the only properties investigated in this test program. CAA TDR 64.

Effect of pressure on the spontaneous ignition temperature of liquid fuels, by Cleveland O'Neal, Jr. U. S. National Advisory Committee for Aeronautics. Oct 1956. 21p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D.C. PB 123669

Spontaneous ignition temperatures were measured in air for n-heptane, isooctane, benzene, and JP-4 and JP-5 aviation fuels in the pressure range of 1 to 9 atmospheres. A solid stream (no spray) of fuel was injected into a 125-cc Erlenmeyer flask enclosed in a bomb. Fuel charges were varied so that the lowest temperature at which spontaneous ignition occurs was obtained. The spontaneous ignition temperature of all the fuels decreased with increasing pressure. Most of the decrease occurred in the range of 1 to 3 or 4 atmospheres. Time lags before ignition were measured. NACA TN 3829.

Evaluation of several aromatic fuel resistant slushing compounds, by James S. Strong. U. S. Naval Research Laboratory. Jun 1942. 13p tables. Order from LC. Mi $2.40, ph $3.30. PB 120515

1. Tanks, Fuel - Coatings 2. Coatings, Protective - Resistance - Measurement 3. NRL P 1895.

Experimental rocket motor performance with white fuming nitric acid and JP-3 at 700 and 300 psia combustion pressure, by Clair M. Beighley and Delbert E. Robison. Purdue University. Rocket Laboratory, Lafayette, Ind. May 1952. 30p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122344

Interim report no. 2 under Contract N7-onr-39418. Report no. I-52-2.
1. Rocket motors - Fuels 2. Rocket motors - Performance 3. JP-3 (Rocket fuel) 4. Nitric acid, White-fuming - Combustion 5. Contract N7-onr-39418, Interim report no. 2.

Fluids, lubricants, fuels and related materials, Pennsylvania State University. Petroleum Refining Laboratory, State College, Pa. Contract AF 33(038)-18193. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1, by Merrell R. Fenske. Mar 1955. 210p drawings, graphs, tables. $3.50. PB 121508

This report is a summary of work which has been carried out under Contract AF 33(038)-18193 for the year of 1 Oct 1951 to 30 Sep 1952. This is the first yearly report on this contract. Previous work from 1 Oct 1951 to 30 Sep 1952 was under Contract OEMsr 408. Progress report no. 8 is PB 22464. Work from Jul 1945 to Oct 1951 was under Contract NOrd 7958(B). Report for 1948 is PB 119124 and PB 119124s. This report describes the current status of development work on Specification MIL-L-7808 oils and turbo-prop lubricants. Fluids of the PRL 3161 and PRL 3313 types are covered in this discussion. Tabulated data presented in three quarterly reports issued during this period are included as Appendix C of this report. AD 65446. Project no. 7331. AF WADC TR 55-30, Part 1.

Part 2, by Merrell R. Fenske and E. Erwin Klaus. Mar 1955, 256p photos, drawings, diagrs, graphs, tables. $4. PB 121509

The current program deals primarily with the effect of phosphorus-containing lubricity additives on an ester-base formulation with established over-all properties. The applicability of this type additive for use in mineral oil formulations has been examined. Equipment has been designed and constructed for constant temperature use in the range of 300° to 800°F. The oxidation behavior of various classes of synthetic fluids and hydrocarbons has been explored at temperatures of 300° to 500°F. Thermal stability of many of the fluids has been determined at temperatures up to 750°F. Dibasic acids have been studied as metal deactivators

for controlling corrosion, and a survey of several brominated aromatics has been made as constituents for non-inflammable liquids. AD 65447. AF WADC TR 55-30, Part 2.

Part 3, by E. Erwin Klaus and Merrell R. Fenske. Mar 1955. 342p photos, drawings, diagrs, graphs, tables. $5.50. PB 121510

The current report deals primarily with the development of high temperature hydraulic fluids and jet engine lubricants and the study of dirtiness characteristics of jet fuel at elevated temperatures. Particular emphasis in the jet engine oil studies has been placed on lubricity studies and severe oxidation and corrosion evaluations at 500°F. Viscosities from 0° to 700°F., thermal stabilities from 500° to 750°F., oxidation and corrosion stability at 347° and 500°F., and operation in a hydraulic pump have been measured for silicones, silicate esters, diesters, pentaerythritol esters, silicone-ester blends, mineral oils, synthetic hydrocarbons and aryl phosphates. Appendix A: Some properties of Spec. MIL-O-5606 hydraulic fluid at elevated temperatures (PRL 6.3). - Appendix B: Progress report for the period 1 Oct 1953 through 31 Jan 1954 on the development of a thin film preservative composition for hydraulic systems (PRL 7.1). AF WADC TR 55-30, Part 3.

Method for the estimation of the aromaticity of aviation gasolines, by A. D. Swensen. U. S. Naval Research Laboratory. May 1942. 21p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120564

1. Fuels, Aviation - Aromatization - Methods 2. NRL P 1872.

Method for the separation and analysis of aromatic fractions of aviation gasoline, by R. H. Blizzard. U. S. Naval Research Laboratory. Apr 1943. 18p photo, drawing, graph, tables. Order from LC. Mi $2.40, ph $3.30. PB 120617

1. Fuels, Aviation - Analysis 2. Fuels, Aviation - Aromatization - Methods 3. Fuels, Aviation - Fractionation 4. NRL P 2039.

Oxidation and gumming tendency of certain typical component hydrocarbons of aviation gasoline, by Dan Fore and J. A. Sanderson. U. S. Naval Research Laboratory. Apr 1939. 56p graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 123252

1. Hydrocarbons - Oxidation 2. Fuels, Aviation - Storage 3. NRL P 1527.

Preparation and properties of solidified gasoline, by Dan Fore, Jr. U. S. Naval Research Laboratory. Mar 1937. 22p tables. Order from LC. Mi $2.70, ph $4.80. PB 120472

Unclassified 1 Sep 1955.
1. Gasoline, Solidified - Patents 2. Gasoline, Solidified - Storage 3. Gasoline, Solidified - Properties 4. Gasoline, Solidified - Preparation 5. NRL P 1346.

Reactions between liquid fuels and oxidants, by Martin Kilpatrick, Arthur G. Keenan, Louis Baker, Jr. and Ann Palm. Illinois Institute of Technology. Dept. of Chemistry, Chicago, Ill. Jun 1955. 26p drawing, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122155

Research has been carried out on the reactions between liquid fuels and oxidants. The research includes: 1) Studies in the kinetics of the reaction with emphasis on the effects of efficient mixing. 2) Studies in the chemistry of the interaction of nitric acid with representative hydrocarbons. 3) A fundamental study of the species present in nitric acid as solid, liquid and gas and a less complete study of the stability of certain nitrates. Continues work under Contracts N7 onr-32903 and Contract N onr-630(00), Project NR 351-056 as reported Nov 1952. Contract N7-onr-32913, NR-051-056, Final report.

Sensitivity of the qualitative identification of various functional groups present in aviation gasoline (the chemical methods), by R. W. Bost. U. S. Naval Research Laboratory. Dec 1938. 12p tables. Order from LC. Mi $2.40, ph $3.30. PB 123295

1. Fuels, Aviation - Chemical properties 2. Fuels, Aviation - Stability 3. Fuels, Aviation - Thermal tests 4. Gasoline - Analysis 5. NRL P 1499.

Some effects of small-scale flow disturbance on nozzle-burner flames, by Edgar L. Wong. U. S. National Advisory Committee for Aeronautics. Sep 1956. 19p photos, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123522

Laminar-like and brush-like propane-air flames were obtained when wire grids were used as turbulence generators in a 1/2-inch nozzle burner. Hot-wire-anemometer equipment was used to measure the flow disturbance intensity in the cold flow with and without the grids in place. NACA TN 3765.

Starting and running low temperature torques, by Bernard Rubin. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1956. 22p diagrs, tables. Order from OTS. 75 cents. PB 121440

Low temperature (-65°F) starting and running torque data for greases are reported in size 104, 204, and 306 bearings using a procedure under investigation by the ASTM Technical Committee G on

Lubricating Grease. The investigation with the 204 bearing was a part of the cooperative effort with other laboratories within the ASTM group working towards the standardization of a low temperature torque procedure. Volume of grease in the bearing could not be directly correlated with starting and running torque. Recommendations are made for improvement of test procedure for specification purposes. Project no. 7331. Covers work from Nov 1951 to Dec 1954. AF WADC TR 56-175.

Storage stability of aviation gasoline in copper flashed drums, by Alan K. Roebuck and William D. Dunn. U. S. Naval Research Laboratory. Jul 1944. 24p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120759

1. Fuels, Aviation - Storage 2. NRL P 2329.

Storage stability of gasoline, 1936-1937, by C. A. Rehbein. U. S. Naval Research Laboratory. Sep 1937. 18p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 123243

1. Gasoline - Storage 2. NRL P 1393.

Study of the behavior of spectral lines of sodium fires in the combustion of fuel oils, by Leo H. Dawson. U. S. Naval Research Laboratory. Oct 1933. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 120642

1. Sodium - Spectra 2. Sodium - Combustion 3. Combustion gas - Spectrographic analysis 4. NRL R 1000.

Variation of properties of glycerol - water recoil fluids O. S. 1324 and O. D. No. 1914 with temperature, by Charles M. Murphy, Jr. and John M. French. U. S. Naval Research Laboratory. May 1943. 19p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120550

1. Glycerine-water compounds - Thermal properties 2. Recoil fluids - Thermal properties 3. NRL P 2060.

HIGHWAYS AND BRIDGES

Load transmission test for flexible paving and base courses. Part III: Load distribution through gravel bases to a weak subgrade, by William M. Aldous, M. H. Price and Walter L. Shearer, Jr. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1953. 30p photos, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123577

The testing program involves the application of a static load on a large-scale flexible section of pavement and the measurement of vertical pressure distribution on the surface of the underlying mechanical subgrade. Triaxial samples are used to evaluate the paving materials used. The present report includes test data from 48 sections of gravel base course with maximum thicknesses of 24 inches. Loads were applied through rigid circular plates ranging from 10 to 30 inches in diameter and through single airplane tires with inflation pressures ranging from 40 to 200 pounds per square inch. For Parts I-II, and IV-V see CAA TDR 108 and 144, PB 111828, 121146. CAA TDR 203.

INSTRUMENTS

Analogue system for computing correlation coefficients, by J. M. Headrick and J. L. Ahearn, Jr. U. S. Naval Research Laboratory. Sep 1956. 8p photos, diagrs, graphs. Order from OTS. 50 cents. PB 121482

A system has been divised and constructed to measure the correlation coefficient between data pairs recorded on film. The system is used to transcribe the data manually from film to magnetic tape. An electronic correlator operates on the magnetic tape output. The original data may be in wave train form, 0 to 50 cycles in length, and means is provided to adjust the time delay between the data pairs. NRL R 4835.

Apparatus for determining the long time voltage endurance of dielectrics, by Myron A. Elliott. U. S. Naval Research Laboratory. Aug 1945. 13p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123372

Text will not reproduce well.
1. Dielectrics - Constants - Measuring equipment 2. NRL P 2617.

Applications of high-speed computing to chemical problems, by Joseph O. Hirschfelder. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Aug 1955. 13p. Order from LC. Mi $2.40, ph $3.30. PB 122945

A short summary is given of the chemical applications of high-speed computing with special emphasis on the theory of flame propagation. Contract N7 onr-28511. WIS ONR-16.

Approximate high-frequency response requirements for air blast pressure-time measuring systems, by John F. Price and S. N. Anastasion. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 18p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120916

This report presents an approximate solution to the problem of high frequency response requirements

for air blast pressure-time instrumentation. These response requirements are derived from an assumed relation between pressure and time existing at a point located near an explosion. The requirements are expressed in terms of the error in the measured value of peak pressure and parameters analogous to charge weight and distance. Previously published as NOL Technical note no. 259. NAVORD 1747.

Bismanol permanent magnets, evaluation and processing, by Edmond Adams and William M. Hubbard. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1953. 19p photos, diagr, graphs, tables. Order from OTS. 50 cents. PB 121278

Bismanol permanent magnets have been evaluated for stability under various operating conditions. The magnets showed a remarkable flux constancy over a wide temperature range after stabilization at low temperatures. There is some decrease in magnetic flux density at the low temperature; the exact flux loss being dependent on the temperature of stabilization. Because of their high coercive force, the magnets are extremely stable magnetically to shock, vibration, centrifugal force and stray magnetic fields. Except for a tendency to chip, bismanol magnets are sufficiently strong physically for most applications. Unprotected bismanol magnets corrode slightly at ordinary temperatures and humidity, and more rapidly at 95 per cent humidity. Magnets with applied protective coatings remained stable at room temperatures and moderate humidities for the six-month test period. Continues work reported in NAVORD 2440. NAVORD 2686.

Computing machine components program. Tenth quarterly report for Oct-Dec 1954, U. S. Naval Ordnance Laboratory. Physical Science Dept., Computer Components Division, Corona, Calif. Jan 1956. 38p diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 122612

A method of reading and writing in small flat plates of magnetic material was described in NOLC Report 268 (PB 119282). Many experiments were carried out to clarify the relations involved, and the results of these experiments are reported here. 1st-9th reports issued as NBS reports 1229, 1234, 1235, 1238, 1245 and NOLC reports 143, 151, 252, (PB 118715-118716), and 268 (PB 119282).

Considerations for the selection of magnetic core materials for digital computer elements, by O. J. Van Sant, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1954. 23p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120846

Some of the principal factors to be considered in selecting and testing magnetic core materials for digital computer elements are discussed. The typical behavior of a magnetic material under the influence of magnetizing forces is described and this behavior is related to the manner in which the performance of a magnetic core may be affected. A simple test circuit is presented with which the dynamic characteristics of an unloaded core may be measured and graphic methods are described with which one may compare the relative feasibility of different core materials for use in lattice memory arrays. NAVORD 3675.

Copper-ball accelerometers: Their advantages and limitations, by J. L. Jones. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1951. 16p drawing, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 122062

1. Accelerometers, Copper ball 2. NAVORD 1585.

Data recorder Mk 5 Mod O (torpedo) engineering report, by F. E. Butler. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 18p photos. Order from LC. Mi $2.40, ph $3.30. PB 120900

1. Mk 5 Mod O (Data recorder) 2. Recorders, Torpedo ranging 3. NAVORD 3727.

Design and construction of a precise projection type microcomparator, by Harold P. Feldman. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1952. 34p photos, drawings, table. Order from LC. Mi $3, ph $6.30. PB 120841

The report describes the design, construction and use of a new projection type micro-comparator. This comparator, designed for maximum operator comfort and a minimum of effort and eyestrain, is capable of reading distances on film accurately to within .001". Direct reading of distances, (no verniers and no subtraction), are made by the use of mechanical counters able to be reset to zero when the operator desires. NAVORD 2625.

Design and operation of magnetic undulators, by W. H. Thon. Stanford University. W. W. Hansen Laboratories of Physics. Microwave Laboratory, and Electronics Research Laboratory, Stanford, Calif. May 1955. 119p photo, diagrs, graphs, tables. Order from LC. Mi $6, ph $18.30. PB 122158

The magnetic undulator consists of an evacuated waveguide surrounded by a periodic arrangement of permanent magnets. Transverse electron oscillations will results if an electron beam is directed through the waveguide. Two magnetic undulators were constructed and were connected to suitable sources of bunched electron beams. Future development of undulator design seems most promising in the direction of increased power output by means of tight electron bunching. SU ML R 262.

Design of laboratory test equipment for Radechon storage tubes, by David Haratz. U. S. Camp

Evans Signal Laboratory, Belmar, N. J. Sep 1955. 36p photos, diagrs (1 fold), tables. Order from OTS. $1. PB 121401

A laboratory type of test gear, for the purpose of checking Radechon storage tubes for compliance to controlling manufacturing specifications in several performance stipulations, was designed and constructed by the Measurements Section, Evans Signal Laboratory. The equipment provides tests to determine persistence of storage surface, resolution, freedom from blemishes, and other pertinent characteristics. Signal Corps project no. 112A. Dept. of the Army project no. 3-99-13-021. SCEL TM 1708.

Electric flowmeter (Thomas principle), by F. G. Penzig. U. S. Air Force. Air Research and Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1954. 95p photos, diagrs, graphs, table. Order from LC. Mi $5.40, ph $15.30. PB 122469

It is shown that the principle of electric flowmeters originally formulated by Thomas for gas meters can be successfully used for flow measurement of a liquid such as aircraft fuel. The temperature difference produced in the flowmeter can be sensed either by resistance thermometers or by thermocouples, each method having particular advantages. The theory of both instruments as well as methods for compensation of various influences are discussed in this report. AD 80127. Project no. 5162. AF WADC TR 54-352.

Electronic multiplier, by K. Joetten and T. R. Williams. Princeton University. Dept. of Electrical Engineering, Princeton, N. J. Aug 1955. 46p photos, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122989

The multiplier described in this paper is of the quarter-difference-squares type, and it consists of a sum-and-difference network, a pair of triode squarers, and a differential amplifier following the squarers. The sum-and-difference network is made up of four identical differential amplifiers, and it provides at its output in push-pull the sum and the difference of the quantities to be multiplied. The differential amplifiers are of a special design; they each have push-pull outputs and their gains are almost independent of tube parameters. Plots showing the operating range of the multiplier for a total distortion of less than 2.5% and 5% are given in the paper. Technical report no. 10 under Contract N6 onr-270, T. O. V.

Experimental investigation of an aerothermopressor having a gas flow capacity of 25 pounds per second, by Arthur A. Fowle. Massachusetts Institute of Technology. Dept. of Mechanical Engineering. Sep 1955. 156p photos, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 123096

The fundamental characteristics of aerothermopressor behavior are revealed by the illustration and interpretation of the results of tests made on this device when fitted with a constant area evaporation section 11 inches in diameter and 7 feet long. The measured influences of initial temperature, water injection rate, and Mach number on performance are shown to be entirely compatible with the concepts and theory relating to the aerothermopressor process. The important influence which the contour of the evaporation section has on aerothermopressor performance is demonstrated experimentally. A net rise in stagnation pressure from the inlet to evaporation section to the exit of the diffuser of about 5% is reported for the variable area experiment showing most promising performance. The experimental results of both constant area and variable area operation are compared with theoretical calculations. The theoretical prediction of over-all performance is shown to be surprisingly accurate. Theoretical computations duplicate all the qualitative aspects of aerothermopressor behavior and provide quantitative results useful for design purposes. Interesting differences between experimental and theoretical results are illustrated and the reasons underlying these differences are explored. Project no. DIC 5-6985. Thesis - Massachusetts Institute of Technology. Appendix A. Review of concepts and theory. - Appendix B. Test apparatus. - Appendix C. Definition and determination of system properties. - Appendix D. Determination of apparent wall friction factor and specific humidity. - Appendix E. Estimation of stagnation pressure losses. Contract N5ori-07878.

Fatigue prediction by means of the cyclograph, by R. L. Cavanagh. Ontario Research Foundation. Nov 1953. 136f photos, drawings, graphs, tables. Order from LC. Mi $6.90, enl pr $22.80. PB 123641

Tests were conducted on SAE 4340 samples in different heat treated conditions to determine whether changes in magnetic and electrical properties at low field strengths could be correlated with fatigue damage. To indicate the changes in magnetic and electrical properties, the cyclograph was used. This is a high frequency, non-destructive, magnetic test instrument. Some tests were also conducted to evaluate the application of the method for a short fatigue test to obtain the endurance limit. Test equipment, specimens and procedures are described in detail. Test results are presented in the form of tables and curves. The static bend test in combination with the fatigue test seems to be the best and most convenient test of those investigated to attempt to determine fatigue damage. It can generally be concluded that it is possible to determine whether a steel part has been loaded above or below the endurance limit while it is in service and that by application of low static loads in the same sense as the fatigue load it appears that the extent of fatigue damage can be approximated. AD 23657. AF WADC TR 53-184.

Flat flame burner and its characteristics as applied to theoretical studies, by J. W. Jenkins. Princeton University. James Forrestal Research

Center. Sep 1955. 52p photos, diagrs, graphs, table. Order from LC. Mi $3.60, ph $9.30. PB 122962

Used with caution and an understanding of the experimental limitations of the method, the flat flame burner can be a useful and reliable tool in flame studies. The principle disadvantages of the method lie in the difficulty in ensuring a uniform flow and in the influence of the edge effects. A simple 'flame lift' method for the determination of adiabatic flame velocities as outlined is believed accurate to within 10% and forms a rapid method for exploratory work. Project OSR Chem. 50-4. AD 88028. PU FRC TN 23. AF OSR TN 56-221. Contract AF 33(038)-23976.

General class of codes and their physical realization, by Arthur E. Laemmel. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jul 1955. 12p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 123052

This report describes a general class of discrete codes and then a straight forward method for designing apparatus to accomplish the coding. The apparatus has the minimum possible storage capacity. Although it is not shown to be the most economical possible, it does have several advantages, such as ease of construction and testing and freedom from spurious modes of operation. A version of the apparatus using a magnetic drum is well adapted to changing its own code, i.e. "learning". PIB 369. PIB R 437-55. Contract Nonr-839(05), NR 375-216.

High-speed high-pressure gage. Part II, by P. L. Edwards. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1955. 34p drawings, graphs. Order from OTS. $1. PB 121178

This report deals with the problem of the measurement of pressure in the Naval Ordnance Laboratory 100,000 psi adiabatic compressor and a gage for that purpose. The effect of the transfer of heat to the gage from the hot gases in the compressor was investigated for the case of a peak pressure of 3000 psi. The frequency response required of the gage and associated electronic circuits is considered in some detail. Formulas and graphs are given that relate the peak pressure to be measured with the bandwidth necessary to measure it. The low-frequency response is considered and formulas are developed which can be used to correct for inadequate low-frequency response. Part I issued as NAVORD 2380. NAVORD 3963.

High-speed precision radar data recorder. Progress report no. 1 for the period Sep-Dec 1955 under Contract no. AF 08(606)-996, by George H. Wayne and Ira L. Resnick. Electronics Corporation of America, Cambridge, Mass. Mar 1956. 29p drawings, diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122387

The equipment will be integrated with a NIKE missile-tracking radar, Model IV, and will record azimuth, elevation, range, and target-identification data on a six-channel tape. Certain major changes in the coding technique were requested and are currently being incorporated into the system. These changes were of such magnitude that a complete redesign of the data-handling components was warranted. Project CONNIE. AF MTC TN 56-13.

Instrumentation for precision frequency measurement, by T. B. Whiteley. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1953. 20p photo, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 120862

A system for precision frequency measurements is described which provides a means for measuring unknown frequencies between 10 cycles and 3,000 megacycles per second. All determinations are based on the 100 kilocycle standard frequency. Unknown frequencies are compared to harmonics or submultiples of the 100 kilocycle signal. Instrumentation is provided to generate, amplify and mix harmonics and sub-harmonics of the 100 kilocycle standard signal with an unknown signal. An oscilloscope and radio receivers are utilized to determine the frequency of the unknown signal. NAVORD 2190.

Magnetic switching network for data handling systems, by L. P. Gieseler. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 20p photos, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120895

A magnetic switching network is described which will switch a number of low level AC analog signals into a single data-handling channel. A mathematical analysis is presented which indicates that the use of a network made up of iron-core reactors results in a much more efficient switch than that formed by a transformer alone. Dynamic tests utilizing Burroughs Unitized Pulse Equipment are also described. A "programmer" circuit which will form part of an analog to digital converter system, and which is made up of magnetic decision elements is described in the appendix. NAVORD 3824. NOL ARR 254.

Magnetic tape recordings of D.C. signals, by Samuel J. Raff. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 15p photos, drawings, diagr. Order from LC. Mi $2.40, ph $3.30. PB 120911

1. Recorders, Magnetic - Design 2. NAVORD 1780.

Metal bolometers of short time of response and high sensitivity, by H. S. Stewart, V. M. Myers and W. D. Walker. U. S. Naval Research Laboratory. Jul 1945. 34p drawings, table. Order from LC. Mi $3, ph $6.30. PB 120715

Unclassified 15 Dec 1953.
1. Bolometers 2. Gun sights 3. Project Spruce
4. NRL H 2577.

Partial report on gas pulsator, by L. F. Campbell and T. O. Meyer. U. S. Naval Research Laboratory. Sep 1945. 61p photos, drawings, diagrs, graphs. Order from LC. Mi $3.90, ph $10.80. PB 122773

Unclassified 15 Dec 1953.
1. Valves, Eichelberg - Tests 2. Pulsators, Gas - Tests 3. NRL O-2650.

Performance of a converging-diverging wind tunnel diffuser in the presence of a scavenging scoop, by S. M. Hastings. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1954. 58p photos, drawings, graphs. Order from LC. Mi $3.60, ph $9.30. PB 120863

1. Wind tunnels - Scavenging systems 2. Diffusers, Supersonic - Performance 3. NAVORD 3665
4. NOL ARR 223.

Photomechanical wave analyser for Fourier analysis of transient waveforms, by T. B. Whiteley and L. R. Alldredge. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1951. 18p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120887

1. Fourier analysis 2. Analyzers, Harmonic - Design 3. NAVORD 2175.

Portable two channel apparatus for measuring air blast by means of piezoelectric gages, by Joseph F. Pittman. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1954. 23p photos, drawings, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120899

A compact air blast pressure-time unit incorporating portability and simplicity of electronic circuits was designed and built at the Naval Ordnance Laboratory. The unit and its performance is described. NAVORD 3775.

Rate measurement of marine chronometers, gimbal mounted chronometer watches, and non-gimbal navigating watches under controlled climatic conditions. Part V: The interval-record and chronograph methods of rate measurement, by H. M. Suski. U. S. Naval Research Laboratory. Oct 1956. 72p diagrs, graphs (fold), tables. Order from OTS. $2. PB 111940

Previous reports in this series have been concerned with the visual, photo, and photo-record methods of daily rate measurement and the results obtained using the latter method. In this final report two methods of greater accuracy (an error reduction over previous methods by more than 10 times), the interval-record and the chronograph methods, are described and discussed; the results obtained using the first of these two methods are compared with previous results. The sensitivities and over-all measuring errors for both of these methods are estimated and compared with values for the three other methods. It is shown that the interval-record and chronograph methods have comparable sensitivities and accuracies. Certain limitations in the interpretation of the records are pointed out. The design of an experiment to investigate the temperature and pressure characteristics of timepieces is indicated. For Parts I-IV see PB 118513-118514, 111774, and 121008. NRL R 4812.

Report on a study of the fyrite 0 -5% CO_2 indicator for the purpose of improving the design and operating instructions to make it suitable for use aboard submarines, by Myron H. Boyer. U. S. Naval Research Laboratory. Apr 1942. 33p drawing, diagr, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120560

1. Indicators, Depth - Tests 2. Instruments, Submarine - Uses 3. NRL P 1868.

Rotary accelerator, by Ralph H. Long, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1954. 57p photos, drawings, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120847

The rotary accelerator is a quick-acting centrifuge for laboratory simulation of a suddenly applied rectilinear (or nearly rectilinear as described) acceleration of long duration. The principle of the machine is given in detail as well as the principal design features and considerations of development and construction. The performance characteristics of the two arrangements (short arm and long arm) are described in enough detail to permit estimates of the useful range. NAVORD 3692.

Self-balancing line-reversal pyrometer, by Donald Buchele. U. S. National Advisory Committee for Aeronautics. Aug 1956. 68p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123515

A self-balancing line-reversal pyrometer is described that measures gas temperatures from 2900° to 4500° R. Its two optical components are a reflector and a fully enclosed unit containing a projection lamp, spectroscope, and photoelectric detector of line reversal. An automatic balancing mechanism permits remote operation by semiskilled personnel. Local-temperature measurements can be made by injection of a narrow stream of sodium-containing powder into the gas from a probe upstream of the point of measurement. In a comparison with a thermocouple pyrometer and a pneumatic-probe pyrometer, the average deviation of the line-reversal method from the mean of all measurements was 60° R. NACA TN 3656.

Some devices for measuring atmospheric attenuation of light, by R. Tousey, H. Friedman and E. O. Hulburt. U. S. Naval Research Laboratory. Jun 1944. 18p diagrs, graph, table. Order from LC. Mi $2.40, ph $3.30. PB 120744

1. Light - Attenuation - Measuring equipment 2. Instruments, Measuring - Meteorological 3. Meters, Haze 4. Telephotometers 5. Visibility - Tables 6. NRL H 2303.

Some direct-coupled computer circuits utilizing NPN and PNP transistors in combination, by M. J. Wier. Illinois. University. Digital Computer Laboratory, Urbana, Ill. Aug 1955. 36p diagrs. Order from LC. Mi $3, ph $6.30. PB 122983

A two transistor bistable circuit is presented and a means is shown of combining this flipflop with a further set of logical elements in a fairly simple manner to yield a complete logical set. Certain special problems associated with this combination are presented and their solutions indicated. A means was also found of producing a four transistor flipflop with symmetrical output voltages. This circuit may be used in circuits which are very similar in form to their vacuum tube equivalents. Finally it was found that a simple means exists which enables one to construct devices of greater than two stable states using the same principles as those employed in the symmetrical flipflop indicated above. This device is probably principally of interest for special applications since it uses too many transistors to make it economical enough for most uses. Report no. 65. Contract N6 ori-71, ONR NR 048-094, T. O. XXIV.

Survey of measuring instruments for low-velocity winds, by John F. Ripken. Minnesota. University. St. Anthony Falls Hydraulic Laboratory. Dec 1953. 133p photos, diagrs, graphs. Order from LC. Mi $6.90, ph $21.30. PB 123105

This paper attempts to review and assess all pertinent existing instruments or methods which might be practically employed to measure the desired wind velocity. The assessment was based on a review of the available literature and limited physical tests, both of which were conducted at the St. Anthony Falls Hydraulic Laboratory. In general the assessments relate to the accuracy, sensitivity, and responsiveness of the sensory instrument, together with a discussion of the related accessory and field use problems. A brief discussion of the general problem and the nature of the wind's structure is followed by a detailed appraisal of dynamic pressure, and thermal and ionization types of anemometers, together with a lesser treatment of other special devices. Project report no. 40. Continued under Contract DA 36-039-sc-56694. Contract DA 11-022-CRD-1048.

Traveling-wave tube as a computer component, by G. G. Bower. U. S. Naval Ordnance Laboratory. Physical Science Dept., Corona, Calif. Jan 1956. 11p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122611

The possibility of using traveling-wave tubes in high-speed digital computers was examined, and it was concluded that commercially available tubes have too much delay for use in computer operations. However, if theoretical values of gain and delay could be realized practically, and if complication, size, and expense were not prohibitive, traveling-wave tubes could be used advantageously. NAVORD 4565. NOLC R 285.

Wide band film dosimeter, by Norman Modine. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1954. 19p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120897

This report contains the results of engineering tests on a device for measuring radiation exposure. The method is based on the use of photoelectric emission from lead screens to obtain an energy-discriminating film dosimeter with the net effect of determining an energy-independent dose value, as well as an effective quantum energy value for simple X- or gamma-ray spectra. NAVORD 3803.

MACHINERY

Effect of three design parameters on the operating characteristics of 75-millimeter-bore cylindrical roller bearings at high speeds, by William J. Anderson. U. S. National Advisory Committee for Aeronautics. Oct 1956. 37p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123633

A total of 30 bearings were run at loads to 368 pounds and DN values to 2.1×10^6. Roller axial clearance ratio had no significant effect on bearing temperature, cage slip, wear, or high-speed operating characteristics except at the lowest clearance ratio (0.0005) where failures occurred. NACA TN 3772.

Field equipment for vibratory compaction of soils and base courses, by William M. Aldous and Harry W. Wills. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Nov 1952. 18p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122308

This report reviews briefly the types of vibratory compaction equipment available for field use in the United States and summarizes the results reported from various sources. Results obtained with lightweight equipment in preparing experimental pavement sections at the Technical Development and Evaluation Center of the Civil Aeronautics Administration are described in considerable detail. CAA TDR 186.

Onan gasoline engine installation at the Naval Research Laboratory for oil and gasoline tests, by W. A. Zisman. U. S. Naval Research Laboratory, Mar 1942. 11p diagr (part fold), graph. Order from LC. Mi $2.40, ph $3.30. PB 120554

1. Engines, Gasoline - Air cooled - Tests 2. Engines, Gasoline - Lubricants - Tests 3. NRL P 1857.

Wälz- und gleitlagertechnik für den konstrukteur (Roller bearing and friction bearing technology for the designer), by Dr.-Ing. Karl Kollmann and Dipl.-Ing. Heinz Hahn. Translated by F. A. Raven. Apr 1956. 26p drawings, graphs. Order from OTS, 75 cents. PB 121366

Gives the theory and practice of roller and friction bearings as presented at a convention of German design engineers. Translated from Automobiltechnische Zeitschrift, vol. 57, no. 4, Apr 1955, pp. 107-113. NAVSHIPS T 602. STS 221.

MEDICAL RESEARCH AND PRACTICE

Analysis of the aviation medicine situation and recommendations for a bureau program, by W. H. Miller. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1938. 9p. Order from LC. Mi $1.80, ph $1.80. PB 122289

Originally printed in April 1938 as Report no. 10, Air Transport Section, Safety and Planning Division, Bureau of Air Commerce. Reprinted by the Civil Aeronautics Authority, 1940.
1. Medicine, Aviation 2. Pilots, Air - Fatigue - Prevention 3. CAA TDR 9.

Synthesis of hormones and enzymes in the mammalian body. Annual progress report for the period 15 Jun 1950-1 Apr 1951 under Contract no. N7 onr-45106, NR 120-033, by Leo T. Samuels. Utah. University. Dept. of Biochemistry, Salt Lake City, Utah. Apr 1951. 10f tables. Order from LC. Mi $1.80, enl pr $3.30. PB 123643

Thus far, the effects of tryptophan, isoleucine, and phenylalanine deficiencies have been studied. The effects observed differ markedly from those seen when the same diets are fed ad libitum. U 21321.

Certain physico-chemical properties of glycerol pectate and their modification by storage, by George A. Feigen, I. L. Trapani and Mary S. Hurd. Stanford University. Dept. of Physiology, Stanford, Calif. Jun 1955. 22p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122159

Interim technical report under Contract N6 onr-25137: Physiological properties of plasma substitutes. See also PB 114106, PB 116406.
1. Glycerol pectate - Storage 2. Viscosity - Effect of pressure 3. Glycerol pectate - Physiological effects 4. Glycerol pectate - Chemical properties.

Chromatography as a method for identifying bacteria: Preliminary studies, by Walter Sellers, Roland B. Mitchell, and Irving Davis. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 5p tables. Order from OTS. 50 cents. PB 121591

Results obtained in this investigation demonstrated that one-dimensional paper chromatography of the supernatant fluid of a broth culture, using only one solvent and one developer, can be used to distinguish Micrococcus pyogenes var. aureus or albus from the other species of Micrococcus tested, and can also be used to separate Sarcina species from the genus Micrococcus. The hypothesis is presented that paper chromatography of broth culture supernatants may be employed to distinguish closely related species which are difficult to separate by other means. AF SAM R 56-93.

Correlation of blood histamine release and skin test response to multiple antigens, by Joseph W. Noah and Alta Brand. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1956. 11p tables. Order from OTS. 50 cents. PB 121586

Twenty-two patients, who presented a clinical syndrome easily identifiable as allergic, were studied for histamine release from blood cells to plasma. Four blood donors who had no allergic illness were used as controls. Intracutaneous injections of 11 antigens indicated the following conclusions: (1) Food and inhalant antigens incubated with the blood of a sensitive individual will release histamine into the plasma. (2) Antigens producing the largest skin reactions also release the greatest amount of histamine. (3) In some instances, clinically significant antigens, particularly food antigens, liberate large amounts of histamine when the skin tests are negative; in others, both skin tests and blood histamine release may be negative when a clinical history of sensitivity is present. AF SAM R 55-118.

Design requirements for an air-transportable surgical theater, by Timothy J. Larkin and Charles H. B. McLendon. Consultants & Designers, Inc. Apr 1955. 242p photos, drawings, diagrs, tables. Order from LC. Mi $11.10, ph $37.80. PB 122460

There is need for an emergency surgical facility which can be flown to disaster sites to provide initial definitive surgery for non-transportable wounded. The four basic areas studied to produce a design for such a facility were: 1. The Medical Study. A determination was made of the interior arrangements and medical supplies necessary for 24-hour continuous operation of a two-operating-table, self-contained surgical unit. 2. The Engi-

neering Study. To house this unit, a container was designed which weighs only 4000 pounds and which permits a payload of 8000 pounds. It has integral aircraft loading and mobility arrangements and large, unencumbered floor and wall area. Air conditioning, heating, lighting, power, explosion-proofing, and auxiliary shelter features were analyzed and provided. 3. Transportation. Consideration was given to problems of center of gravity, transportation of hazardous and temperature-sensitive materials, cargo loading, removal of the surgical theater from the aircraft, and prime movers for the unit. 4. Other Applications. The container which houses the emergency surgical facility can also be used to form nuclei of airborne hospitals or for a variety of other purposes. Project no. 6355. AF WADC TR 55-168. Contract AF 33(616)-2732.

Discrete-frequency automatic audiometer simulating manual technic, by Francis A. Brogan. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Sep 1956. 13p photos, diagrs. Order from OTS. 50 cents. PB 121594

An automatic audiometer is described which utilizes discrete frequencies, offers 1-second tones at random, and simulates manual audiometry. The time required for testing both ears is approximately 5 minutes for 5 frequencies. Present equipment can test up to 12 frequencies. The intensity range utilizing IBM recording equipment is 55 db, but this range can easily be extended an additional 30 db without changing the test time. All types of recording equipment may be utilized in conjunction with the basic unit. A unique feature of this equipment is that it prevents the subject from directly controlling the test results. Each response is evaluated for correlation with the test stimulus. AF SAM R 56-123.

Incidence and effect of aniseikonia on aircraft pilotage. Dartmouth Eye Institute. Research Division, Hanover, N. H. Mar 1943. 25p drawing, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122296

1. Pilots, Air - Eyes - Accomodation and refraction 2. Aniseikonia - Effects 3. Eikonometers - Design 4. CAA TDR 30.

Intracellular oxidative enzymes: Glucose - 6-PO_4 dehydrogenase in oral, ocular, liver, and brain cortex tissues, by Bertram Eichel. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 10p graphs, tables. Order from OTS. 50 cents. PB 121587

Spectrophotometrically, glucose-6-phosphate dehydrogenase protein activity of tissue homogenates behaves in accord with zero order reaction kinetics. Good straight line proportionality was obtained between activity and homogenate concentration. Only the liver exhibited the capacity for the endogenous reduction of TPN in the absence of glucose-6-phosphate. The retina possesses the largest concentration of the enzyme. Comparisons have been made between the other tissues studied and the retina (the mean retina unit activity taken as 100 percent). The enzyme is distributed in virtually all mammalian tissues. AF SAM R 56-31.

Postmortem changes in the vestibular and cochlear receptors, by César Fernández. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jul 1956. 20p photos. Order from OTS. 50 cents. PB 121593

A study was made under light microscopy of the sequence of histologic changes of the vestibular and cochlear structures in guinea pigs as autolysis progressed. In postmortem immersion, diffusion of the fixative was a slow process, taking hours to reach the inner ear structures, and therefore the changes which appeared were nothing other than postmortem changes. AF SAM R 56-118.

Studies on cutaneous heat losses. Part 9: Cutaneous temperature gradients, heat losses and blood flows in the dog's footpad, by A. C. Higginbotham, H. E. Ederstrom and A. B. Hertzman. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero-Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1952. 15p photo, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122824

The application of the Fick principle to the calculation of cutaneous blood flow from estimations of surface heat losses and measurements of tissue temperatures was examined in the dog's footpad. The rigorous satisfaction of the observational requirements in the application of this principle imposed the necessity of extreme accuracy in the measurement of tissue temperature gradients. It was concluded that the practical applicability of this method is therefore limited to special circumstances. AD 5223. For Parts 1-8, 10-14 see PB 106376, 106958-106959, 107579, 107466, 107580-107582, 122825-122826, 114175-114177. AF TR 6680, Part 9. Contract AF 18(600)-96.

Studies in respiratory physiology: Chemistry and mechanics of pulmonary ventilation, by W. O. Fenn, A. B. Otis and H. Rahn. Rochester. University. Dept. of Physiology. Aug 1951. 559p photos, diagrs, graphs, tables. Order from OTS. $6. PB 121572

ATI 125852. Previously entered as PB 106704. 1. Respiration - Physiology 2. Respiration - Volume determination 3. Respiration - High altitude 4. Respirators 5. Pressure breathing 6. Contract W33-038-ac-14716 7. AF TR 6528.

Tissue citric acid content and susceptibility to infection in mice acclimatizing to and recovering from altitude, by L. Joe Berry. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 7p tables. Order from OTS. 50 cents. PB 121592

Citric acid concentration of blood, liver, spleen, kidney, duodenum, and heart of mice acclimatizing to a simulated altitude of 20,000 feet progressively declined to a level 30 percent below control values (heart 20 percent) after 3 weeks in decompression chambers and remained unaltered during 3 additional weeks of exposure. Animals kept in the chambers for 3 weeks and returned to normal atmospheric pressures showed no change in citrate concentration after 5 days of recovery. After 10 days of recovery, liver and spleen had normal amounts of citric acid, but remaining specimens were normal only after 14 days. Susceptibility to Salmonella typhimurium infection was greatest when the citric acid concentration was significantly lower than that of the control group. When citrate was normal, susceptibility was normal. AF SAM R 56-110.

Urinary excretion and plasma levels of free ninhydrin-reactive compounds in X-irradiated rats, by R. E. Kay, D. C. Harris and C. Entenman. U. S. Naval Radiological Defense Laboratory, San Francisco, Calif. Aug 1955. 17p tables. Order from LC. Mi $2.40, ph $3.30. PB 122906

Fasted rats were exposed to sublethal (450 r) or superlethal (2500 r) whole-body doses. Twenty-hour urines were taken from 2 days pre- to 3 days post-irradiation. AD 72949. US NRDL TR-53. NMRI Proj NM 006 015.04.

METALS AND METAL PRODUCTS

A. C. magnetic properties of ferroxcube III, by W. W. Talbert. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 19p drawing, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120942

A comprehensive survey of the magnetic properties of Ferroxcube III was made for the frequency range of 0.2 to 200 kilocycles per second. The variation of a-c permeability, with d-c biasing field, frequency, and a-c- biasing field as parameters, is presented. NAVORD 1844.

Aluminum coatings on stainless steel, by J. E. Srawley. U. S. Naval Research Laboratory. Oct 1956. 41p photos, graphs, tables. Order from OTS. $1.25. PB 121487

A limited investigation of the resistance of aluminum-coated, type 310 stainless steel to attack by fuel-ash constituents has been carried out. The coatings were applied in the laboratory by hot-dipping and were subsequently processed by heat treatment. Within the limitations of the experimental procedures, which were confined to a testing temperature of 1700°F, the coated specimens did not exhibit substantially better resistance than the uncoated steel. Variations in heat treatment, including the use of a recommended procedure, had little effect on resistance. NRL R 4838.

Cast copper anti-friction steel (Liteinye medistye antifriktsionnye stali), by A. A. Lunev. Translated by Rose Jermain. Jan 1956. 15p photos, graphs, tables. Order from OTS. 50 cents. PB 121364

Steels containing about 30% copper with aluminum and lead additions are proposed for anti-friction bearings and brass or bronze substitutes. Translated from Liteinoe Proizvodstvo, no. 5, 1955, pp. 15-18. NAVSHIPS T 599. STS 228.

Causes of porosity and leakage in non-ferrous castings. U. S. Naval Research Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

Heat treatment of leaky bronze castings for improving pressure tightness, by Fred L. Riddell. Nov 1944. 30p photos, drawings, graphs, tables. Mi $2.70, ph $4.80. PB 120754

1. Bronze castings - Leakage 2. NRL M 2416.

Foundry details for 3rd stage cylinder $7\frac{1}{2}$ cu. ft. high pressure air compressor. Progress report, by A. H. Hesse and R. H. Brouk. Feb 1943. 13p photos, drawings, table. Mi $2.40, ph $3.30. PB 120613

1. Castings - Leakage 2. Castings - Porosity 3. Castings, Composite 4. NRL M 2003.

Combined effects of carbon, oxygen, nitrogen and hydrogen on the properties of titanium sheet weldments, by John F. Rudy. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory. Directorate of Research, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1956. 44p photos, drawings, diagr, graphs, tables. Order from OTS. $1.25. PB 121491

Four series of interstitial alloys were melted and rolled into sheet. The first series contained three levels of hydrogen ranging up to 0.063 weight percent. The second series contained three levels of the elements oxygen and carbon combined, ranging up to 0.200% oxygen and 0.239% carbon. The third series contained oxygen and nitrogen in three levels ranging up to 0.166% oxygen and 0.120% nitrogen. The fourth series contained nitrogen and hydrogen in three levels ranging up to 0.102% nitrogen and 0.088% hydrogen. In addition to these alloys, a base metal ingot which contained no intentional addition was also melted and rolled into sheet. Inert gas shielded arc welds were made in 1/8 inch sheets of each of the thirteen alloys. The physical properties of these alloys were determined by bend tests, tensile tests, impact tests, hardness measurements and metallographic observations for both the welded and unwelded material. These data will aid in establishing maximum allowable combined percentages of carbon, oxygen, nitrogen, and hydrogen for weldable titanium sheet. Project no. 7351. Summarizes work from Sep 1953 to Dec 1955. AF WADC TR 56-121.

Comparison of theoretical and experimental results for 24S-T and 75S-T aluminum alloy columns buckling in the elastic and inelastic ranges, by Bo Braathen and Bryan R. Noton. Flygtekniska Försöksanstalten (FFA), Stockholm. Mar 1956. 31p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123454

An investigation of the elastic and inelastic buckling of pin-ended and flat-ended 24S-T and 75S-T aluminium alloy columns of rectangular cross-section has been carried out. One hundred and fifty specimens in both extruded and rolled materials were tested. In order to facilitate a study of the extended Southwell method for predicting buckling loads, strain gauge readings have been taken on some of the pin-ended columns in 24S-T aluminium alloy. The theoretical ultimate loads were calculated using the tangent-modulus theory, the reduced-modulus theory and the extended Southwell method, and curves of comparison have been prepared from these values. FFA 66.

Controlled directional solidification in non-ferrous castings by the use of insulating materials, by William C. Wick. U. S. Naval Research Laboratory. Jun 1945. 45p photos, drawings, diagr, graph, tables. Order from LC. Mi $3.30, ph $7.80. PB 123371

1. Steel castings - Solidification - Research
2. NRL M 2567.

Creep properties of metals under intermittent stressing and heating conditions. Part 5: Further creep results on Alclad 7075-T6 aluminum alloy and consideration of analytical procedures, by N. H. G. Daniels and H. B. Masuda. California. University. Institute of Engineering Research, Berkeley, Calif. May 1956. 97p. Order from OTS. $2.50. PB 121476

A further study of the creep properties of aluminum alloy Alclad 7075-T6 (Clad 75S-T6) under isothermal intermittent stressing and under cyclic temperature steady load conditions has been made at 300°F, 450°F, and 600°F. Neither the correlation method nor the use of comparisons based on net time under load were successful at 600°F for the extreme types of cycle used. Correlations for other alloys are also given. The cyclic temperature, steady load creep data were also subjected to attempted analysis using other correlation methods available in the literature, but these did not seem superior to the empirical method. Other intermittent condition creep data in the literature which have become available since the last report were also analyzed, and the limitations of the method, as discussed therein, were confirmed. Project no. 7360. Covers work accomplished between Oct 1954 and Oct 1955. For Part 4 see PB 121435. AF WADC TR 53-336, Part 5. Contract AF 33(038)-11502.

Development of titanium-base alloys for elevated temperature application. Part III, by William F. Carew, Frank A. Crossley and Donald J. McPherson. Armour Research Foundation, Chicago, Ill. May 1956. 101p photos, graphs, tables. Order from OTS. $2.75 PB 121467

The principal objective of the work reported herein was a determination of the effects on mechanical properties of complexing the α and β phases of a promising α-β type alloy, Ti-6Al-3Mo. Tin and zirconium were employed as β complexers and chromium, manganese, and vanadium were employed as α complexers. Age hardening characteristics of Ti-Al-Ag alloys were determined. Further studies on the nature of embrittlement in binary Ti-Al alloys were carried out and results of these studies are reported. Project no. 7351, Task no. 73510. For Parts 1-2 see PB 119008-119009. Covers period of work from Jan 7 to Dec 31, 1955 under Contract AF 33(616)-2853. AF WADC TR 54-278, Part 3.

Development of transformation data for special titanium alloys. Interim technical report no. 5 covering the period Dec 1, 1954 - Apr 30, 1955 under Contract no. DA 11-022-ORD-1292, by A. W. Goldenstein and W. Rostoker. Armour Research Foundation, Chicago, Ill. May 1955. 28p photos, diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122846

The isothermal transformation characteristics of a 6% aluminum and 4% vanadium titanium alloy have been studied. The investigation included the establishment of a TTT chart, metallographic examination of transformed structures and measurement of tensile and impact properties of transformed specimens. Some correlation between the mechanical properties and structure was established. Isothermal transformation heat treatments which produced optimum tensile and impact properties, and those which induced brittleness were recognized. ARF Proj B 057, Report no. 5.

Development, operation and foundry application of the spiral fluidity mold for measuring the fluidity of cast steel, by Howard F. Taylor and Edward A. Rominski. U. S. Naval Research Laboratory. May 1941. 20p photos, drawings. Order from LC. Mi $2.40, ph $3.30. PB 120513

1. Steel castings - Physical properties - Tests
2. NRL H 1731.

Ductility and fracture resistance of ship plate, by A. E. Ruark, W. J. Ferguson, H. L. Smith, G. A. Hornbeck, I. R. Kramer, P. E. Shearin, R. M. Trimble and H. N. Michie. U. S. Naval Research Laboratory. Nov 1946. 94p photos, diagrs, graphs (5 fold), tables. Order from LC. Mi $5.40, ph $15.30. PB 120753

1. Ships - Plates - Fracture tests 2. Ships - Plates - Impact tests 3. NRL O 2796.

Dynamic creep, stress-rupture, and fatigue properties of 24S-T4 aluminum at elevated temperatures. Part I: Unnotched specimens, by Fred W. de Money and Benjamin J. Lazan. Minnesota. University, Minneapolis, Minn. Mar 1954. 51p photos, drawing, diagrs, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 122865

Fatigue, stress-rupture, and creep data obtained under various combinations of mean and alternating axial stress are presented and discussed for rolled aluminum alloy 24S-T4 at 300° and 500°F. The data are presented as S-N curves and stress range diagrams to show the effect of temperature, alternating-to-mean load ratio, and stress magnitude on the fatigue, stress-rupture and creep properties. The effect of temperature and alternating-to-mean ratio on the characteristics of the creep curve is discussed on the basis of "static" and "dynamic" types. The role of both creep and fatigue as factors in rupture is discussed with particular reference to temperature and alternating-to-mean ratio. AF WADC TR 53-510, Part 1. AD 36901. Contract AF 33(038)-20840.

Effect of alloying elements on the hardenability of steel, by F. M. Walters, Jr. U. S. Naval Research Laboratory. Mar 1942. 14p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120551

1. Steel - Hardenability - Effect of alloys 2. NRL M 1850.

Effect of baking on delayed fracture of electroplated ultra high-strength steel, by B. F. Brown. U. S. Naval Research Laboratory. Oct 1956. 20p photo, graphs, tables. Order from OTS. 50 cents. PB 121499

The merits of the various methods which are used to test electroplating embrittlement are discussed. Delayed fracture tests on notched tensile specimens were conducted to assess the relief of this embrittlement in ultra high strength by baking at 350°F after plating. For chromium-plated steel this relief was essentially complete after baking 24 hours. For cadmium-plated steel the relief was incomplete even after baking 200 hours. For zinc-plated steel little relief was seen even after baking 200 hours. NRL R 4839.

Effect of crack length and stress amplitude on growth of fatigue cracks, by Waloddi Weibull. Flygtekniska Försöksanstalten (FFA), Stockholm. May 1956. 44p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 123453

Earlier observations have indicated that the growth rate of a fatigue crack, which in usual fatigue tests with constant load amplitudes rapidly increases with the length of the crack, would be constant if the stress amplitude were kept constant, i.e. that the observed increase of the rate is entirely due to the increase in stresses caused by the decreasing cross-sectional area. In order to verify this assumption, fatigue tests with notched specimens of Unclad 24S-T and Alclad 75S-T sheets have been run with nearly constant stress amplitudes, obtained by reducing the load in proportion to the remaining area. The investigation has confirmed that for the tested specimens the rate of growth seems to be completely independent of the crack length since the transition period has been passed. The relationship between stress amplitude and growth rate has been determined. FFA 65.

Effect of quenching temperature on the results of the end-quench hardenability (Jominy) test, by Arthur L. Christenson and Edward C. Nelson. U. S. Naval Research Laboratory. Jun 1943. 24p photo, drawing, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120522

1. Steel - Hardenability - Tests 2. Steel - Jominy tests 3. Steel - Quenching media - Hardening effects 4. NRL M 2092.

Effect of ultrasonics on molten metals, by J. Byron Jones, John G. Thomas and Carmine F. dePrisco. Aeroprojects Inc., West Chester, Pa. Jan 1955. 127p photos, diagrs, graphs, tables. Order from OTS. $3.25. PB 121403

The application of ultrasonics at a frequency of about 15 kc to small melts of 195 aluminum alloy resulted in accelerated degassing. Grain refinement was observed only when ultrasonic energy was introduced at or above the liquidus temperature. A microphone to appraise elastic energy levels in liquid melts was devised. Extensive investigations of the problems incident to the transmission of elastic vibratory energy into the molten metals were carried out, and the requirements therefore are reported. Project no. 7351. AF WADC TR 54-490. Contract AF 33(616)-2050.

Effects of intermittent versus continuous heating upon the tensile properties of 2024-T4, 6061-T6, and 7075-T6 alloys, by G. W. Stickley and H. L. Anders. U. S. National Advisory Committee for Aeronautics. Aug 1956. 7p tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123536

The object of these tests was to determine the effects of intermittent and continuous heating at 300 and 400°F, for total periods of 100 and 200 hours, upon the tensile properties of 2024-T4 and 6061-T6 alloy rolled-and-drawn rod and 7075-T6 alloy extrusions, at room temperature and at the temperature of heating. The effects of intermittent heating were found to be cumulative and the same as for continuous heating. NACA TM 1419.

Evaluation of preheat and post-heat treatment of welds on thin sections of steel NE 8630, by I. C. Mattson and C. E. Hartbower. U. S. Naval Re-

search Laboratory. Mar 1946. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123373

1. Steel alloys - Heat treatment 2. Steel alloys - Welding - Tests 3. NRL M 2556.

Evaluation of titanium aircraft parts semi-finished products, by F. J. Gillig and L. W. Smith. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Aug 1954. 74p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 122462

A contact survey of 34 of the major commercial producers of aircraft engines and aircraft in the United States was conducted for the purpose of determining the difficulties and problems that have been encountered in the fabrication and processing of titanium and titanium alloys for aircraft applications. AF WADC TR 54-404. Contract AF 33(616)-471.

Exploratory research in the field of container materials for titanium, by W. B. Crandall, K. D. Scheffer, C. H. McMurtry and R. B. Burdick. Alfred University, Alfred, N. Y. Jan 1955. 46p photos, diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122863

Five intermetallic combinations were investigated as containers for titanium. These were: zirconium-silicone, zirconium-aluminum, calcium-aluminum, molybdenum-aluminum, and molybdenum-zirconium. The selected compounds were synthesized, hot-pressed into crucibles, cleaned, and tested in the following manner: (1) Ti-75A and the alloy RC-130AW were melted in crucibles of the selected compositions for various times and degrees of superheat, up to ten minutes at 150°C above the melting points, (2) evaluation of the solidified melts were made by hardness tests, microstructure examination, carbon analysis, and quantitative spectrographic determinations of the percentages of Si, Mo, Al and Zr. From the tests conducted, it was determined that the crucibles formed from Mo_3Al rendered melts of the best quality of all those tested, with Mo_2Zr crucibles showing the next relative importance. Although the melts were contaminated by the furnace atmosphere, it was determined that they were picking up only a small and constant amount of crucible constitutents, thus placing relatively high significance on Mo_3Al as a container material for titanium. Ordnance project TB 4-15. WAL report no. 13 (Final report). WAL R 401/201-4. Contract DA 30-115-ORD-498.

Influence of heat treatment on the magnetic properties of some armor-plate steels of the "N-A-X" and "STS" types, by Louis A. Carapella and Herman F. Kaiser. U. S. Naval Research Laboratory. Feb 1942. 29p photo, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122735

1. Armor plate - Magnetic properties - Effect of heat treatment 2. Steel - Heat treatment - Effect on magnetic properties 3. NRL M 1842.

Installation of Naval Research Laboratory lamination detector at Philadelphia Navy Yard, by Kenneth C. Ripley. U. S. Naval Research Laboratory. Jan 1939. 34p photos, diagrs, table. Order from LC. Mi $3, ph $6.30. PB 123294

1. Metals - Testing equipment 2. Steel plates - Metallography 3. NRL M 1506.

Investigation of Prot accelerated fatigue test, by E. J. Ward and D. C. Schwartz. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1952. 31p photos, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122867

Prot has proposed a method of accelerated fatigue testing. The method consists of continuously increasing the stress on a test specimen until failure occurs. Specimens are tested at several rates of increasing stress. Then the failure stresses are plotted against the square root of the rate of increasing stress. Prot then proposes that a straight line drawn through the failure stresses will intersect the zero rate of increasing stress at the endurance limit. This project has investigated the validity of Prot's proposal for SAE 4340 steel and also for flash welded points in SAE 4340. The method was extended in an attempt to utilize statistical analysis of the data to estimate scatter of stress at the endurance limit. AD 2118. For description of Prot's method see PB 119814. AF WADC TR 52-234.

Low expansion alloys for main steam lines, by I. R. Kramer. U. S. Naval Research Laboratory. Jan 1940. 61p photos, diagr, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 123244

1. Alloys, High temperature - Thermal properties 2. Steam pipe lines - Materials - Tests 3. NRL M 1589.

Mechanical property, corrosion and welding studies on 6066 aluminum alloy, by John D. Wood. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jun 1956. 36p photos, graphs, tables. Order from OTS. $1. PB 121497

The mechanical properties and stress corrosion characteristics of 6066-T6 extrusion was studied. The effect of salt spray exposure on 6066-T6 sheet was determined and found to approach 2014-T6 alloy. In addition, the welding characteristics of 6066 were investigated and it was found that 6066 alloy can be arc welded using 6066, 716 and 195 alloy filler metals. Project no. 7351. Covers work from Sep 1954 to Sep 1955. AF WADC TR 56-99.

Plastic behavior of engineering materials. Part 3: Critical review and interpretation of the literature on plastic (inelastic) behavior of engineering metallic materials, by M. C. Steele, C. K. Liu, and J. O. Smith. Illinois. Engineering Experiment Station. Dept. of Theoretical and Applied Mechanics. Jun 1953. 255p diagrs, graphs, tables. Order from LC. Mi $11.10, ph $39.35. PB 122464

This report presents a critical review and an interpretation of the literature on the inelastic behavior of engineering metallic materials. The literature published in this field has assumed large proportions and only the important papers are selected for consideration. Theoretical reflections on the inelastic behavior of materials have wide application possibilities so that it was necessary to subdivide this report into six different chapters, each connected to a general or a specific design problem. AD 21919. For Parts 1-2 see PB 116839-116840. AF WADC TR 52-89, Part 3. Contract AF 33(038)-15677.

Principles of dispersion hardening which promote high-temperature strength in iron-base alloys, by E. E. Underwood, A. R. Elsea, and G. K. Manning. Battelle Memorial Institute, Columbus, Ohio. Jun 1956. 68p graphs, tables. Order from OTS. $1.75. PB 121455

The strength properties of an iron-20 per cent chromium base alloy, as influenced by ternary additions of titanium, beryllium, or boron, were studied from 80 to 1200 F. Property changes in these single-phase alloys were followed by means of tensile, creep-rupture, and hot-hardness tests, augmented by some X-ray and internal friction measurements. AD 97114. Project 7351, Task 70646. Covers work from Jan 14, 1955 to Jan 13, 1956 under Contract AF 33(616) 2785. AF WADC TR 56-184.

Properties and welding of aircraft tubing and plate of the SAE X4340 composition, by Clarence E. Jackson and Myron A. Pugacz. U. S. Naval Research Laboratory. Jan 1943. 61p drawings, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 120616

1. Tubes, Steel - Mechanical properties 2. Tubes, Steel - Welding 3. Tubing, Aircraft 4. Steel plates - Mechanical properties 5. Steel plates - Tensile properties 6. Steel plates - Welding 7. NRL M 2019.

Properties of active eutectoid titanium alloys, by R. F. Bunshah and H. Margolin. New York University. Research Division, New York, N. Y. Jun 1956. 70p photos, graphs, tables. Order from OTS. $1.75. PB 121481

The microstructure and mechanical properties of Ti-5Cu-3Al, Ti-8Cu-3Al, Ti-5Cu-3Al-2Sn and Ti-8Cu-3Al-2Sn alloys were studied. A stable alpha-plug-compound structure shows the best combination of strength and ductility. Microstructure and mechanical properties of binary Ti-Ni alloys were investigated. They are quite similar to those of binary Ti-Cu alloys. In line with some recent work on steel, nickel and zinc, some preliminary data on a binary Ti-2Cu alloy show a considerable increase in the strength of this alloy without loss of ductility, by a suitable prestrain and anneal treatment. The strengthening may be attributed to subboundaries produced thereby. Project no. 7351. Covers work from Jan 1, 1955 to Jan 31, 1956 under Contract AF 33(616)-2766. AF WADC TR 56-146.

Research of the weldability of iron alloys (comparison of V-notched and Tee-bend test specimens), by Clarence E. Jackson and E. A. Rominski. U. S. Naval Research Laboratory. Nov 1939. 29p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 123255

For earlier report see PB 120442.
1. Iron alloys - Welding 2. Iron alloys - Notch sensitivity 3. NRL M 1569.

Solidification studies on cast steel. Part II, by C. W. Briggs and R. A. Gezelius. U. S. Naval Research Laboratory. Jan 1935. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120502

For Part I see PB 120649.
1. Steel castings - Solidification - Research
2. NRL M 1108.

Some observations on the relationship between fatigue and internal friction, by S. R. Valluri. U. S. National Advisory Committee for Aeronautics. Sep 1956. 42p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123514

Results are presented of an investigation made to determine the internal friction and fatigue strength of commercially pure 1100 aluminum under repeated stressing in torsion at various temperatures and stress levels in an effort to find if there exists any correlation between internal friction and fatigue characteristics. NACA TN 3755.

Study of the possibility of reinforcing high-temperature alloys by addition of refractory powders, by John D. Burney. Mallory, P. R. & Co., Inc., Indianapolis, Ind. May 1956. 42p photos, drawing, graphs, tables. Order from OTS. $1.25. PB 121474

A study of the possibility of reinforcing 80 Ni - 20 Cr alloy by the addition of such refractory oxides as Al_2O_3, TiO_2, ZrO_2, Cr_2O_3 and SiO_2 was made. Several powder metallurgical fabrication techniques were investigated such as (1) pressing and sintering, (2) pressing, sintering and repressing,

(3) pressing, sintering followed by hot working, (4) hot pressing and (5) liquid phase sintering. Project no. 7350. AF WADC TR 56-190. Contract AF 33-(616)-2959.

Survey of low-alloy aircraft steels heat treated to high-strength levels. Part 5: Mechanical properties in the presence of stress concentrations, by George Sachs and E. P. Klier. Syracuse University, Syracuse, N. Y. Sep 1954. 150p photo, drawings, diagr, graphs. Order from OTS. $3.75. PB 121505

This report summarizes the results of impact tests and notch-tension tests on high-strength steels. The impact strength of constructional low-alloy steels generally exhibits a minimum at tempering temperatures between 500 and 750°F for short tempering times. Therefore, steels tempered either at about 400°F or over 800°F are preferably used. Also, high-strength steels with optimum impact strength at a given strength level are obtained by holding the carbon content as low as possible. The effects of the numerous variables encountered in processing and heat treating steels on the impact strength are apparently not universal and not well clarified and frequently are obscured by secondary effects, such as the softening associated with slack quenching. In contrast, the notch-strength in tension of high-strength steels appears to respond sensitively to a number of variables of different types such as magnitude of stress concentration, eccentricity of loading, section size of quenched and tested specimen, section size of product and method of quenching. The data available at present in these respects, are rather limited but appear to indicate universal trends. AD 50288. For Part 2, see PB 123090. AF WADC TR 53-254, Part 5. Contract AF 33(616)-392.

Survey report on shaping of steel by extrusion methods, by M. J. Wahll, M. Goldman, S. L. Case, M. C. Udy and F. W. Boulger. Battelle Memorial Institute, Columbus, Ohio. Jul 1954. 671p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $11.10, ph $102.65. PB 123002

This report presents the results of an engineering survey sponsored by Frankford Arsenal, dealing with hot and cold extrusion of steel, tooling materials, equipment, economics and possibilities of both. It contains an exhaustive bibliography of the literature published up to Dec 1953 including reference to extrusion of metals other than steel and to theoretical papers on the plastic flow of metals. Unclassified 25 Feb 1952. Looseleaf. Includes bibliography through Dec 1953. Contract DA 36-038-ORD-10681.

Tensile properties of AZ31A-O magnesium-alloy sheet under rapid-heating and constant-temperature conditions, by Ivo M. Kurg. U. S. National Advisory Committee for Aeronautics. Aug 1956. 21p diagr, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123513

Specimens of AZ31A-0 magnesium-alloy sheet were heated to rupture at nominal rates of 0.2° F to 100° F per second under constant tensile load conditions. The data are presented and compared with the results of conventional tensile stress-strain tests at elevated temperatures after 1/2-hour exposure. A temperature-rate parameter was used to construct master curves from which stresses and temperatures for yield and rupture can be predicted under rapid-heating conditions. A comparison of the elevated-temperature tensile properties of AZ31A-0 and HK31XA-H24 magnesium-alloy sheet under both constant-temperature and rapid-heating conditions is included. NACA TN 3752.

Tensile properties of HK31XA-H24 magnesium-alloy sheet under rapid-heating conditions and constant elevated temperatures, by Thomas W. Gibbs. U. S. National Advisory Committee for Aeronautics. Aug 1956. 20p diagr, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123507

Specimens of HK31XA-H24 magnesium-alloy sheet from an experimental batch were heated to failure at nominal temperature rates from 0.2° F to 100° F per second under constant-load conditions. Rapid-heating yield and rupture stresses are presented and compared with the yield and ultimate stresses from elevated-temperature tensile stress-strain tests for 1/2-hour exposure. Linear temperature-rate parameters were used to correlate rapid-heating results by constructing master curves which can be used for predicting yield stresses and temperatures and for estimating rupture stresses and temperatures. NACA TN 3742.

Tests of 3%Al - 5% Cr titanium alloy, summary report, phase II, by S. S. Smith, Jr. Menasco Manufacturing Co., Burbank, Calif. Jun 1956. 143p photos, fold drawings, diagrs, graphs, tables (part fold). Order from LC. Mi $7.20, ph $22.80. PB 122847

Mechanical properties obtained by sectioning and tensile testing the first P2V-4 nose gear cylinder forging showed that the titanium alloy met specification requirements in all areas. Full scale fatigue testing to destruction of one P2V-4 nose gear equipped with a titanium cylinder showed the life of the cylinder to exceed that of a steel cylinder on a P2V gear previously tested by Lockheed Aircraft Corporation by a factor of more than 4. Drop testing a complete P2V-4 nose gear equipped with a titanium alloy clinder proved it to be functionally sound and showed a performance equal to that of a gear equipped with a steel cylinder. R-349. Contract NOA(S) 51-408-F, Amend. 1.

Titanium phase diagram study, by H. Margolin, J. P. Nielsen and H. K. Work. New York Univer-

sity. College of Engineering, Engineering Research Division. Apr 1954. 176p photos, diagr, graphs, tables. Order from LC. Mi $8.10, ph $27.30. PB 122910

An investigation of the phase relationships in the titanium-rich regions of the systems Ti-Pb, Ti-Mo-Al, Ti-Mo-O, Ti-Mn-Fe, Ti-Fe-Mo and Ti-Mn-O. Final report under Contract DA-30-069-ORD-208. WAL R 401/85-31.

Titanium, zirconium, and some other elements of growing industrial importance. Organization for European Economic Cooperation, Paris. Sep 1956. 111p photos, drawings, graphs, tables. Order from O.E.E.C. Mission, Publications Office, Suite 61, 2000 P St., N. W., Washington 6, D. C. $1.50. PB 123822

Project no. 247.
1. Alloys, High temperature 2. Titanium - Production 3. Titanium - Lubrication 4. Zirconium - Production 5. Beryllium - Production 6. Tantalum - Production 7. Molybdenum - Production 8. Tungsten - Production 9. Conductors, Semi - Materials 10. OEEC TAR 247 (55)1.

Variation of permeability with frequency, by R. K. Wangsness. Revised. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 28p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120915

1. Ferromagnetic materials - Magnetic properties - Measurement 2. NAVORD 1756, Revised.

Weldability tests of high tensile steel (Elimination of cracking tendency in welding Navy high tensile steel). Partial report, by Clarence E. Jackson. U. S. Naval Research Laboratory. Apr 1944. 23p photos, drawings, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120584

BuShips Welding test no. 325.
1. Steel - Weldability - Tests 2. Steel - Cracking tests 3. NRL M 2277.

Welding test 182, by Clarence E. Jackson and E. A. Rominski. U. S. Naval Research Laboratory. Nov 1939. 13p photos, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 123257

Will not reproduce well.
1. Electrodes, Chromium-nickel - Tests 2. Welding - Electrodes - Tests 3. Steel plates - Welding - Tests 4. NRL M 1576.

Working metals by electro-sparking, by A. V. Nosov and D. V. Bykov. Gt. Brit. Dept. of Scientific and Industrial Research. 1956. 70p drawings, diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 90 cents PB 122953

This book was written as a practical manual for all concerned with the operation of electro-spark units. The physical basis of working metals by electro-sparking is given; data are also given on the efficiency and accuracy of the method and on the quality of surface obtained with this technique. The main technological operations and the construction of the simpler machine tools and apparatus are described. The translation includes an outline of practical experience acquired in the workshop of industrial cooperative societies in Russia. S. O. code no. 47-192. Abridged translation of Elektroiskrovaia obrabotka metallov.

METEOROLOGY AND CLIMATOLOGY

Atlas of 700-MB five-day-mean northern hemisphere anomaly charts. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Jul 1955. 166p maps. Order from LC. Mi $7.80, ph $25.80. PB 122242

To accompany AF AWS TR 105-100/1 (PB 123040).
1. Charts, Weather 2. Weather forecasting - Use of upper air charts 3. Weather forecasting - Aids 4. Weather forecasting - Methods 5. Climatology 6. AF AWS TR 105-100/2.

Cosmic rays. California. University. Dept. of Physics, Berkeley, Calif. Feb 1955. 47p diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 122547

The purpose of the present experiment is to study further the intensities of some of the components of cosmic radiation at sea level and attempt to corroborate the existence of certain time variations reported by other investigators. Our problem then is to relate any observed time variations at sea level to true time variations of the primary cosmic radiation. Contents: No. 31. Cosmic ray time variations, by E. L. Chupp. - No. 32. Cosmic-ray intensity fluctuations at sea level, by Robert L. Chasson. Contract N6 ori-111, T. O. II, NR 021-007, Technical reports no. 31-32.

Development of practical, short-range, weather prediction techniques, by H. B. Visscher, R. M. Whiting, W. R. Biggers, P. W. Funke, R. J. Shafer, R. E. Bailey, and J. T. Hilworth. Eastern Air Lines, Inc. Meteorology Department, Municipal Airport, Atlanta, Ga. Dec 1955. 127p maps, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 122364

Prior scientific reports under this and previous Air Force contracts have been published as (1) Geophysical Research Paper No. 23, (PB 111268) and (2) Scientific Report No. 2, published December 1954. A supplementary method is developed for the movement of certain classes of mountain lows west of 95° longitude. This method corrects and refines

that portion of Scientific Report No. 2 which dealt with these mountain lows. A technique is developed to aid in drawing prognostic charts, particularly under conditions when there is no strong development or strong system susceptible to treatment under previous objective techniques. A method for predicting those line squalls which form along the Appalachian Mountains during the summer-time is developed and described. It involves the location of surface fronts and microstructure of the 500 mb chart. The problem of forecasting local thunderstorms which are not associated with fronts or line squalls is investigated and a method for predicting them based upon radiosonde data is devised. A method of predicting the movement of cold lows at the 500 mb level is devised. The complex problem of predicting clear skies using 500 mb parameters is investigated and detailed methods for predicting likely areas, and the attendant probability is given. Third report in this series. For first report see PB 111268. Second report is Scientific report no. 2 under Contract AF 19(604)-1066. AF CRC TN 56-258. Contract AF 19(604)-1066, Scientific report no. 1.

Effects of the primary cosmic radiation on matter, by Harold Curtis. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Physics Laboratory, Bedford, Mass. Jan 1956. 25p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122233

A survey of the present knowledge of the primary cosmic radiation is presented. The data on the flux of particles as functions of energy, latitude, altitude and chemical type have been reproduced in a consistent set of units. The effects of the exposure of materials to this radiation in terms of the produced ionization are predicted. AF GRD SG 78. AF CRC TN 56-200.

Frequency distributions of predominant tropopause heights along 80 degrees west in summer, by James M. Havens and Werner A. Baum. Florida State University. Dept. of Meteorology, Tallahasse, Fla. Aug 1955. 24p maps, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123445

Sample frequency distributions of height of the predominant tropopause in summer, at various latitudes along 80°W, as interpolated from analyzed tropopause-contour charts, are studied. At most locations the frequency distributions are such as to be statistically acceptable as being samples drawn from relatively simple theoretical parent distributions. It is therefore possible to compute theoretical frequencies of predominant-tropopause height for individual class intervals of height at these locations. Technical report 1. Contract Nonr-1600(00), NR 082-071.

Further studies of thunderstorm conditions affecting flight operations: Turbulence, by Roscoe R. Braham, Jr. and Fred W. Pope. U. S. Air Force. Air Weather Service. Andrews Air Force Base, Washington, D. C. Mar 1949. 32p diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123221

Data used in this study were obtained from P-61C airplanes flying through storms in Florida and Ohio in 1946 and 1947. Gusts and drafts encountered were computed from records obtained from equipment installed by NACA and from photographs of a special panel of flight instruments. AF AWS TR 105-39.

Half-hemispheric 500 mb topography description by means of orthogonal polynomials. Part I: Computation, by Reid A. Bryson and Peter M. Kuhn. Wisconsin. University, Dept. of Meteorology, Madison, Wis. Feb 1956. 48p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122217

High speed computing techniques employing the magnetic drum digital computer at the University of Wisconsin make feasible the use of an objective topography description of the 500 mb and other surfaces. Contours over the half hemisphere bounded by 0°W, 10°N, 180°W and 70°N are fitted by a combination of twenty-two Tschebyscheff orthogonal polynomials. Scientific report no. 4. AF CRC TN 56-260. Contract AF 19(604)-992.

Informal papers in Arctic meteorology. Supplement no. 1. McGill University. Arctic Meteorology Research Group, Montreal, Canada. Jun 1956. 31p graphs. Order from LC. Mi $3, ph $6.30. PB 122363s

Supplement to PB 122363. Contents: Use of Fjørtoft's graphical solution for the barotropic atmosphere as a possible analytical aid in Arctic research, by Herbert J. Avise. Abstracts of other lectures.
1. Fjørtoft's theory 2. Atmosphere, Barotropic - Theory - Canada 3. Meteorology, Polar - Canada 4. Contract AF 19(604)-1141 5. AF CRC TN 55-896.

Investigation into the physical and electrical characteristics of sea ice, by William J. Dichtel and George A. Lundquist. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1951. 18p photos, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120912

Measurements of direct current resistivity, salinity and density as well as shadow photographs were made of sea ice samples as a function of time and depth for one winter at Point Barrow, Alaska. The shape and distribution of the high saline volumes was studied by means of shadow photographs. A theory and photographs of a process that could explain the higher surface saline layer is presented. Temperature was found to be a function of distance from the surface of the ice. Density determinations were inconclusive, probably because of the

random brine distribution in the ice. Volume resistivity was found to be a function of temperature and the direction in which the measurements were made. NAVORD 1769.

Magnetic atmospherics, by John B. Wilcox. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1952. 40p drawing, diagrs, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120948

Naturally occurring electromagnetic disturbances, commonly called atmospherics, have been investigated from the standpoint of their contribution to geomagnetic field oscillations in the audio frequency range. Thunderstorms and their accompanying electrical discharges have been surveyed as the major source of atmospherics. It has been found that currents in the idealized vertical lightning stroke of known length and location may be determined by the observation of magnetic atmospheric wave forms at two stations removed from the discharge by distances large compared to its length. NAVORD 2293.

Objective system for preparing operational weather forecasts, by Iver A. Lund and Eberhard W. Wahl. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Analysis Laboratory, Bedford, Mass. Nov 1955. 52p tables. Order from LC. Mi $3.60, ph $9.30. PB 122365

The contingency method reported on in a previous survey is reviewed and its applicability to short range forecasting problems is discussed in detail. A method for determining the best predictors to be used with this system is presented. An actual forecasting problem is used to illustrate how the forecasting system is developed. Forecasts were made by this system using independent data; they are compared with those made by various other techniques. AF CRC TN 55-219. AF GRD SG 75.

Plan-pattern of snow echoes at the generating level, by M. P. Langleben. McGill University. MacDonald Physics Laboratory. "Stormy Weather" Research Group. Feb 1956. 17p photos, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122247

A technique of obtaining constant-altitude upper-level maps from a series of PPI photographs at progressively increasing elevation angle is described. These maps have been used principally to study the snow echo pattern at the generating level. AF CRC TN 56-278. MW-24. Contract AF 19(122)-217.

Precipitation-static problem. Third partial report, by Ross Gunn. U. S. Naval Research Laboratory. Feb 1944. 19p photos, drawing, diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120740

1. Corona discharges - Intensity - Theory 2. NRL O 2243.

Primary cosmic radiation and its time variations, by S. F. Singer. Maryland. University. Physics Department, College Park, Md. May 1956. 145p diagrs, graphs, tables. Order from LC. Mi $7.20, ph $22.80. PB 122911

This report discusses (i) the quiescent (or average) primary spectrum, (ii) the latitude cutoff (the apparent absence of very low energy cosmic rays), and (iii) the really large variations, such as the solar flare increase and the magnetic storm decrease, where we have good hope of measuring the change in the primary radiation itself. Contract AF 18-(600)-1038. AF OSR TN 56-234.

Report on post-analysis of typhoons in the western north Pacific, 1947. U. S. Air Force. Air Weather Service. Andrews Air Force Base, Washington, D. C. Jul 1949. 35p maps, table. Order from LC. Mi $3, ph $6.30. PB 123222

1. Cyclones, Tropical - Forecasting 2. Typhoons - Seismological data 3. AF AWS TR 105-42.

Scientific reports under Contract AF 19(604)-1491, by James W. Warwick. Colorado. University. High Altitude Observatory, Boulder, Colo. Order separate parts described below from LC, giving PB number of each part ordered.

No. 1 for the period 15 Jun-15 Sep 1955. Jan 1956. 12p diagr. Mi $2.40, ph $3.30. PB 122221

The primary objectives of this contract are measurements of ionospheric absorption and refraction, of selected discrete radio noise sources, at low frequencies in the range from 15 Mc/s up to VHF. The present report, covering the first three months of operation of this contract, summarizes a number of fairly loosely inter-related researches directed both towards instrumental techniques that are necessary to conduct radio astronomy experiments in this frequency range, and towards ultimate theoretical interpretation of the eventual experimental data. AF CRC TN 56-164.

No. 2: Current (September 1955) status of English and French radio astronomy research on ionospheric and atmospheric problems. Jan 1956. 8p. Mi $1.80, ph $1.80. PB 122220

The report summarizes research in England and France in regard to structure of the ionosphere and troposphere by means of measures on discrete radio noise sources (radio stars) or the radio emission from the sun. AF CRC TN 56-165.

No. 3 for the period 15 Dec 1955 - 15 Mar 1956. Mar 1956. 12p diagrs. Mi $2.40, ph $3.30. PB 122219

This report discusses the problem of signal-to-noise ratio in the phase-switching interfero-

meter pioneered by Ryle at Cambridge, Eng., as well as the overall operation of the equipment. AF CRC TN 56-192.

Short range and extended forecasting by statistical methods. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Feb 1948. 207p diagrs, graphs, tables. Order from LC. Mi $9.30, ph $31.80. PB 123220

This is a final report on research extending over a period of about four years under Contract W-30-053-ac-1065 with the Division of Industrial Cooperation, Massachusetts Institute of Technology. It discusses the mathematical theory of the prediction of time-series, harmonic analysis of records of movement of major centers of action, temperature prediction, pressure studies, non-linear prediction, analogue techniques, and special analogue studies. Contract W 30-053-ac-1065, Final report. AF AWS TR 105-38.

Solar spectrum from 4.5μ to 5.3μ as observed at Columbus, Ohio, by J. H. Shaw and H. Z. Cummins. Ohio State University. Dept. of Physics and Astronomy, Columbus, Ohio. Feb 1956. 27p graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 122944

A high-resolution map of the solar spectrum covering the region from 4.5μ to 5.3μ is presented, together with a list of line frequencies. Although the general appearance of the spectrum is similar to that obtained in an earlier study, many new weak lines have been observed. Some of these lines are believed to be caused by CO in the solar atmosphere and some by ozone in the earth's atmosphere. AF CRC TN 56-455. OSURF Proj 587, Scientific report no. 2.

Structure of small scale and middle scale turbulence at Brookhaven, by H. A. Panofsky and Isaac Van der Hoven. Pennsylvania State University. Mineral Industries Experiment Station. Dept. of Meteorology. Mar 1956. 83p graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 122218

This report summarizes the result of experiments at the Brookhaven tower made in 1953-55. It deals with the properties of spectra and cross spectra of the velocity components, as obtained from tower, balloon and airplane observations. Based on the spectra and cospectra, high-frequency corrections are calculated for Reynolds stresses and turbulent energy. Finally, methods are suggested to estimate energy and stress from wind and radiation. Scientific report no. 1 under Contract no. AF 19(604) 1027. See also PB 114773 for final report under earlier contract. AF CRC TN 56-254.

MINERALS AND MINERAL PRODUCTS

Magnetic anisotropy of cobalt ferrite and nickel ferrite, by Henry Shenker. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1955. 54p drawings, graphs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120874

The purpose of this work was the study of the magnetic anisotropy energy of cobalt ferrite and nickel ferrite over the temperature range from 20°K to their Curie temperatures (approximately 800°K respectively). A short description is given of the theories of ferromagnetism and ferromagnetic anisotropy in cubic crystals. Bibliography pp. 34-37. Includes Change 1, 15 Nov 1955. NAVORD 3858.

Properties of molding sands under conditions of gradient heating, by N. C. Howells, R. E. Morey, and H. F. Bishop. U. S. Naval Research Laboratory. Oct 1956. 14p photos, drawings, graphs. Order from OTS. 50 cents. PB 121540

A new hot strength test has been used on molding and core sands. This test differs from the conventional isothermal test in that it reproduces in a compression test specimen the thermal gradients that surround a solidifying casting. A compressive strength vs. temperature curve obtained by this gradient heating method was relatively smooth and showed a continuous decrease instead of the sharp peaks and valleys characteristic of a curve obtained by the conventional test. Various molding sand and core sand mixtures were tested under conditions which represent mold interface regions for castings that solidify in the vicinity of 2000° to 2400°F. NRL R 4857.

Synthetic steel molding sands, by R. E. Morey. U. S. Naval Research Laboratory. Feb 1940. 26p photos, drawing, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 123245

Several variables producing inaccuracies in sand test results are studied and recommendations are made for avoiding or minimising these variables. A study of a fine synthetic molding sand over a wide moisture range is made with other sands shown for comparison. Other points investigated are the effect of silica flour when used to "close up" a sand, the effect of bentonite and sand grain size on the surface finish of steel castings and the effect of the relative humidity of the atmosphere on dry sand strength. NRL M-1590.

Vanadium oxides in converted slags (Okislee vanadiya v peredel'neekh schlakakh), by A. N. Morozov. Translated by Lloyd G. Robbins. Apr 1956. 34p photos, drawing, diagrs, tables. Order from OTS. $1. PB 121365

In basic reduction slags, vanadium occurs in the form of considerably dissociated compounds of V_2O_3 with FeO and CaO (possibly also with MgO and MnO). In acidic slags, vanadium trioxide exists principally in a free state. In both cases, the higher vanadium oxides will form by oxidization of the upper layers of the slag in a furnace open to the atmosphere. Permanent compounds of vanadium pentoxide with calcium oxide can not form in liquid slag because decomposition of calcium vanadates occurs at temperatures lower than the temperature of the metallurgical reduction. Translated from Metallurg (USSR), no. 1, 1939, pp. 15-27. NAVSHIPS T 601, STS 220.

ORDNANCE AND ACCESSORIES

Dependence of the water-entry cavity on the surface condition of a missile model, by Albert May. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1951. 16p photo, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120914

Since the cavity formed when a missile enters water may affect the trajectory and the general performance of the missile, an investigation was carried out on those factors which influence the cavity formation at velocities near the minimum velocity for cavity production. Such velocities are in the range frequently used in model studies. For low-speed spherical missiles entering the water vertically it was found that the performance of models with contaminated surfaces appear to be the proper extrapolation of high-speed behavior. NAVORD 1763, NOL ARR 21.

Determination of average equivalent weight and average equivalent volume and their precision indexes for comparison of explosives in air, by J. Maserjian and E. M. Fisher. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1951. 22p table. Order from LC. Mi $2.70, ph $4.80. PB 120851

Data for mean peak pressures and positive impulses determine figures of merit which express the performances of explosives fired in air. These are the equivalent weight (EW) and equivalent volume (EV). Two independent means, the graphical and relative pressure methods, are described to obtain EW and EV from peak pressure measurements. Two comparable methods are described to obtain these figures of merit from positive impulse data. A method is also described for determining EW and EV from an analytical study of the positive impulse data. The discussion includes the statistical treatment of air blast data and methods of assigning precision indexes. NAVORD 2264.

Development of remote control for the JB-2 flying bomb, by M. W. Rosen, M. L. Kuder and E. N. Pettitt. U. S. Naval Research Laboratory. Oct 1945. 87p photos, fold drawings, fold diagrs, table. Order from LC. Mi $4.80, ph $13.80. PB 122791

Descriptions of equipments developed during the program are given. Details of equipment used in the system, but previously developed are referred to existing instruction manuals. Since this report presents instructions for installation of equipment, tuning, adjustments and operation, it may serve as a preliminary system instruction manual. NRL R 2616.

Evaluation of the detonator Mk 55 Mod O (NOL-Re2b-41-151), by J. H. Herd. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1951. 14p photos, drawing, tables. Order from LC. Mi $2.40, ph $3.30. PB 122438

1. Mk 55 Mod O (Detonator) 2. Detonators, Primer - Tests 3. NAVORD 2130.

On the drag coefficient of spherical missiles after entry into water, by Albert May. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1951. 17p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120854

1. Spheres - Drag coefficient 2. NAVORD 2241.

Primer to replace primer cap no. 3 improved fuze explosive trains, by G. U. Graff. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 11p tables. Order from LC. Mi $2.40, ph $3.30. PB 120808

1. Detonators, Primer - Design 2. NAVORD 2456.

Projectile shock on aircraft armor supports: First partial report, by Erwin W. Kammer. U. S. Naval Research Laboratory. Jul 1944. 24p photos, drawing, diagr, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 120706

Unclassified 1 Sep 1955.
1. Armor, Aircraft - Supports - Tests 2. Armor plate - Ballistic tests 3. Penetration - Armor 4. NRL O 2331.

Significant parameters for the expansion of propellant gases in an idealized gun, by W. R. Heybey. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1951. 17p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122061

Earlier phases of the work reported in NOL M 10819.
1. Gases, Propellent - Thermodynamics 2. NAVORD 1582 3. NOL ARR 10.

Statistical study of primer sensitivity drop-tests, by J. R. Sullivan. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1953. 53p graphs, tables (part fold.) Order from LC. Mi $3.60, ph $9.30. PB 120867

A study was made of the validity of the method used in conducting primer and detonator drop-tests at the Naval Ordnance Laboratory. Details of primary interest were (a) arithmetic vs. logarithmic intervals, (b) variation in interval size, and (c) the effect of sample size on the accuracy of the results obtained. Mk 101 type and Mk 102 type primers were subjected to sensitivity tests by the up-and-down (Bruceton) technique and the rundown technique. A detailed statistical analysis was conducted on the results of the sensitivity tests. NAVORD 2226.

PACKING AND PACKAGING

Investigation of containers for the shipment and storage of RH-195, by J. E. Johnson. U. S. Naval Research Laboratory. Nov 1945. 23p tables. Order from LC. Mi $2.70, ph $4.80. PB 120752

1. Hydantoin, 1,3,Dichloro-5,5-dimethyl 2. Saran (Trade name) - Uses 3. Containers, Shipping - Closures 4. Containers, Storage - Tests 5. NRL P 2697.

Preservation of the exterior surfaces of wooden shipping containers to retain identification symbols in long-term outdoor storage, by H. W. Eickner and E. A. Mraz. U. S. Forest Products Laboratory, Madison, Wis. Ordnance project no. TB5-1101F. Dept. of the Army project no. 591-07-001. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1. May 1955. 53p photos, tables. $1.50. PB 121432

This preliminary technical report summarizes the evaluation tests performed on two hundred and thirty-five stencil marking systems, including various combinations of pretreatments, marking media, and topcoat treatments. The tests were made on small test panels of red oak, southern yellow pine, and Douglas-fir. The legibility of the various stencil systems was compared after exposure of the test panels to soaking and drying, high and low humidity, accelerated weathering, and to six-month weather exposure. FPL R 55-1, Part 1.

Part 2. May 1955. 25p photos, diagrs, table. 75 cents. PB 121431

This preliminary technical report summarizes the work performed in the preparation, stenciling, treating, and placement of wooden shipping containers in outdoor storage at Madison, Wis.; Panama Canal Zone; Fort Churchill, Canada; and Yuma, Ariz. Four marking materials were used in combination with two undercoat and four topcoat treatments on boxes of red oak, southern yellow pine, and Douglas-fir. Boxes will be withdrawn from each exposure site for examination and evaluation once each year. The test program will continue for a period of five years. FPL R 55-1, Part 2.

PERSONNEL APTITUDE TESTING

Assessment program for OCS applicants, by Milton G. Holmen, Robert V. Katter, Ann M. Jones and Irving F. Richardson. George Washington University. Human Resources Research Office, Washington, D. C. Feb 1956. 52p tables. Order from LC. Mi $3.60, ph $9.30. PB 122208

This study was undertaken (1) to find out whether controlled rating situations used at the basic training center level could predict OCS success and failure well enough so that they might be developed as screening devices, (2) to analyze the graduation rates of groups of candidates who had received four different periods of pre-OCS training and orientation, and (3) to provide an objective description of candidates who pass and candidates who fail OCS. GWU HRRO TR 26.

Development of proficiency tests for basic combat and light infantry training, by Robert A. Baker, Guy Scott and Eugene F. MacCaslin. George Washington University. Human Resources Research Office, Washington, D. C. Jul 1955. 68p diagrs, graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 122874

The purpose of this study was to develop reliable and valid measures of the proficiency attained by trainees in basic and advanced infantry training. Each test consists of 17 subtests of the critical combat skills. The subtests were constructed in accordance with the advice and opinions of a large group of military experts, and only items which had the support of recognized authorities were included. Each test was evaluated for its validity, reliability, objectivity, ease of administration, and ease of scoring. GWU HRRO TR 19.

Experimental comparison of five different attitude indicators, by John F. Gardner and Robert J. Lacey. U. S. Air Force, Air Research and Development Command, Wright Air Development Center, Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. May 1954. 26p photos, tables. Order from LC. Mi $2.70, ph $4.80. PB 122869

Two studies were conducted in which five simulated aircraft attitude indicators, representing three different indicating principles, were compared. Two indicators were of the "earth reference" type, in which the moving element represented the horizon as on the conventional attitude indicator. Two indicators were of an "airplane reference" type, which presented aircraft rather than horizon movement. The fifth indicator provided a "stabilized sphere" type of presentation. Tests were made in a C-8 Link Trainer and records were made of pilot performance for a variety of flight maneuvers, control reversals following simulated rough air gusts, and pilot preferences. Major interest centered around comparison of the "earth reference" and "airplane reference" principles of attitude indication, since these provide opposite directions of movement on the indicator. AD 34642. AF WADC TR 54-32.

Human engineering experiment on electron tube test set TV-2/U, by Harold Zweigbaum. U. S. Camp Evans Signal Laboratory, Belmar, N. J. Apr 1955. 13p photo, graphs, tables. Order from OTS. 50 cents. PB 121398

Consideration of the man-machine relationship involved in the operation of electron tube test set TV-2/U led to the design of a statistical experiment to ascertain whether or not undue reliability was being placed on the precision of measurement obtained by a normal class of operators. Measurement data were obtained by two classes of operators, laboratory personnel whose readings were used as a standard of comparison, and depot personnel who had received both instructions in the use of the instrument and several weeks time for familiarization in its operation. Analysis of the components of variance indicated that major contributions to variation in results were those due to lack of reproducibility within a class of operators. Signal Corps project no. 2051B. Dept. of the Army project no. 3-27-01-013. SCEL TM 1642.

Program to test skill in terminal forecasting, by Irving I. Gringorten, Iver A. Lund and Martin A. Miller. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Analysis Laboratory, Bedford, Mass. Jun 1955. 70p diagrs, graphs, tables (part fold). Order from LC. Mi $3.90, ph $10.80. PB 123036

The primary purpose of this survey is to explain, in detail, how to initiate and conduct a verification program to determine the skill of the forecaster. AF GRD SG 80. AF CRC TN 55-227.

(Appendicies III-VI). Jun 1955. 47p tables. Order from LC. Mi $3.30, ph $7.80. PB 123036s

Appendix to Report 80 (PB 123036). AF GRD SG 80 (Annex). AF CRC TN 55-227A.

Relation of an indirect measure of attitude to expressed military attitude, by Elizabeth G. French. U. S. Air Force. Air Research and Development Command. Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1955. 10p table. Order from LC. Mi $1.80, ph $1.80. PB 123458

This paper describes an attempt to develop an indirect objective measure of attitude which would be related to more direct surveys of military attitude. In this study an objective indirect measure was developed and related to the direct measure currently in use. Some relationship was demonstrated between the two measures under conditions of experimental administration. In addition the indirect measure yielded similar distributions under experimental and operational conditions while the direct measure showed the expected higher mean and smaller variance under operational conditions. Project 7704, T. O. 77099. AF PTRC TN 55-72.

Relationships between a size-matching test and pedestal sight gunnery performance, by Walter Lesiw and Mymon Goldstein. U. S. Air Force. Air Research and Development Command. Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Feb 1956. 21p diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 123455

The present study undertook to determine the extent to which framing may be considered a task of perceptual recognition. Target diagrams similar to the pedestal sight visual display were prepared in printed test format. Instead of responding with muscular adjustments, as in usual pedestal sight performance, subjects simply judged whether the diagrams represented correct or incorrect framing. The bias favoring too-large framing circles, observed previously on the pedestal sight, was also found to hold for the printed test. Subjects differed from each other in over-all ability with the printed test, and these differences proved stable. However, relationships between the printed test and pedestal sight performance were, at best, moderate for framing and small for the other pedestal sight components. Some of the similarities and differences between the printed test and the pedestal sight, which are probably responsible for the magnitudes of the observed relationships, are discussed in the report. Project 7708, T. O. 77141. AF PTRC TN 56-29.

Tactical training of the infantry rifle squad, by M. Dean Havron, William A. Gorham, Peter G. Nordlie and Ralph G. Bradford. George Washington University. Human Resources Research Office, Washington, D. C. Jun 1955. 122p drawings, diagr, graphs, tables. Order from LC. Mi $6.30, ph $19.80. PB 122876

The purpose of this study was to develop training methods and procedures to increase the effectiveness of infantry rifle squads. Four methods of

training-designated the Control Method, the Group Participation Method, the Combat Fundamentals Method, and the Team Training Method, were developed. A different group of eight squads was trained by each of these methods, with all training conducted by Army instructors. At the end of training, performance tests were administered to each group of squads to evaluate the effectiveness of the different methods. GWU HRRO TR 18.

Trainfire 1: New course in basic rifle marksmanship, by Howard H. McFann, John A. Hammes and John E. Taylor. George Washington University. Human Resources Research Office, Washington, D. C. Oct 1955. 109p drawings, diagrs, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 122873

By means of suitable research, TRAINFIRE I proposed (1) to develop a practical basic course of rifle marksmanship instruction which will prepare the soldier to use his rifle effectively in combat and (2) to develop proficiency tests, based upon combat criteria, to measure the adequacy of this training. Comprehensive analyses of the situations confronting the rifleman in combat provided the bases for developing an experimental course of training and two proficiency tests (marksmanship and target detection), within the scope of the 90 hours or rifle marksmanship training prescribed. GWU HRRO TR 22.

PHOTOGRAPHIC AND OPTICAL GOODS

Airphoto patterns of soils of the western United States, by Robert E. Frost and K. B. Woods. Purdue University. Engineering Experiment Station. Aug 1948. 82p photos. Order from LC. Mi $4.80, ph $13.80. PB 123565

Supplements CAA TDR 52 (PB 122310).
1. Soils (Engineering) - Photographic analysis 2. Photography, Aerial - Interpretation 3. CAA TDR 85.

Analysis of the data obtained with a high speed streak camera, by Robert S. Allgaier. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 36p photo, drawing, graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120892

This report contains an analysis of the accuracy of the data obtained with a rotating drum streak camera. The camera photographs the rapidly changing separation of two components of an adiabatic gas compressor. The exposure time of the camera has been reduced from 10 to 1.5 microseconds. This has reduced the dynamic uncertainty, and has made it possible to achieve the desired precision of +2-1/2% of the separation measurement. The static uncertainty is now the largest uncertainty. See also NAVORD 3555 (PB 120844). Contents: Appendix 1. Analysis of the ratio vp/y. - II. Dynamic smearing at the minimum piston-end plug separation. NAVORD 3848.

Evaluation of the accuracy of Shoran-controlled photography, by Carl H. Hammack and LeRoy Lex. Jack Ammann Photographic Engineers, Inc., San Antonio, Texas. Contract DA 44-009-eng-1604. Project 8-35-05-001. Order separate parts described below from LC, giving PB number of each part ordered.

Mission I, parts A and B. n.d. 55f diagrs, graphs, tables. Mi $3.60, enl pr $10.80. PB 123677

The analysis endeavors to evaluate the accuracy of Shoran-controlled photography for the entire totality of observed measurements and for a set of measurements without the gross errors. The results of the analysis in each case show that accuracy of Shoran-controlled photography satisfies the requirement of 1:50,000 mapping. AD 32977.

Mission IA, part A. n.d. 35f diagrs, graphs, tables. Mi $3, enl pr $7.80. PB 123680

This report, second of six missions, contains an analysis of the errors found in reduced Shoran distances and in displacements of Shoran positions from photo plumb points as determined by the A-7 co-ordinatograph for Mission IA, Part A. It contains 5 sets of curves which compare the distribution of random errors found in the Shoran instruments as against the random errors occurring according to the law of probability for the same number of hypothetical frequencies (ERDL Report No. 1081). From these curves and allied data it is possible to evaluate the accuracy of the Shoran measurements. AD 33224. Declassified 7 July 1954.

Mission II, part B. n.d. 44f diagrs, graphs, tables. Mi $3.30, enl pr $9.30. PB 123676

There was found in this mission a synchronization error of approximately .138 sec. between the exposures of the Shoran recorder and those of the aerial camera. There is inserted in this report a brief summary covering the operational procedures and techniques used during each mission. There is, also, a review of the statistical evaluation of the accuracy obtained for each mission up to this time. AD 29452.

Mission IV, parts A and B. n.d. 58f diagrs, graphs, tables. Mi $3.60, enl pr $10.80. PB 123679

There was also found in this mission, similar to Mission II, Part B, a synchronization error of .071 seconds between the exposures of the Shoran recorder and those of the aerial camera. AD 32085.

Mission V, part A. n.d. 45f diagrs, graphs, tables. Mi $3.30, enl pr $9.30. PB 123675

There was found in this mission, a synchronization error of approximately .136 seconds between the exposures of the Shoran recorder and those of the aerial camera. Further analysis made by ERDL on Missions, I, Parts A & B, III, Part A, and II, Part B, revealed that Jaynes and Gent Shoran distances had additional constant errors when their distances exceeded 100 miles. Accordingly, a tabulation of revised mean errors occurring under these different circumstances was prepared and included in this report as Exhibit 20. Distributions about these various mean errors were combined resulting in a smaller standard deviation for these missions. AD 32014.

Final report. Six missions of the Arizona test area. n.d. 32f diagrs, graphs, tables. Mi $3, enl pr $7.80. PB 123678

This final report on the evaluation of the accuracy of high precision Shoran equipment combines the results with several modifications as found and presented in the six reports on the six missions flown over a 30 minute quadrangle south of Phoenix, Arizona. The statistical analysis deals with the errors found in reduced Shoran distances and in displacements of Shoran positions from photo plumb points as determined by the Wild A-7 Autograph. It attempts to show what accuracy may be expected from high precision Shoran after constant errors have been eliminated and under ideal operating conditions. In most instances errors were of a constant and random nature. AD 32813.

Evaluation of the CZR-1 fixed camera system, by R. J. Nichol, Ernest Stern, and S. A. Chamer. U. S. Air Force, Air Research and Development Command, Missile Test Center, Patrick Air Force Base, Fla. Apr 1956. 47p diagrs, tables. Order from LC. Mi $3.30, ph $7.80. PB 122971

Quality control technical note no. 13-B.
1. Cameras, Ballistic - Evaluation 2. Photography, Shadow 3. AF MTC 56-27.

High-speed streak camera, by Robert S. Allgaier. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1953. 45p photos, drawings, diagrs, graph. Order from LC. Mi $3.30, ph $7.80. PB 120844

A high-speed streak camera has been built for use with an adiabatic gas compressor. The camera will be used to obtain the gas volume by photographing the separation of the compressor piston and end plug (between which the gas under study is contained) through the side window of the compressor. An external light source will provide the illumination. See also NAVORD 3848 (PB 120892). NAVORD 3555.

Illumination for battleship aircraft night operations, further tests, by E. O. Hulburt. U. S. Naval Research Laboratory. May 1937. 10p diagr, graph. Order from LC. Mi $1.80, ph $1.80. PB 120475

Unclassified 12 May 1955.
1. Seaplanes - Landing 2. Searchlights - Intensity 3. Filters, Polarizing 4. NRL H 1362.

Origin, distribution, and airphoto identification of United States soils with special reference to airport and highway engineering, by D. S. Jenkins, D. J. Belcher, L. E. Gregg and K. B. Woods. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1946. 260p photos, drawings, diagrs, maps, tables. Order from LC. Mi $11.10, ph $39.35. PB 122310

The report consists of two separate but closely related groups of subject matter, followed by a chapter describing the application of the techniques. The first part provides a means of studying soil through the application of the principles of soil origin and development. The second part describes a new technique for identifying soils from airphotos that is based partly upon geology and soil development. CAA TDR 52.

Appendix B: Airphotos illustrating the origin, distribution, and airphoto identification of United States soils. 1946. 61p photos. Order from LC. Mi $3.90, ph $10.80. PB 122310s
CAA TDR 52, Appendix B.

Perspective analysis of approach light patterns, by R. E. Warren. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Aug 1949. 165p diagrs (part fold), tables. Order from LC. Mi $7.80, ph $25.80. PB 123567

This report describes the perspective studies of eight different approach lighting systems. Twelve studies of each system were made showing how each pattern will appear to the pilot who is letting down on the proper approach path or on one of several erroneous paths. CAA TDR 96.

Photographic study of the minima of non-migrating underwater explosion bubbles from 0.1 and 0.2 gram charges, by John F. Goertner and Ermine A. Christian. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1953. 12p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 120993

1. Bubbles - Photography 2. Explosions, Underwater - Photographic analysis 3. NAVORD 3610.

Toeplersche schlierenverfahren: Grundlagen für seine anwendung und quantitative auswertung (Toepler's Schlieren method: Basic principles for its use and quantitative evaluation), by Hubert Schardin. Translated by F. A. Raven. Jul 1947. 87p photos, tables, diagrs. Order from LC. Mi $4.80, ph $13.80. PB 122830

The theoretical principles of Toepler's schlieren method are developed to a point which permits construction of the apparatus, suited to a definite purpose with the aid of the derived equations. It further permits calculating deflections of light within the object when the variations of density are known. Therefore, it can be predetermined whether application of the schlieren method promises success in a given case. In simple cases the condition in the object is to be calculated inversely from the deflection of light. This eliminates the criticism that quantitative evaluation is impossible, which has always been a disadvantage of the schlieren method heretofore. The most important fields of application are summarized, and the theoretical basis for each is treated, insofar as seems requisite for an exact application of the schlieren method. Translated from Forschungsheft 367. Supplement to "Forschung auf dem gebiete des Ingenieurswesens", Ausgabe B, band 5 Jul/Aug 1934. DWTMB T 156.

Transmission of light by fog, by J. A. Sanderson. U. S. Naval Research Laboratory. May 1940. 20p tables. Order from LC. Mi $2.40, ph $3.30. PB 120503

1. Fog - Light absorption 2. Infrared radiation - Transmission 3. NRL H 1615.

Universal camera control system, by Arnold C. Eibeck. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Photo Reconnaissance Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Jan 1954. 261p photos, drawings, diagrs, graphs. Order from LC. Mi $11.10, ph $39.95. PB 122465

A typical bomber installation may include a single forward oblique camera, a vertical camera, two cameras in a split-vertical arrangement, three cameras in a tri-metrogon station, and possibly five or more cameras in a multi-camera station. The requirements of these cameras may vary considerably. With present camera equipment an installation of this type would require numerous and different control systems. The multiplicity of all this non-uniform equipment presents a formidable problem in the training of personnel, systems planning, installation, operation, supply, and maintenance. The solution planned for this general problem is the adoption of a single standard camera control system to provide single point control of any and all cameras in an aircraft. This system would be so designed as to readily accept and properly operate all present and future Air Force aerial cameras. The term Universal Camera Control System refers to any combination of its individual components assembled to form a system capable of accomplishing the aerial photographic requirements. This report is intended to describe the components available for the Universal Camera Control System and the manner in which they function to provide the required operation of a camera system. AD 31526. AF WADC TR 53-402.

PHYSICS

General

Analysis of the "magic square" method of handling multiple variables in flight testing and some proposed alternate methods, by Harry F. Kohl. U.S. Air Force. Air Research and Development Command. Wright Air Development Center. Directorate of Flight and All-Weather Testing, Wright-Patterson Air Force Base, Dayton, Ohio. Jul 1955. 69p graphs, tables. Order from LC. Mi $3.90, ph $10.80. PB 122459

A detailed mathematical analysis is presented for the prediction of temperatures at different positions in the exhaust system of the R-4360-59B engine as installed in the KC-97 aircraft. The predicted temperatures are based upon the results of planned flight tests involving the magic squares programming developed by personnel of the Shell Oil Co. Forty-two equations were developed and they contain from one to six independent variables and two to seventeen terms in their right-hand members. The equations can be used to predict the R-4360-59B engine exhaust temperatures for any prescribed pattern of operating conditions within or near the envelope of the given flight test program. Use of interaction terms was found to be unimportant in this problem. Task 3048. AD 70023. AF WADC TN 55-13.

Basic heat transfer and flow friction design data for gas flow normal to banks of staggered tubes--use of a transient technique, by W. M. Kays and R. K. Lo. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Aug 1952. 96f photos, drawing, diagrs, graphs, tables. Order from LC. Mi $5.40, enl pr $16.80. PB 123644

The objectives of this investigation were (1) to demonstrate the applicability of an extremely simple transient technique for the determination of the heat transfer performance of circular tube banks with various staggered layout patterns; (2) to obtain the basic characteristics of certain compact patterns that have not been previously reported upon; and (3) to extend to lower Reynolds numbers the existing data. Both the heat transfer and flow friction performance of six staggered tube patterns are considered. By the transient technique the heat transfer performance of what amounts to a tube bank of indefinite extent in all directions is determined, and in addition, the performance of individual tube rows near the entrance and exit of the heat exchanger core have also been obtained. The test results indicate that the transient technique is applicable with good accuracy to the determination of the characteristics of staggered tube banks,

yielding substantially the same performance characteristics as steady-state methods. U24657. SU ME TR 15.

Calculation of compressible subsonic flow past a circular cylinder, by Max Munk and George Rawling. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1952. 25p diagrs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120830

The solution of the problem of compressible potential flow about a circular cylinder by the Rayleigh-Janzen method is extended through the fourth approximation by the use of an automatic calculator carrying out the mathematical operations as well as numerical computations. NOL ARR 106. NAVORD 2477.

Compressible flow tables for air in increments of 0.001 in Mach number, by H. N. Riise. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Aug 1954. 205p graph, tables. Order from LC. Mi $9.30, ph $31.80. PB 122967

This report is a tabulation of Mach-number functions, from M = 0.050 to M = 10.000, which is useful to the aerodynamicist. The increments used are small enough (0.001 in M) to eliminate the necessity for interpolation in almost every application. CIT JPL P 27. Contract DA-04-495-ORD-18.

Determination of the time constant of a blast wave from the pressure-distance relation, by Feodor Theilheimer. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1950. 10p table. Order from LC. Mi $1.80, ph $1.80. PB 120918

A formula is derived which expresses the time constant of an air blast wave in terms of the peak pressure and the derivative of the peak pressure with respect to distance. This formula is then specialized for the case of an ideal gas. NAVORD 1734.

Flow without dissipation of a viscous compressible fluid, by G. Kuerti. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 35p drawing, diagrs. Order from LC. Mi $3, ph $6.30. PB 120827

Validity of the Stokes relation between the two viscosity coefficients of a compressible fluid being assumed, the conditions for vanishing dissipation are developed and a detailed analysis of the possible fluid motions is given. In particular, the occurrence of vacuum boundaries delimiting finite or infinite fluid masses is discussed. NAVORD 2463. NOL ARR 103.

Heat transfer and flow friction characteristics of flattened and dimpled-flattened tubes, by W. M. Kays and D. W. Johnson. Stanford University. Dept. of Mechanical Engineering, Stanford, Calif. Jul 1950. 34f drawings, graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 123914

This report contains the results of basic heat transfer and flow friction tests of four compact high performance heat transfer surfaces. The surface geometries are flow through flattened tubes, flow through flattened tubes which have been dimpled, or pinched at intervals along the flow length, and flow over in-line banks of both flattened and dimpled-flattened tubes. The heat transfer and flow friction characteristics, respectively, are given in both tabular and graphical form. The test results indicate that the characteristics for flow through a flattened tube are very similar to those for flow through a circular tube if correlated on a hydraulic diameter basis. U 11168. Technical report no. 11 under Contract no. N6 onr-251, T. O. 6, NR 035-104. SU ME TR 11.

Interaction of shock waves with a thermal layer, by Robert Varwig and Jay Zemel. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1955. 41p photos, drawings, diagrs, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120820

A series of experiments has been conducted to determine the nature of the interaction resulting when a shock wave passes through a heated air layer, and is reflected from a rigid boundary. Investigations were made with three types of shocks; cylindrical and plane shock waves produced in the shock tube, and spherical shock waves produced by a spark discharge. NAVORD 4021. AF SWP 266.

Laminar boundary layer on a rotating cylinder in crossflow, by E. Krahn. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1955. 22p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120821

A rotating cylinder in a stream produces a circulation which is regarded as the cause of the Magnus force. The problem is to find the dependence of the circulation on the rotational speed of the cylinder. This question is treated in the present report for a stationary flow about a circular cylinder with the axis perpendicular to the direction of the stream under the assumption that the flow in the boundary layer is laminar. Two approximate methods are used for the calculation of the boundary layer. One is due to Burgers and the other is an adaptation of the Polhausen method. In the case of only one stagnation line on the surface of the cylinder the boundary layer is evaluated numerically, the profiles and the shearing stress computed. NAVORD 4022.

Laminar heat transfer characteristics of a hemisphere for the Mach number range 1.9 to 4.9, by Irving Korobkin. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 34p photo,drawing, graphs. Order from LC. Mi $3, ph $6.30. PB 120893

1. Mach number - Effect 2. Flow, Laminar - Heat transfer 3. Boundary layer, Laminar - Heat transference 4. Boundary layer, Laminar - Pressure gradients 5. NAVORD 3841 6. NOL ARR 257.

Metric theory of the differential equations of exterior ballistics, by D. C. Lewis, Jr. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1954. 25p diagr, tables. Order from LC. Mi $2.70, ph $4.80. PB 120988

1. Ballistics, Exterior - Theory 2. Equations of motion 3. Riemann's method 4. NAVORD 3651 5. NOL ARR 221.

New methods of measurement of residual stress, by R. F. Brodrick. Lessells and Associates, Inc., Boston, Mass. Jan 1954. 82p photos, graphs. Order from OTS. $2.25. PB 121478

This report presents a review of potential new methods of residual stress measurement and a description of studies made to establish the feasibility of each method. Various mechanical and physical phenomena which appeared to have some value in this field are discussed. Phenomena and techniques which could not be eliminated from consideration without further analysis were subjected to experimental study. These experiments are described. It is concluded that an extension of the Mathar drilling method is possible such that quantitative values of stress at various depths could be obtained. It is also concluded that mechanical indentation could be developed to the point where it could reveal quantitative information about residual stress. Other phenomena considered are either classified as possessing no value in a quantitative sense, or possessing some potential dependent on further basic advances in their particular fields. AD 41704. AF WADC TR 54-3. Contract AF 33(616) 253.

On some two-dimensional problems in heat conduction for irregular domains with regular or mixed boundary conditions, by Arnold N. Lowan. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1951. 43p. Order from LC. Mi $3.30, ph $7.80. PB 120919

1. Thermal conductivity - Theory 2. NAVORD 1740 3. NOL ARR 18.

One-dimensional adiabatic flow of an inviscous fluid, by R. V. Mises. U. S. Naval Ordnance Laboratory, White Oak, Md. Jul 1951. 20p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120920

The basic equations governing the one-dimensional non-steady flow of a perfect gas are reformulated in such a way that general integrals can be derived. Complete solutions for the problem of wave interference and other problems with given initial values are presented. NAVORD 1719. NOL ARR 16.

Photoelastic analysis of the stresses in fatigue test specimens, by J. S. Brock and H. B. Maris. U. S. Naval Research Laboratory. Apr 1941. 36p photos, diagrs, tables. Order from LC. Mi $3, ph $6.30. PB 120512

1. Stress analysis 2. Loads, Static 3. Stresses, Photoelastic - Analysis 4. NRL H 1723.

Probability and statistics in item analysis and classification problems: Selection of item variables for prediction, by Gustav Elfving. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 56p diagrs. Order from OTS. $1.50. PB 121590

A basic problem in test construction is the suitable selection of k out of N test items, the scores on the k items to be used in predicting the value of an unknown criterion. This problem is considered in the framework of classical multivariate statistical analysis, and aims at providing some useful tools, rather than any unified procedure. AF SAM R 56-91.

Recent air shock velocity measurements near small charges of highly confined explosives, by J. Savitt and R. H. F. Stresau. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1952. 20p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120882

See also NAVORD reports 2285 (PB 120881) and 2841 (PB 120880).
1. Blast, Air - Shock waves - Velocity 2. Shock waves - Velocity - Measurement 3. NAVORD 2442.

Shock distances in front of symmetrical bodies, by W. H. Heybey. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1953. 20p graphs. Order from LC. Mi $2.40, ph $3.30. PB 120997

A method is presented to determine theoretically the distance at which a detached shock may be found in front of a symmetrical body placed at angle of attack zero into supersonic uniform flow. NAVORD 3594. NOL ARR 211.

Shock velocities in the immediate neighborhood of detonating explosives, by R. H. Stresau and J. Savitt. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1951. 20p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120881

See also NAVORD reports 2442 (PB 120882) and 2841 (PB 120880).
1. Shock waves - Velocity - Measurements 2. Blast, Air - Shock waves - Velocity 3. NAVORD 2285.

Some difficulties encountered in using the method of characteristics in three dimensions, by R. C.

Roberts. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1952. 21p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 120832

This report is concerned with the examination of some of the difficulties encountered in applying the method of characteristics to the numerical solution of problems in three dimensions. In particular, several numerical methods are compared with respect to relative ease in use, relative accuracy, and numerical stability. One simple method is proposed and is shown to be as accurate as other known methods. This is illustrated by an example. NAVORD 2491. NOL ARR 109.

Square root method, by Calvin C. Elgot. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1952. 8p. Order from LC. Mi $1.80, ph $1.80. PB 122006

1. Square root - Calculation 2. NAVORD 2609.

Tables of some thermodynamic functions which occur in the theory of magnetism, by Larry P. Schmid and J. Samuel Smart. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1954. 28p tables. Order from LC. Mi $2.70, ph $4.80. PB 120864

1. Tables, Mathematical 2. Brillouin function 3. Magnetic fields - Theory 4. NAVORD 3640.

Theoretical investigation of turbulent boundary layer flow with heat transfer at supersonic and hypersonic speeds, by Jerome Persh. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1955. 45p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120891

A theoretical investigation of compressible turbulent boundary layer flow with and without steady state heat transfer has been conducted. This investigation is based on a simple physical model of the flow suggested first by Prandtl and used later by Donaldson. The physical model consists of a laminar sublayer region with a linear velocity profile and an outer turbulent portion with a power law velocity profile. Comparisons between theory and experiment demonstrate that the analysis yields good results for compressible turbulent boundary layer flow with and without steady state heat transfer. NAVORD 3854. NOL ARR 258.

Theory of the propagation of shockwaves and their formation by explosions, by H. G. Snay and R. H. Matthias. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1951. 30p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 120861

A set of simultaneous ordinary differential equations is derived for the peak pressure and time factor of shockwaves. These equations satisfy the Rankine-Hugoniot conditions and the partial differential equations of fluid dynamics. Relationships are derived for two cases: (1) that the shockwave is observed at a fixed point (applicable to the measurement of airblast waves). (2) that the point of observation moves with the medium (applicable to shockwave measurements in water). NAVORD 2195.

Ultrasonic propagation in solid materials. Scientific report no. 2 for the period Oct 1-Dec 31, 1955 under Contract no. AF 19(604)-1423. Andersen Laboratories, Inc., West Hartford, Conn. Dec 1955. 7p diagr, graph. Order from LC. Mi $1.80, ph $1.80. PB 122222

During the second period of this contract, a half size model of the 833 usec. variable delay line was fabricated to test the design. Test data is given in the body of this report. A probe for determining transmission characteristics and comparing them to visual strains is now being constructed. Continues research under Contract AF 19(604)-835 and Contract AF 19(604)-1095. For Scientific report no. 1 see PB 122349. AF CRC TN 56-155.

Unsteady compressible flow with rotational symmetry, by W. H. Heybey. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1951. 24p diagrs. Order from LC. Mi $2.70, ph $4.80. PB 122010

In order to investigate the effect of chambrage on the gas flow in the explosive chamber of a gun, a study of three dimensional flow with rotational symmetry was undertaken. The equations for unsteady compressible isentropic flow, using a perfect gas, were expressed in terms of characteristic surfaces. The properties of these characteristic surfaces and characteristic grids are discussed. A relationship between the dependent variables for each characteristic surface was established which constitutes a "linkage" system. By means of this "linkage" system equations are set up which make it possible to obtain the solution of the flow by means of a numerical integration. NAVORD 2444. NOL ARR 99.

Useful approximate equations of motion for the 100,000 psi adiabatic compressor, by P. L. Edwards. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1954. 21p graphs. Order from LC. Mi $2.70, ph $4.80. PB 122050

1. Equations of motion 2. Compressors, Adiabatic - Theory 3. NAVORD 3754.

Velocities of explosive produced air shocks, by Jacob Savitt. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 12p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120880

Continuation of work reported in NAVORD 2285 (PB 120881) and 2442 (PB 120882).
1. Blast, Air - Shock waves - Velocity 3. Shock waves - Velocity - Measurement 3. NAVORD 2841.

Wave propagation beyond critical incidence, experiments and comments, by S. J. Jacobs and T. P. Liddiard. U. S. Naval Ordnance Laboratory, White Oak, Md. Aug 1953. 20p photos, drawings, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120840

1. Shock waves - Transmission 2. NAVORD 2602.

Nuclear

Calculated efficiencies of NaI crystals, by E. A. Wolicki, R. Jastrow, and F. Brooks. U. S. Naval Research Laboratory. Oct 1956. 40p graphs, tables. Order from OTS. $1. PB 121419

Probabilities for the interaction of gamma rays with NaI scintillation crystals have been calculated for the case of a point isotropic source situated on the axis of a cylindrical crystal. These results can be used in obtaining the absolute gamma-ray detection efficiency of a NaI scintillation counter by a method which does not require calibrated radioactive sources. Computations were made for eighteen commercially available crystal sizes and for a wide range of gamma-ray energies and source-to-crystal distances. The results are presented in both tabular and graphical form. NRL R 4833.

Calibration of a polonium-beryllium neutron source, by Alfred J. Moses and John J. O'Connor. U. S. Arsenal, Watertown, Mass. Aug 1954. 24p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122909

The object was calibrate a polonium-beryllium neutron source, preliminary to its use for the activation analysis of minor components in titanium and titanium alloys and to develop techniques in the calibration of neutron sources in general. In this work, a polonium-beryllium neutron source, containing 5.64 curies polonium was used as source of neutrons. The thermal neutron flux was determined by the activation of indium foil and, after suitable corrections, was calculated to be 42,000 neutrons/cm^2/ sec for the geometry employed. The cadmium-ratio was determined in the paraffin block at various distances from the source. Both thermal and fast neutron fluxes are greatest near the source and irradiations should be made with the sample in this position. O. O. Project TB4-15. D/A Project 593-08-021. WAL R 401/207.

Diffusion chamber study of very slow mesons. III: Scattering of negative pions in hydrogen, by M. C. Rinehart, K. C. Rogers, and L. M. Lederman. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Jun 1955. 16p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122161

1. Atomic power - Research 2. Hydrogen - Mesotron reactions 3. Cloud chambers - Uses 4. Mesotrons - Scattering 5. Contract N6-ori-110-Task no. 1 6. Nevis-12 7. R-107 8. CU-86. For Parts I-II see PB 118855 and 120053.

Technical report, 1953-1954, Part 1, for the period 1 Oct 1953 to 31 Mar 1954. Chicago. University. Dept. of Physics. Laboratory of Molecular Structure and Spectra, Chicago, Ill. 1954? 227f photos, diagrs, graphs, tables. Order from LC. Mi $9.90, enl pr $36.30. PB 123674

AD 53029. For report for Jun-Aug 1947 see PB 98611. Contents: Spectra of iodine solutions. I: Effects of low temperatures upon iodine complexes, by Joe S. Ham, Jr. (Reprinted from Journal of American Chemical Society, vol. 76, pp. 3875-80, 1954.) - Spectra of iodine solutions. II: Effects of high pressures upon iodine complexes, by Joe S. Ham, Jr. (Reprinted from Journal of American Chemical Society, vol. 76, pp. 3881-5, 1954.) - Spectra of iodine solutions. III: $3\pi_1 - 1\Sigma^+$ transition of the iodine molecule in solution, by Joe S. Ham, Jr. (Reprinted from Journal of American Chemical Society, vol. 76, pp. 3886-7, 1954.) - Symbolic structural formulas for boron hydrides, by John R. Platt. (Reprinted from Journal of Chemical Physics, vol. 22, p. 1033, 1954.) - Free-electron network model for conjugated systems. V: Energies and electron distributions in the FE MO model and in the LCAO MO model, by Klaus Ruedenberg. (Reprinted from Journal of Chemical Physics, vol. 22, 1954.) - Free-electron network model for conjugated systems. VI: Quantitative comparison of the FE MO model and the LCAO MO model, by Norman S. Ham and Klaus Ruedenberg. (Reprinted from Journal of Chemical Physics, vol. 22, 1954.) - Box model and electron densities in conjugated systems, by John R. Platt. (Reprinted from Journal of Chemical Physics, vol. 22, 1954.) - Survey of vacuum ultraviolet spectra of organic compounds in solution, by H. B. Klevens and J. R. Platt. - Hyperconjugation and spectrum of the benzenium ion, prototype of aromatic carbonium ions, by Norbert Muller, Lucy W. Pickett, and Robert S. Mulliken. (Reprinted from Journal of American Chemical Society, vol. 76, 1954.) - Intermolecular charge-transfer forces,by R. S. Mulliken. (Reprinted from Rendiconti del Seminario Matematico e Fisico di Milano, 1953; Journal de Chimie Physique, in press; Proceedings of the International Conference on Theoretical Physics (Kyoto and Tokyo, Sep 1953.)) - Interaction of electron donor and acceptor molecules, by R. S. Mulliken. (Reprinted from Proceedings of the International Conference on Theoretical Physics (Kyoto and Tokyo, Sep 1953); Journal de Chimie Physique, in press.) - New xenon light source for the vacuum ultraviolet, by P. G. Wilkinson and Yoshio Tanaka. (Reprinted from Journal of Chemical Physics, vol. 22, 1954.) - Study of two-center integrals useful in calculations on molecular structure. III: Unified treatment of the hybrid, Coulomb, and one-electron integrals, by Klaus Ruedenberg, C. C. J. Roothaan, and Walter Jaunzemis. - Free-electron theory and the virial theorem, by William Lichten. (Reprinted from

Journal of Chemical Physics, vol. 22, p. 1278, 1954). Contract N6ori-20, T. O. IX, NR 019 101. Contract DA 11-022-ORD-1002.

Useful life of radioactive self-luminous material, by L. H. Dawson. U. S. Naval Research Laboratory. Apr 1939. 17p photos, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123253

Date of test, Jul 1936 - Apr 1939. Some pages will not reproduce well.
1. Radioactive substances - Decay determination
2. Radioactive substances - Drying 3. Radioactive substances - Luminescence - Measurements 4. NRL H-1531.

PHYSIOLOGY

Effects of oxygen deprivation (high altitude) on the human organism, by Ross A. McFarland. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. May 1938. 85p photos, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 122275

Originally printed in May 1938 as Report no. 13, Safety and Planning Division, Bureau of Air Commerce. Reprinted by the Civil Aeronautics Authority, 1941.
1. Oxygen deficiency - Physiological effects
2. Flying, High altitude - Physiological effects
3. CAA TDR 11.

Transthoracic pressure in man during rapid decompression, by Ulrich C. Luft and Richard W. Bancroft. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 14p graphs, table. Order from OTS. 50 cents. PB 121588

Pressures were recorded in the human chest during rapid decompression under controlled conditions in a low-pressure chamber and compared with those observed in a dry, rigid container under similar conditions. The analysis of transthoracic pressure transients permits an estimate of the maximal decompression orifice permissible in a cabin of known volume without causing a significant rise in transthoracic pressure when decompression is sustained with open airways. The mean flow resistance offered by the human airways appears to be considerably greater in rapid decompression than during spontaneous, quiet breathing. AF SAM R 56-61.

PSYCHOLOGY

The discrimination hypothesis and cue reversal, by Claude B. Elam and D. Winfred Tyler. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 4p graphs. Order from OTS. 50 cents. PB 121589

Fourteen Macaca mulatta (rhesus) monkeys, divided into two matched groups, were presented with a simultaneous discrimination problem in the Wisconsin General Test Apparatus. The reinforcement relationship was consistent with a given stimulus block in the case of one group, but was inconsistent for the other group. After eight days of training, both groups were presented a cue-reversal problem. It was found that animals presented the consistent relationship reversed more rapidly than did the other group despite their earlier demonstrated preference for the formerly positive stimulus. The results favor an interpretation based upon the discrimination hypothesis. AF SAM R 56-82.

Human factors in electronics reliability, by Gilbert K. Krulee. Tufts College, Medford, Mass. Jul 1954. 78p diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 122980

The objective in writing this report has been to review the presently existing studies relating to human factors in the reliability of electronic equipments and to prepare an interpretive summary of the major findings and implications. Introductory sections of the report contain a discussion of the diagnostic elements of maintenance activities and of the information-processing aspects of diagnostic tasks. The possible application of present-day theories of information-processing to the simplification of preventive-maintenance and fault-location and the routine monitoring of equipment-performance can be more readily accomplished. Studies relating to the training of personnel in systematic diagnostic procedures are also described. Efforts to develop symbolic trouble-shooting tasks are summarized. The possibility of improving the effectiveness of present-day on-the-job training programs on ships is explored. Studies on morale are described, and conditions relating to intrinsic job satisfactions are stressed. Finally, the implications of recent studies on the analysis of failure data obtained from fleet experience is discussed. Contract Nonr-494(03), NR 145-088.

Measurement of subjective values, by Harold Gulliksen. Princeton University. Dept. of Psychology, and Educational Testing Service, Princeton, N. J. Jul 1955. 31p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 123047

Four different value laws are developed and tested by using them to predict the scale value of composite stimuli from the scale values of their components. These four laws are an additive law, a squareroot law, a logarithmic and a negative exponential law. They are tried out on a set of food preferences by means of Pearson's method of false position. The negative exponential law of diminishing returns gave the best fit to the data but was not markedly better than any of the other laws.

Project on "Mathematical techniques in psychology". NSF grant G-642. Contract N6onr 270-20, NR 150-088.

Probability and statistics in item analysis and classification problems: A statistical formulation of the attenuation paradox in test theory, by Rosedith Sitgreaves. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Aug 1956. 19p. Order from OTS. 50 cents. PB 121595

This paper presents in greater detail a probability model for the single factor mental ability testing situation. This model is useful in studying the so-called "attenuation paradox" in test theory. The present probability model provides both a basis for and an explanation of the paradox. The relationship between validity and reliability in this formulation is investigated further here, and an expression is given for determining the value of ρ which maximizes the validity coefficient of the test. AF SAM R 57-1.

Special report surveying the work on mathematical techniques as related to psychological problems, by Harold Gulliksen and Ledyard Tucker. Princeton University. Dept. of Psychology, and Educational Testing Service, Princeton, N. J. Jul 1955. 18p. Order from LC. Mi $2.40, ph $3.30. PB 123048

The research activity at Princeton University on mathematical techniques as related to psychological problems is concentrating on extending and increasing the precision of scientific description of human behavior. A number of the complexities and subtleties of human behavior have proven amenable to description in quantitative terms. Methods describing or measuring various types of psychological discriminations have been developed. These methods are being extended to the systematic description of attitudes and value judgments of groups of people. Project on "Mathematical techniques in psychology". NSF grant G-642. Contract N6 onr-270-20, NR 150-088.

Studies in abstractive generalization: Comparison between monkeys and children on tests of learning and transfer ability, by George Gentry, Sylvan J. Kaplan, and Ira Iscoe. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1956. 12p photos, graphs, tables. Order from OTS. 50 cents. PB 121585

Comparisons between monkeys and children were made of rates of learning and degrees of transfer on critical tests designed to reflect capacity for abstractive generalization. Results demonstrate the superiority of the children over the monkeys on all tests given. The findings of this study suggest the need for caution in generalizing the behavioral effects of ionizing radiation upon monkeys to that which might be predicted for man under comparable conditions. AF SAM R 55-9.

What HumRRO is doing--1955. George Washington University. Human Resources Research Office, Washington, D. C. Apr 1956. 53p photos, map, diagrs, graphs. Other from LC. Mi $3.60, ph $9.30. PB 123021

This is the third in a series of informal annual reports on the work of the Human Resources Research Office, operating at George Washington University directed at developing more effective training techniques, improving ways of motivating men for training and combat duty, and developing background information and new techniques for psychological warfare. This volume presents brief accounts of several methods and typical results of research nearing completion at the end of 1955. GWU HRRO RB 3.

RUBBER AND RUBBER PRODUCTS

Acoustic properties of rubber loaded with ceramic spheres, by William S. Cramer. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1955. 13p graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120984

1. Rubber, Butyl - Acoustic properties
2. NAVORD 3930.

Antiozonants in oil extended and plasticized GR-S vulcanizates, by E. W. Bergstrom. U. S. Arsenal, Rock Island, Ill. Dec 1955. 21p photos, tables. Order from OTS. 75 cents. PB 121501

The object of this investigation was to determine if antiozonants which are known to be effective in protecting unplasticized GR-S vulcanizates from ozone attack will be effective in protecting oil extended and plasticized GR-S vulcanizates from ozone attack. Dept. of the Army project no. 593-15-008. Ordnance project no. TB4-521A, Report no. 20. RIAL 55-4221.

Development of integral fuel tank sealant compound, by John M. Snider and Frank Hirosawa. Coast Pro-Seal and Manufacturing Co., Los Angeles, Calif. May 1954. 145p tables. Order from LC. Mi $7.20, ph $22.80. PB 122475

This work was undertaken to develop materials other than polysulfide polymers for use in fuel tank sealant applications. Liquid polymers were prepared by the bulk copolymerization of acrylic esters and allyl glycidyl ether. These polymers could be cured to elastomeric products by the reaction of amine curing agents with epoxy groups. The cured products generally had good high temperature properties but poor low temperature flexibility. Resistance to aromatic fuels was not as good as would be desired. Liquid polymers of a polyester type were prepared from mercapto-

acetic acid. These polymers could be made sensitive to oxidation curing reactions by a process of heat treatment. AF WADC TR 53-450. AD 37706. Contract AF 33(600)-19202.

Investigation of plasticizers for oil-resistant rubber for service at low temperatures in contact with hydrocarbon fluids, by J. C. Hillyer and C. S. Imig. Phillips Petroleum Co., Bartlesville, Okla. Nov 1952. 48p tables. Order from LC. Mi $3.30, ph $7.80. PB 123646

A review of prior work and available literature on plasticizers in oil-resistant rubber for low-temperature applications was made. With respect to compatibility these data indicate that a prospective plasticizer should (1) contain polar groups, (2) have a relatively low molecular weight - about 300, and (3) contain a high percentage of oxygen - about 31 percent or possibly higher. The following materials were evaluated as low temperature plasticizers for Paracril NS-26; various liquid polybutadienes and their derivatives; the butadiene-furfural cotrimer and several of its derivatives; hydroxylated butadiene derivatives; polyethylene glycol derivatives; Thiokol's ZI-109 alone and blended with TP-90B; substituted amides, ureas and urethans, TP-90B derivatives; hydroxynitriles; diallyl sebacate and divinyl benzene as vulcanizable softners; several silicones; several phosphonate esters; several mercaptanethylene oxide condensates; and sorbitol. AF WADC TR 52-80. Contract AF 33(038)-17201.

Preservation of tires in outdoor storage, by W. J. Touhey. U. S. Arsenal, Rock Island, Ill. May 1953. 36p photos, tables. Order from OTS. $1. PB 121480

The protection of tires in outdoor storage by ozone resistant coatings, weather resistant veneers, covers, chemical inhibitors and waxes has been investigated. The physical properties and surface condition of GR-S test pads were determined after various aging times and conditions, in different geographical locations, both with and without protective coatings on the rubber, and with and without chemical inhibitors and waxes in the rubber. RIAL R 53-2504.

Study of rubber preservatives, by P. King. U. S. Naval Research Laboratory. Apr 1943. 12p photos, tables. Order from LC. Mi $2.40, ph $3.30. PB 120621

1. Rubber - Preservatives 2. NRL R 2052.

Versuche zur feststellung des haftvermögens von personenwagen-bereifungen. (Tests to determine the adhesive power of passenger-car tires), by B. Förster. Translated by Mary L. Mahler. Aug 1956. 36p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123535

Experimental data on braking coefficients of friction and cornering characteristics for automobile tires are presented. Although the particular types of tires investigated are not of direct interest to the aircraft industry, the data do serve to indicate certain basic aspects of tire behavior and should be of interest to those concerned with the study of tire braking and cornering characteristics. The effects of the following factors are indicated: (a) forward speed, (b) tire loading, (c) tire pressure, (d) form stiffness of tire, (e) tire size, (f) tread pattern, (g) road surface material and condition, and (h) the effects of braking on cornering characteristics. Translated from Deutsche Kraftfahrtforschung, no. 22, pp. 1-31. NACA TM 1416.

STRUCTURAL ENGINEERING

Elastic sphere under dynamic and impact loads, by Robert M. Gray and A. Cemal Eringen. Purdue University. Division of Engineering Sciences, Lafayette, Ind. Aug 1955. 189p graphs, tables. Order from LC. Mi $8.40, ph $28.80. PB 123099

With the use of the Fourier transform technique the solution is given for the problem of the isotropic elastic sphere under dynamic surface tractions. The cases of moving surface tractions, diametrically opposite moving concentrated loads, moving ring loads, impact loads, blast load, and diametrically opposite concentrated impact forces are studied in detail. An electronic digital computer was used for tabulating the functions occurring in the latter case of impact on an incompressible sphere. Plots of displacement and stress components are given for this case. It is shown that with the use of these tables any other problem of impact loading which is symmetrical with respect to the center of the sphere can be evaluated. Technical report no. 8. Thesis - Purdue University. Contract Nonr-1100(02).

Fatigue failure under resonant vibration conditions, by B. J. Lazan. Minnesota, University, Minneapolis, Minn. Mar 1954. 54p diagrs, graphs, tables (2 fold). Order from LC. Mi $3.60, ph $9.30. PB 122866

The nature of resonant vibration and the accompanying amplification of fatigue stress are discussed in relationship to the damping energy absorbed by a vibrating system. The resonance amplification factor is defined as a measure of the severity of a resonant condition. The sources of damping in a vibrating system are discussed and classified according to whether they are external (structural) or internal (material). Data on the internal damping properties of a variety of structural materials are presented and the general behavior is discussed. In cases where internal damping is significant, the importance of

both fatigue strength and damping properties of materials as joint criteria for resonant strength is demonstrated and quantitatively expressed. The analyses are made in terms of the resonant strength constant for the material (the material factor) and the volume-stress function of the part (the part factor). AD 39439. AF WADC TR 54-20. Contract AF 33(038) 20840.

Large deflection of curved plates, by H. G. Lew, J. A. Fox and T. T. Loo. Pennsylvania State University. Oct 1956. 38p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123683

Several problems on large deflections of curved plates with compound curvature are treated. Large-deflection equations of plates and cylinders are used. It is shown that the effective width of the curved plates in longitudinal compression is reduced by the presence of an initial deflection function. NACA TN 3684.

Torsional instability of hinged flanges stiffened by lips and bulbs, by George Gerard. New York University. Aug 1956. 12p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123516

Based on torsional instability theory, buckling charts are presented for determining the critical strain of hinged flanges stiffened by idealized lip and bulb elements. NACA TN 3757.

Vermoeiingssterkte van klinkverbindingen en pengatverbindingen. (Fatigue strength of riveted joints and lugs), by J. Schijve. Translated by J. Vanier. Aug 1956. 54p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123534

This report deals with a number of tests on riveted joints and lugs for the primary purpose of comparing the several types of riveted joints and to study the effect of various factors on the fatigue strength of lugs. A check was made to ascertain whether or not an estimate of the fatigue life at a certain loading could be made from the dimensions of the joint and the fatigue data of the unnotched material. Recommendations are made on the proportioning of joints to obtain better fatigue behavior. References: pp. 33-35. Translation of Nationaal Luchtvaartlaboratorium, Rapport M, 1952, May 1954. NACA TM 1395.

TEXTILES AND TEXTILE PRODUCTS

Evaluation of rot-resistant treatments for elastomer-coated fabrics, by J. M. Ashcroft. U. S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jul 1955. 51p tables. Order from OTS. $1.25. PB 121420

Evaluates active fungitoxic components of commercially available rot-resistant treatments applied to cotton fabrics subsequently coated with elastomers. This evaluation is intended to reveal interactions, if any, between fungitoxicant and coating which might impair functioning of either, or of the base fabric. Attempt was also made to determine effect of rot-resistant treatment on coating from measurements of physical properties of coating. Project 8-93-31-107 (8-91-02-001). ERDL R 1412.

Research and development of abrasion resistant treatments for nylon webbings, by George Thomson, Joseph S. Panto, Myron J. Coplan and Ernest R. Kaswell. Fabric Research Laboratories, Inc., Dedham, Mass. Jun 1956. 79p photos, diagrs, graphs, tables. Order from OTS. $2. PB 121494

The purpose of the work reported was the development of finishes which could be applied to nylon webbings with resulting increase in abrasion resistance. The finish was to remain flexible at -65°F. and be stable to artificial sunlight for 100 hours and to a temperature of 170°F. for 16 hours. Preference was given to commercially available water dispersions of a number of different types of resins such as acrylic, acrylonitrile, natural rubber and silicones because of their freedom from hazards of toxicity and flammability, and their ease of handling. Webbings treated with one particular silicone and catalyst emulsion were superior to all other treated samples from the point of view of abrasion resistance, low temperature flexibility and resistance to heat ageing. Project no. 7320. Covers period of work from Nov 1954 through Feb 1956 under Contract AF 33(616)-2703. AF WADC TR 56-151.

Study of tensile mechanics of some blended woolen yarns, by Myron J. Coplan. Fabric Research Laboratories, Inc., Dedham, Mass. Jul 1955. 119p graphs, tables. Order from OTS. $3. PB 121343

A series of 55 blended woolen type wool-nylon and wool-viscose yarns varying in twist and composition were examined and their tensile behaviour interpreted in terms of the intrinsic fiber properties, their own geometry, and the geometry of the yarns. Technical report no. 2 under Contract NOnr 478(00). Case no. C51137. For Report no. 1 see PB 121471.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Development of a safety and planning program, by Richard C. Gazley. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1938. 29p tables. Order from LC. Mi $2.70, ph $4.80. PB 122288

Originally printed April 1938 as Report no. 7, Safety and Planning Division, Bureau of Air Commerce. Reprinted by the Civil Aeronautics Authority, 1940.
1. Safety devices and measures 2. CAA TDR 7.

Study of safety of aircraft having single dual-geared power plant, by K. S. Cullom. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1938. 6p tables. Order from LC. Mi $1.80, ph $1.80. PB 122290

Originally printed in Apr 1938 as Report no. 12, Safety and Planning Division, Bureau of Air Commerce. Reprinted by the Civil Aeronautics Authority, 1940.
1. Aircraft - Safety devices and measures 2. Engines, Aircraft - Dual gears - Safety factors 3. CAA TDR 10.

Seat design for crash worthiness, by I. Irving Pinkel and Edmund G. Rosenberg. U. S. National Advisory Committee for Aeronautics. Oct 1956. 42p photos, drawings, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 122892

1. Seats, Airplane - Crash 2. Loads, Structural - Dynamic - Theory 3. Safety 4. NACA TN 3777.

Study of coiled tubing for aircraft hydraulic systems, by Conrad H. Cooke and Ronald D. Stouffer. Martin, Glenn L., Co., Baltimore, Md. Feb 1955. 115p drawings, diagrs, graphs, tables (part fold). Order from OTS. $3. PB 121477

A study has been made to determine the limitations of coiled stainless steel tubing to be used as a replacement for hydraulic hose. A survey of the present and future requirements for flexible sections of hydraulic plumbing was conducted and used as the basis for the theoretical analysis of the stresses and deformations arising from pressure and mechanical flexure combined. A recommended test program was formulated, in detail, to confirm the analysis and furnish that information which ultimately could be used to make up a design manual for coiled stainless steel tubing. AD 68348. AF WADC TR 55-121. Contract AF 33(616)-2510.

Instruments

CAA-RTCA instrument landing system. Part II: Tests and modification, by Henry I. Metz. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1943. 28p photos, map, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 123548

For Part I see PB 123547.
1. Landing, Instrument 2. Radar, Ground controlled approach 3. CAA TDR 36.

Design and the performance calculation of ejectors and aspirators, by E. M. Knoernschild. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Equipment Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1951. 51p photos, drawings, diagr, graphs. Order from LC. Mi $3.60, ph $9.30. PB 122848

A simple theory on the performance of an air ejector, based mainly on constant area and constant pressure mixing, is derived. A method is outlined which, with the aid of two charts, allows the design and the quick precalculation of the characteristics of an ejector or aspirator. AD 1184. AF TR 6673.

Quick disconnect adapter for external power cable, by Jean W. Hamilton. Airtron, Inc., Linden, N. J. Jun 1955. 26p photos, drawings. Order from OTS. 75 cents. PB 121283

This study has been conducted to consider the various methods that might be employed to obtain a remote or automatic disconnect of the external power cable, #AN3430, mating with the receptacle, #AN3114, as installed in combat aircraft and to prepare detail designs of a recommended system. An automatic disconnect of the external power connection is considered a desirable feature since it will permit an aircraft ready for flight to take off with minimum assistance from ground crew. The problem which presents itself has two basic factors which are interdependent: 1. Installation of the power receptacle in aircraft. 2. Means of affecting remote or automatic release of external power cable. Project no. 4155. AF WADC TR 55-306. Contract AF 33(600)-22188.

Stagnation temperature probes for use at high supersonic speeds and elevated temperatures, by E. M. Winkler. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1954. 34p photos, drawings, graphs. Order from LC. Mi $3, ph $6.30. PB 120894

1. Probes, Temperature - Design 2. Flow, Supersonic - Heat transference 3. NAVORD 3834 4. NOL ARR 256.

Summary of proposed inertial guidance systems flight test ranges, by Richard V. Walker. U. S. Air Force. Air Research and Development Command, Air Force Armament Center, Eglin Air Force Base, Fla. Sep 1955. 16p diagrs, maps. Order from LC. Mi $2.40, ph $3.30. PB 122141

The inertial systems flight test ranges provide approximate east-west and north-south flight paths and are long enough to allow realistic flight times for long range navigation. This report describes the instrumentation used on these ranges, the facilities available at the terminal bases, and the methods to be used for reducing photographic and radar data obtained using these ranges. AD 72197. AF AC TM 55-3.

Engines and Propellers

Design manual for regenerative heat exchangers of the rotary type, by Harold H. Sogin and Kamal-Eldin Hassan. Illinois Institute of Technology. Dept. of Mechanical Engineering. Heat Transfer Laboratory, Chicago, Ill. Jun 1956. 122p diagrs, graphs, tables. Order from OTS. $3.25. PB 121469

This report deals with the thermal design of rotary type regenerative heat exchangers for aircraft gas turbine power plants. Hausen's regenerator theory is developed in a form directly applicable to the rotary machine, and deviations from some of the underlying assumptions are examined. A numerical method to calculate the performance of unbalanced regenerators is included, but this calculation is not required for application of the theory. Pressure drop and heat transfer data for flame trap and wire screen matrices are assembled. The effect of the regenerator performance on the thermodynamic cycle is discussed. Finally, a sample calculation is presented. Project 3066, Task 70141. AF WADC TR 55-13. Contract AF 33(616)-98.

Frequency response characteristics of a stabilized single rotor helicopter, by Wallace M. Ritchey, Jr. U. S. Air Force. Air Research and Development Command, Wright Air Development Center, Directorate of Flight and All-Weather Testing, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1956. 69p photos, diagr, graphs. Order from LC. Mi $3.90, ph $10.80. PB 122470

Results of flight tests to evaluate a stabilizer (automatic pilot) installed in an H-19 helicopter are discussed, and the logitudinal and lateral-directional response characteristics of the aircraft are presented in time history and in frequency response form. The frequency response characteristics were obtained by the Fourier integral transformation of aircraft transient response data. The results are presented for three airspeeds and for various feedback settings of the stabilizer. Project no. 5106. AF WADC TN 56-131.

Investigation of dirt sensitivity of turbo engine control components, by J. E. Ash, J. C. Lee and D. Kurtovich. Armour Research Foundation, Chicago, Ill. Oct 1954. 223p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $9.90, ph $34.80. PB 122476

The effect of the contaminant in the fuel on the friction force was studied on two types of valves: sleeve valve and double poppet valve. It was found that the friction caused by dirt particles generally increased with the spool diameter, the rate of flow and the pressure differential across the valve assembly. The friction also increased with the time intervals between two consecutive movements of the valve spool, and tended to level off after one hour. The effect of the bearing length on the friction was less pronounced. The optimum surface finish was found to be 5 to 10 microinches RMS, and the surface hardness about 60 RC (for Arizona road dust). Surfaces smoother than 5 microinch RMS and harder than 60 RC brought no further reduction in friction. It was also found that a constant rotary motion applied to either sleeve or spool of a valve assembly almost eliminated the friction entirely. Project 3073. For report of earlier research see PB 118492. AD 76873. AF WADC TR 54-479. ARF Proj. 3073-30239. Contract AF 33(616)-421.

Jet pump as a lubrication oil scavenge pump for aircraft engines, by Richard G. Cunningham. Pennsylvania State University. Dept. of Engineering Research, University Park, Pa. Jul 1954. 139p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.90, ph $21.30. PB 122461

A study was made of the oil jet pump, in particular the possibility of application as a scavenge pump for aircraft engines. Three major problems treated in the theoretical and experimental investigations are: (a) effect of high viscosity; (b) cavitation and altitude ceiling characteristics; and (c) behavior with an air-oil mixture inducted at the suction port. An analytical expression is developed which describes pump performance in dimensionless terms: a flow ratio, a pressure-difference ratio, the nozzle to throat area ratio; and two friction loss coefficients. Project no. 3060. AD 75184. AF WADC TR 55-143. Contract AF 33(616)-436.

Preliminary measurements of nonsteady velocities in a single stage axial-flow compressor, by Hsuan Yeh, Harry M. Croner and Donald E. Andrews. Johns Hopkins University. Dept. of Mechanical Engineering. Jun 1956. 48p photos, drawings, diagrs, graphs. Order from OTS. $1.25. PB 121434

Fluctuation intensities at selected stations in an axial-flow compressor stage were measured. The intensity of the induced velocity due to the rotor at points in front of the rotor is analyzed. Also investigated is the fluctuation intensity due to the periodic presence of wakes behind the rotor. Such analytical considerations are found to be in substantial agreement with the measured data. The wake behind blades is found to decay and spread in the same manner as the wake behind single airfoils except in the immediate neighborhood of the following blade row, at which place the decay is accelerated. Project 3066, Task 70153. Previous reports are PB 121052 and 121489. AF WADC TR 55-249. Contract AF 33(616)-152.

Airports and Airways

Application of simulation techniques in the study of terminal-area air traffic control problems, by C. M. Anderson and T. K. Vickers. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Nov 1953. 31p drawings, diagr, graphs, table. Order from LC. Mi $3, ph $6.30. PB 122309

1. Airports - Air traffic control 2. Simulators, Dynamic 3. Simulators, Radar - Design 4. CAA TDR 192.

Development of airport control tower lighting, by M. S. Gilbert. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Apr 1949. 20p photos, diagrs, graph, table. Crder from LC. Mi $2.40, ph $3.30. PB 122303

1. Airports - Air control centers - Lighting systems 2. CAA TDR 82.

Development of airport taxi guidance signs, by Marcus S. Gilbert and Robert E. Faucett. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Jun 1952. 11p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 123572

This report describes the development of an elevated sign or route marker for use along runways and taxiways in airport taxiway guidance systems. Lighted translucent flush block letters make the sign visible and legible at night; these letters are outlined in black on a chrome yellow background to give the desired daytime effect. CAA TDR 170.

Some considerations of high intensity approach lighting, by H. J. Cory Pearson and M. S. Gilbert. U. S. Civil Aeronautics Administration. Technical Development and Evaluation Center, Indianapolis, Ind. Oct 1948. 15p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 122300

1. Lights, Approach 2. Lights, Flashing - Visibility 3. Runways - Lights 4. CAA TDR 60.

Study of channelized traffic. U. S. Waterways Experiment Station, Vicksburg, Miss. Feb 1956. 26p photos, drawings, diagrs, graphs, fold maps. Order from LC. Mi $2.70, ph $4.80. PB 122905

A survey was conducted at four B-47 bases to provide information on the following items: a. Location of areas of channelization. b. Distribution of traffic in channelized areas. c. Volume of traffic. The survey showed that channelization was greatest on the straightaway portions of taxiways and apron taxilanes. Traffic was channelized to a lesser extent at curves and at runway (take-off) ends. The distribution plots showed that about 75 percent of the B-47 traffic on the straightaways of taxiways fell in a lane 7.5 ft wide. The majority of the take-offs at most of the fields were made in a width of about 30 ft at runway ends. The volume of traffic on main taxiways of two-wing bases may be expected to average about 5000 coverages per year. WES TM 3-426.

Aerodynamics

Effect of spin on aerodynamic properties of bodies of revolution, by L. E. Schmidt and C. H. Murphy. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Aug 1953. 26p photos, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122908

The effect of spin on the aerodynamic coefficients of a five caliber long body of revolution was studied. It was found that for a range of gun twists of 1-10 to 1-40 there is a 5% variation in the drag coefficient and a variation in the Magnus moment coefficient. No measurable variation was observed in the other coefficients. APG BRL M 715.

Finite span wings in compressible flow, by E. A. Krasilshchikova. Translated by Morris D. Friedman. Sep 1956. 130p drawings, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123533

Translated from: Scientific Records of the Moscow State University, v. 154, Mechanics no. 4, 1951, with appendix condensed from a document "Modern Problems of Mechanics", 1952.
1. Flow, Supersonic - Theory - Russia 2. Flow, Compressible - Theory - Russia 3. Ailerons - Vibration - Russia 4. Ailerons - Flutter - Calculations - Russia 5. Wings - Flutter - Calculations - Russia 6. Wings - Vibration - Calculations - Russia 7. NACA TM 1383.

Naval Ordnance Laboratory memoranda, NAVORDS, and reports published by the Aeroballistic Re-

search Department, Oct 1945-Dec 1953, by Lucille S. Webb. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1954. 22p. Order from LC. Mi $2.70, ph $4.80. PB 120987

1. Aerodynamics - Bibliography 2. Ballistics, Exterior - Bibliography 3. NAVORD 3660 4. NOL ARR 222.

Surface temperature and pressure distributions on a circular cylinder in supersonic cross-flow, by L. W. Walter and A. H. Lange. U. S. Naval Ordnance Laboratory, White Oak, Md. Jun 1953. 23p photos, drawing, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 120878

1. Cylinders, Circular - Pressure distribution 2. Mach number - Effect 3. Flow, Supersonic - Theory 4. NAVORD 2854.

Rockets and Jet Propulsion

Design and development of an experimental integrated control for a rocket engine, by S. H. Machlanski and P. E. Prout. Aerojet-General Corporation, Azusa, Calif. Aug 1954. 185p photos, diagrs, graphs (part fold), tables (part fold). Order from LC. Mi $8.40, ph $28.80. PB 122477

A program to evaluate, develop and analyze rocket engine control system components and subcomponents has been completed. An analysis of the dynamics of pressure-sensing elements and connecting lines was made. Components and subcomponents used as diaphragms, seals, solenoid valves, metallic "O" rings and pressure switches were evaluated. Various lubricants such as molybdenum disulfide, Lubeplate and Fluorolube mixtures were investigated. Processing and coating techniques such as ceramic, Super-Scottsonizing, titanium carburizing, titanium anodizing, filter-screen ceramic coating and a bimetallic Al Fin bonding process were evaluated for acid service. AD 74307. Aerojet report 844, vol. II. Project 3073. AF WADC TR 54-235, Part 4. Contract AF 33(038)-30074.

Development of temperature-sensing elements for jet engines, by Gary Steven and W. C. Troy. Armour Research Foundation, Chicago, Ill. Apr 1952. 20p photos, diagrs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122122

The thermoelectric characteristics were determined for the thermocouple $MoSi_2$/Pt and ZrB_2/Pt. Instability of emf output disqualifies these combinations from high temperature application in jet engine control. Chromel-alumel thermocouples were fabricated with various shapes of the hot junction. The design was intended to achieve rapid heat transfer assembly. Characteristic response times were determined at Armour Research in a hot gas jet with a mass flow rate of 4 lb/sec/ft^2. The recorded data represent the intersection of the time sweep on an oscillograph screen with the 63.2% mark of the thermal emf rise. Covers work from Feb 23, 1951 to Feb 23, 1952. AF WADC TR 52-121. Contract AF 33(038)-17637.

Experimental investigation of a light-weight rocket chamber, by John E. Dalgleish and Adelbert O. Tischler. U. S. National Advisory Committee for Aeronautics. Oct 1956. 11p photos. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 123640

Supersedes RM E52L19a.
1. Rocket motors - Combustion chambers 2. Rocket motors - Cooling 3. NACA TN 3827.

Functions of Prandtl-Meyer angle for supersonic nozzle design, by Harold N. Riise. California Institute of Technology. Jet Propulsion Laboratory, Pasadena, Calif. Dec 1953. 108p graph, tables. Order from LC. Mi $5.70, ph $16.80. PB 122966

This report is a tabulation of Mach number, Mach angle, and area ratio vs Prandtl-Meyer angle. The tabulation was made to facilitate design of supersonic nozzles up to Mach number = 10 and was computed in increments of 0.01° in Prandtl-Meyer angle through the range ψ = 0 to ψ = 102.34. CIT JPL P 26. Contract DA-04-495-ORD-18.

Procedures for performing and evaluating acoustical surveys of turbojet engine test facilities, by Samuel Labate. Bolt, Beranek and Newman, Inc., Cambridge, Mass. Apr 1955. 58p photos, drawings, diagrs, graphs. Order from LC. Mi $3.60, ph $9.30. PB 122466

Procedures and techniques are described for performing extensive acoustical surveys of turbojet engine test facilities. The measuring equipment is described and its use for various types of measurements at specific measuring positions in a typical facility is discussed. Data-reduction equipment and techniques are also described. Procedures are presented for utilizing the data obtained from an acoustical survey to determine (a) the acoustic power developed by a turbojet engine, (b) the effectiveness of the acoustical treatments in the facility, (c) the transmission loss properties of doors, windows and walls, and (d) other acoustical properties such as stack directivity, cell radiation patterns, bend effects, etc. Project no. 7211. AF WADC TR 55-145. Contract AF 33(616)-2151.

Marine Transportation

Interim submarine-borne hyperbolic tracking system, by D. J. Bordelon. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1953. 24p photos, diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120834

See also PB 122022.
1. Tracking equipment - Design 2. Hydrophones - Efficiency 3. Trajectories, Guided missile - Determination 4. Hyperbolic functions 5. Tracking, Three dimensional - Analysis 6. NAVORD 2566.

Marine borer control. Part VII: Evaluation of petroleum-ether-soluble fractions and distillation fractions of creosote, by T. R. Price and T. R. Sweeney. U. S. Naval Research Laboratory. Oct 1956. 9p tables. Order from OTS. 50 cents. PB 121532

Four distillation fractions of high-temperature coal tar creosote and two petroleum-ether-soluble creosote fractions from which the tar bases and both tar acids and tar bases were removed were evaluated for their ability to protect wood against attack by marine borers. A linear relationship between attack and concentration of preservative was derived for each fraction from which a rating of the performance of each fraction relative to whole creosote was obtained. For Parts I - VI see PB 106763, 115476, 115477, 111866, 121410, 121433. NRL R 4851.

Suppression of body and hull noises by elastically ("floating") mounted motors and engines (Körperschalldämmung elastisch gelagerter motoren), by Erich Stolte. Translated by F. A. Raven. Mar 1956. 24p photos, drawing, graphs, tables. Order from OTS. 75 cents. PB 121367

It is shown generally that by the correct use of rubber to metal bonding an extensive suppression of body (or hull) noises and concussion can be achieved. To what extent it is possible is elucidated by various examples (exciting force/mass), and also, in the case of sub-critical engine mountings, a good sound suppression is attained which suffices in many cases, even if concussion suppression (shock adsorption) is not achieved in these cases. Translated from Motortechnische Zeitschrift, vol. 15, no. 11, Nov 1954, pp. 316-322. NAVSHIPS T 607. STS 234.

Underwater explosion phenomena: Parameters of a non-migrating bubble oscillating in an incompressible medium, by Hans G. Snay and Ermine A. Christian. U. S. Naval Ordnance Laboratory, White Oak, Md. Feb 1952. 36p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122083

A number of functions, which avoid much laborious computation in the practical application of the incompressible theory of explosion gas bubbles, are derived and tabulated. Examples of the uses of these functions are given. Some of the values of specific bubble parameters are extended to a wider range of conditions than was previously covered. NAVORD 2437.

MISCELLANEOUS

Industrial research laboratories of the United States, tenth edition, compiled by James F. Mauk, Harold Peacock, and Melvin S. Ruffner. National Research Council. 1956. 566p. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. $10. PB 122123

1. Laboratories, Industrial research - Directories 2. NRC 379.

Report of NRL progress. U. S. Naval Research Laboratory. Nov 1956. 56p. Order from OTS. $1.25. Also available at annual subscription rate of $10 a year in U. S. A., foreign subscription rate $13 a year. PB 121668

Contents: Articles: Regenerated electrical output storage tube, by F. H. Harris. - Transonic whirling arm, by R. M. Schecter. - Ionization in combustion zones, by W. W. Balwanz, J. M. Headrick, and J. L. Ahearn, Jr. - Scientific program: Problems accepted. - Problem notes: Applications research: Sweep reference voltage generator for use in an electronic display system. . . . Upper speed threshold for the discrimination of visual movement as a function of stimulus luminance. . . . Effectiveness of a collimated reticle as an aid to visual detection of aircraft at high altitude. - Astronomy and astrophysics: Comparison-type receivers for celestial white noise radiation at 0.86 cm wavelength. - Chemistry: Synthesis and antioxidant activity of some new polyfluoralkyl sulfides and selenides. - Mechanics: Aluminum, magnesium, and magnesium-lithium projectiles, fired in vacuum with the NRL expendable breech high-speed gum, obtained velocities up to 15,600 ft/sec as measured by a drum camera. . . . Pressure-time studies of the valveless pulsejet combustion process. - Metallurgy and ceramics: Theory of the mechanism of modification in the solidification structure of aluminum-silicon alloys . . . . Fifty-six-pound lead single crystal monochromator. . . . Friedel theory of thermoelectric power applied to magnesium alloys. . . . Properties of molding sands under conditions of gradient heating. . . . Further studies on grain boundary liquation as related to stainless steel hot cracking. - Nuclear and atomic physics: New developments in NRL's large electrostatic accelerator. . . . Exact and approximate treatments of the one-dimensional blast wave. - Optics: On the properties and uses of phosphorescent and fluorescent materials. - Radio: Distributed-power amplifier. . . . Effect of air exposure on various cathodes for demountable vacuum systems. . . . Enhancing the phase-shifting properties of antenna materials used for antenna applications. - Solid-state physics: Interband magneto-optic effects in semiconductors. . . . Energy transport by cascade and resonance processes in doubly activated phosphors. - Sound: Solvent resistance of the bond between butt-joined piezoelectric crystals used in sonar transducers. - Published reports. - Papers by NRL staff members. - Patents.

SELECTED LIST OF ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

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

Biology and Medicine

Therapy of radioelement poisoning. Transcription of a meeting on experimental and clinical approaches to the treatment of poisoning by radioactive substances, held October 20 & 21, 1955. Edited by Marcia White Rosenthal. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 175p. Order from OTS. $1. ANL-5584

Biological and medical research division quarterly report, April, May, June, 1956, by A. M. Brues. Argonne National Lab., Lemont, Ill. Jul 1956. Contract W-31-109-eng-38. 101p. Order from OTS. 55 cents. ANL-5597

A device for the removal of mercury vapor from the exhaust of vacuum cleaners, by W. D. Cline and J. A. Westbrook. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Sep 1948. 12p. Order from LC. Mi $2.40, ph $3.30. K-272

Radiological hazards of the air surrounding the LPR, by R. L. Ashley. North American Aviation, Inc., Downey, Calif. Feb 1952. Decl. Mar 1956. 10p. Order from LC. Mi $2.40, ph $3.30. NAA-SR-Memo-195

The role of primary beta radiation in area radiation dose rates; Plant Six (uranium ore refinery) Digest Area, by R. F. Nagel. Mallinckrodt Chemical Works, St. Louis. Nov 1950. Changed from Official Use Only Oct 1955. 14p. Order from LC. Mi $2.40, ph $3.30. NYO-5237

Final report on AEC project 815. Texas Agricultural Experiment Station, College Station, Texas. Jul 1956. Contract AT(40-1)-1307—Modification No. 2. 11p. Order from LC. Mi $2.40, ph $3.30. ORO-152

The performance of contactors for liquid-liquid extraction. Progress report no. 2 covering period March 15, 1952 to July 1, 1952, by D. S. Arnold, C. A. Plank, and Frederick Philips Pike. North Carolina State Coll., Raleigh. Jul 1952. Contract AT(40-1)-1320. 55p. Order from LC. Mi $3.60, ph $9.30. ORO-155

Quarterly progress report for the period ending September 30, 1954. California. Univ., Los Angeles. Atomic Energy Project. Oct 1954. Decl. Mar 1956. Contract AT-04-1-gen-12. 121p. Order from LC. Mi $6, ph $18.30. UCLA-307

Quarterly progress report for period ending December 31, 1954. California. Univ., Los Angeles. Atomic Energy Project. Dec 1954. Decl. Mar 1956. Contract AT04-1-gen-12. 124p. Order from LC. Mi $6.30, ph $19.80. UCLA-320

Chemistry and Chemical Engineering

Production of D_2O for use in the fission of uranium, by Harold C. Urey, Aristid V. Grosse, and George Walden. Columbia Univ., N. Y. Jun 1941. Decl. May 1956. 32p. Order from LC. Mi $3, ph $6.30. A-94

Calculation of the performance of exchange tower in the production of heavy water, by Harrison C. Carlson and J. O. Maloney. Columbia Univ., New York. Oct 1942. Decl. May 1954. Contract OEMsr-412. 51p. Order from LC. Mi $3.60, ph $9.30. A-327

The design of cascades for the concentration of deuterium, by Irving Kaplan and Karl Cohen. Columbia Univ., New York. Div. of War Research. Oct 1942. Decl. May 14, 1954. Contract OEMsr-412. 31p. Order from LC. Mi $3, ph $6.30. A-335

Design of ether-water contacting system. Final report, by T. H. Chilton, J. B. Tepe, and W. K. Woods. Du Pont de Nemours (E. I.) and Co.

Engineering Dept., Wilmington, Del. Jan 1943. Decl. Dec 1955. Contract OEMsr-788. 90p. Order from LC. Mi $4.80, ph $13.80. A-519

Extraction of valuable constituents of pitchblende ores. Section I. The digestion of BBB ore with nitric acid. Progress report, by Scott E. Wood, James English, Jr., Herbert M. Clark, Edward J. King, James L. Miller, Andrew S. Tomcufcik, and Howard R. Brownell. Yale Univ., New Haven. Sterling Chemistry Lab. Mar 1944. Decl. Oct 1955. 26p. Order from LC. Mi $2.70, ph $4.80. A-1030

The extraction of uranium from pitchblende by ammonium carbonate, by Herbert M. Clark and Ralph G. Van Name. Yale Univ., New Haven. Sterling Chemistry Lab. Jan 1947. Decl. Oct 1955. 10p. Order from LC. Mi $1.80, ph $1.80. A-2934

Determination of boron in beryllium and its compounds, by Martha S. Richmond. National Bureau of Standards, Washington, D. C. Jun 1947. Decl. Feb 1956. 21p. Order from LC. Mi $2.70, ph $4.80. A-2943

Final report. Part I. The preparation of certain fluorine containing compounds. Period covered May 1, 1943 to December 31, 1944. Part II. Removal of ether peroxides from diethyl ether used in an extraction process. Period covered January 1, 1945 to June 30, 1946. Purdue Research Foundation, Lafayette, Ind. Decl. Jan 1956. Contract W-7405-eng-74. 64p. Order from LC. Mi $3.90, ph $10.80. A-3972

A rapid colorimetric method for the determination of fluoride ion using "Ferrisal" reagent, by Joseph Greenspan and Sidney J. Stein. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Nov 1944. Decl. Dec 1955. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-3967

The reduction of uranium trioxide by ethyl alcohol, by B. M. Haines and V. P. Calkins. Tennessee Eastman Corp., Oak Ridge, Tenn. Nov 1946. Decl. Jan 1956. Contract W-7401-eng-23. 15p. Order from LC. Mi $2.40, ph $3.30. AECD-4006

The dibutyl carbitol extraction procedure for the separation of tubanyl (UO_2^{++}) and phosphate ions, by E. J. Lord, L. J. Andrews, and J. W. Gates, Jr. Tennessee Eastman Corp., Oak Ridge, Tenn. Jul 1945. Decl. Feb 1956. Contract W-7401-eng-23. 4p. Order from LC. Mi $1.80, ph $1.80. AECD-4117

Progress report for the month of October 1947, by A. E. Bearse, E. J. Center, H. A. Pray, A. C. Richardson, and J. D. Sullivan. Battelle Memorial Inst., Columbus, Ohio. Oct 1947. Decl. Jan 1956. Contract W-38-094-eng-27. 23p. Order from LC. Mi $2.70, ph $4.80. AECD-4132

Progress report for the month of December 1947, by A. E. Bearse, F. C. Croxton, and J. D. Sullivan. Battelle Memorial Inst., Columbus, Ohio. Dec 1947. Decl. Jan 1956. Contract AT-30-1-gen-202. 6p. Order from LC. Mi $1.80, ph $1.80. AECD-4141

Recovery of tuballoy uranium from tantalum, by C. P. Johnston and A. Milch. Tennessee Eastman Corp., Oak Ridge, Tenn. Sep 1945. Decl. Feb 1956. Contract W-7401-eng-23. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4163

The separation of uranium from thorium; the oxalic acid leach, by E. W. Christopherson, H. R. Grady, R. W. Woodard, and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Jul 1946. Decl. Feb 1956. Contract W-7401-eng-23. 12p. Order from LC. Mi $2.40, ph $3.30. AECD-4181

Modified liquid phase reactor, by J. W. Zuidema and A. E. Ballard. Tennessee Eastman Corp., Oak Ridge, Tenn. Jun 1944. Decl. Feb 1956. 5p. Order from LC. Mi $1.80, ph $1.80. AECD-4183

Analytical procedure for determination of tuballoy uranium in solid salvage residues, by William R. Lasko and C. D. Susano. Tennessee Eastman Corp., Oak Ridge, Tenn. Jan 1946. Decl. Feb 1956. Contract W-7401-eng-23. 7p. Order from LC. Mi $1.80, ph $1.80. AECD-4194

A method for the determination of boron in TF_6UF_6, by E. Staple, E. D. Marshall, F. Nelson, and W. Simon. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Mar 1946. Decl. with deletions Nov 1955. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. AECD-4212

Evaluation of sampling variables—vessel C-102, by H. B. Loopstra, F. H. Tingey, and F. P. Vance. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Sep 1954. Decl. Feb 1956. Contract AT(10-1)-205. 11p. Order from LC. Mi $2.40, ph $3.30. AECD-4216

Absolute beta assay with end-window Geiger-Mueller counters, by George W. Reed, Jr. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 16p. Order from OTS. 20 cents. ANL-5608

The concentration of pitchblende. Progress report, by A. L. Wesner, O. F. Tangel, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Jun 1950. Changed from Official Use Only Oct 10, 1955. Contract AT-30-1-gen-228. 16p. Order from LC. Mi $2.40, ph $3.30. BMI-240

Examination of residues from the nitric acid digestion of pitchblende, by B. Langston, O. F. Tangel, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. Jul 1950. Changed from Official Use Only Oct 10, 1955. Contract AT-30-1-gen-228. 10p. Order from LC. Mi $1.80, ph $1.80. BMI-241

The recovery of uranium from carnotite ores. Period covered November 1, 1947 to June 30, 1948, by A. C. Richardson, F. M. Stephens, Jr., and D. D. Rabb. Battelle Memorial Inst., Columbus, Ohio. Jun 1948. Decl. Mar 1956. Contract AT-30-1-gen-258. 22p. Order from LC. Mi $2.70, ph $4.80. BMI-JDS-128

Progress report for the month of September 1949, by Iver Igelsrud, Elmer F. Stephan, John Chocholak, Earl White, Gilbert Dawson, and Ralph Belcher. Battelle Memorial Inst., Columbus, Ohio. Sep 1949. Decl. Apr 1956. Contract W-38-094-eng-27. 25p. Order from LC. Mi $2.70, ph $4.80. BMI-JDS-212

Recovery of thorium and uranium from monazite sands. Progress report for September 1949, by G. D. Calkins, R. B. Filbert, Jr., and R. H. Poirier. Battelle Memorial Inst., Columbus, Ohio. Sep 1949. Decl. Sep 1955. Contract AT-30-1-gen-228. 9p. Order from LC. Mi $1.80, ph $1.80. BMI-JDS-213

Uranium recovery from Florida phosphates, by H. W. Adam, J. W. Cookston, R. Meaders, O. F. Tangel, and A. L. Wesner. Battelle Memorial Inst., Columbus, Ohio. Aug 1949. Decl. Apr 1956. Contract W-38-094-eng-27. 42p. Order from LC. Mi $3.30, ph $7.80. BMI-JDS-214

Progress report on the concentration of pitchblende, by Adam L. Wesner, Benny Langston, O. F. Tangel, and A. C. Richardson. Battelle Memorial Inst., Columbus, Ohio. May 1950. Changed from Official Use Only Oct 10, 1955. Contract AT-30-1-gen-228. 18p. Order from LC. Mi $2.40, ph $3.30. BMI-JDS-232

Miscellaneous notes on analytical methods, compiled by H. L. Davis. Metallurgical Lab. Univ. of Chicago, Chicago, Ill. Feb 1944. Decl. Nov 1955. 83p. Order from OTS. 50 cents. CC-1706

A summary of the properties, preparation, and purification of the anhydrous chlorides and bromides of uranium. Part A. Uranium chlorides. Part B. Uranium bromides, by O. Johnson, T. Butler, J. Powell, and R. Nottorf. Metallurgical Lab. Univ. of Chicago, Chicago, Ill. Sep 1944. Decl. Nov 1955. 32p. Order from OTS. 25 cents. CC-1974

Chemical research—radiation chemistry; report for month ending March 15, 1945. Chicago. Univ. Metallurgical Lab. Decl. Feb 1956. Contract W-7401-eng-37. 11p. Order from LC. Mi $2.40, ph $3.30. CC-2800(Del.)

The precipitation of lanthanum from solution in the presence of radiation. Problem Assignment Number 320 MLC 2001, by R. A. Penneman, J. A. Ghormley, S. Gordon, B. Leaf, and A. O. Allen. Chicago. Univ. Metallurgical Lab. Apr 1945. Decl. Feb 1956. Contract W-7401-eng-37. 8p. Order from LC. Mi $1.80, ph $1.80. CC-2871

The extraction of uranium into hexone as uranyl thiocyanate from thorium nitrate solutions, by William H. Reas. California. Univ., Berkeley. Radiation Lab. May 1945. Decl. Feb 1956. Contract W-7405-eng-48B. 13p. Order from LC. Mi $2.40, ph $3.30. CC-3017

Thermal decomposition of nitrous oxide, by Stanley H. Jury. Oak Ridge National Lab., Tenn. Feb 1952. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-52-3-143

Physical properties of uranyl sulfate solutions at atmospheric pressure, by J. D. Roarty, S. I. Kaplan, W. D. Powers, and R. F. Redmond. Oak Ridge National Lab., Tenn. Mar 1952. Decl. Feb 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-52-3-253

Equations useful in determining separation factors by repeated batch extraction and equilibration, by J. T. Roberts. Oak Ridge National Lab., Tenn. Jul 1952. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-52-7-132

Pressure and power calculation methods for pulse columns, by H. F. Johnson. Oak Ridge National Lab., Tenn. Jul 1952. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-52-7-162

Solubility and distribution of Di(2-ethylhexyl) phosphinic acid, by W. H. Baldwin. Oak Ridge National Lab., Tenn. Nov 1952. Decl. Feb 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-52-11-57

Ion exchange separation of trace impurities, by W. A. Brooksbank and G. W. Leddicotte. Oak Ridge National Lab., Tenn. May 1953. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.40, ph $3.30. CF-53-5-228

Analysis for trace impurities by neutron activation, by W. A. Brooksbank, G. W. Leddicotte, and H. A. Mahlman. Oak Ridge National Lab., Tenn. Oct 1953. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-53-10-52

The use of potassium dichromate as an inhibitor of corrosion of mild steel in the ternary system, PDA-benzene-water, by C. D. Susano. Oak Ridge National Lab. Y-12 Area, Tenn. Dec 1953. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-53-12-31

Hydrofluoric acid concentration by electrodialysis, by E. J. Parsi. Oak Ridge National Lab., Tenn. Dec 1953. Decl. Feb 1956. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-53-12-117

Recovery of uranium from reduction bomb slag by direct fluorination, by M. R. Bennett. Oak Ridge National Lab., Tenn. Apr 1954. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-54-4-217

Estimated two-liquid phase temperatures for HRT soup, by C. H. Secoy. Oak Ridge National Lab., Tenn. Sep 1954. Decl. Apr 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-54-9-13

Investigation of vacuum fusion and other equipment for the determination of oxygen, hydrogen, nitrogen, and carbon in nonferrous metals and alloys, by J. H. Edgerton and H. G. Davis. Oak Ridge National Lab., Tenn. Sep 1954. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-54-9-16

Some selected methods for determining uranium and vanadium in the presence of each other, by C. D. Susano and L. J. Brady. Oak Ridge National Lab., Tenn. Jan 1955. Decl. Feb 1956. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-55-1-77

Some properties of ThO_2—D_2O slurries. TBR memo no. 10, by P. N. Haubenreich. Oak Ridge National Lab., Tenn. Feb 1955. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-55-2-51

Ore processing: Resin test loop studies—problem statement, by J. C. Bresee. Oak Ridge National Lab., Tenn. Feb 1955. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-55-2-146

On the effect of reactor exposure on the rate of oxidation of copper single crystals, by F. W. Young, Jr. Oak Ridge National Lab., Tenn. Mar 1955. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-55-3-70

Evaluation of the watertightness of an asphalt, tamped-clay pit liner, by K. E. Cowser, R. J. Morton, and T. W. Bendixen. Oak Ridge National Lab., Tenn. Mar 1955. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. CF-55-3-128

Effect of pre-cleaning of glass samplers on the oxygen content of sodium, by J. C. White. Oak Ridge National Lab., Tenn. Jul 1955. Decl. Apr 1956. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-55-7-16

Investigation of an ion-exchange separation procedure, by M. M. Vick and G. W. Leddicotte. Oak Ridge National Lab., Tenn. Sep 1955. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-55-9-152

Raw materials economic studies: A preliminary estimate of the cost of uranium recovery using Dalphex slurry process, by B. B. Klima and R. R. Wiethaup. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-46

Raw materials economic studies: A preliminary estimate of the cost of uranium recovery using Dalphex clarified leach liquor process, by B. B. Klima, R. R. Wiethaup, and R. H. Guymon. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-66

A new calculation method for evaluating solvent extraction contactor performance, by M. E. Whatley. Oak Ridge National Lab., Tenn. Nov 1955. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-55-11-30

Raw materials economic studies: A preliminary estimate of the cost of uranium recovery using the Dapex slurry process, III, by B. B. Klima, R. R. Wiethaup, and R. H. Guymon. Oak Ridge National Lab., Tenn. Dec 1955. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-55-12-112

The theory and some applications of the hydraulic ram as applied to countercurrent ion exchange, by

S. H. Jury. Oak Ridge National Lab., Tenn. Jun 1956. Contract W-7405-eng-26. 22p. Order from LC. Mi $2.70, ph $4.80. CF-56-6-74

Technology—chemical engineering; report for month ending July 26, 1943. Chicago. Univ. Metallurgical Lab. Decl. Jan 1956. Contract W-7401-eng-37. 15p. Order from LC. Mi $2.40, ph $3.30. CN-828

Equilibrium distribution and physical properties for the system uranyl nitrate—diethyl ether-water. Progress report, by Marion Monet. Chicago. Univ. Metallurgical Lab. Dec 1944. Decl. Feb 1956. Contract W-7401-eng-37. 36p. Order from LC. Mi $3, ph $6.30. CN-2491

Analysis for Pu(III) and Pu(IV) on a tracer scale, by E. L. King. California. Univ., Berkeley. Radiation Lab. Dec 1944. Decl. Feb 1956. Contract W-7405-eng-48B. 28p. Order from LC. Mi $2.70, ph $4.80. CN-2726

Analysis of Pu(IV) polymer for chloride ions. Progress report on P. A. No. CX3-2, by D. G. Rose. Clinton Labs., Oak Ridge, Tenn. Apr 1945. Decl. Feb 1956. Contract W-7405-eng-39. 10p. Order from LC. Mi $1.80, ph $1.80. CN-2807

An early macro scale demonstration of the bismuth phosphate extraction and decontamination procedure at production plant concentrations of plutonium, by S. Peterson. Argonne National Lab., Lemont, Ill. Nov 1946. Decl. Feb 1956. Contract W-31-109-3ng-38. 5p. Order from LC. Mi $1.80, ph $1.80. CN-3668

Calculation of the temperature distribution in a slug with a solid aluminum cap, by F. H. Murray, W. Karush, M. Ginsburg, and G. Young. Chicago. Univ. Metallurgical Lab. Apr 1944. Decl. Feb 1956. 11p. Order from LC. Mi $2.40, ph $3.30. CP-1580

"Versene" titration of thorium and aluminum, by W. R. Cornman. E. I. du Pont de Nemours & Co. Savannah River Lab. Aug 1956. Contract AT(07-2)-1. 8p. Order from OTS. 15 cents. DP-171

The preparation of an americium gamma source, by R. C. Milham. E. I. du Pont de Nemours & Co. Savannah River Lab. Aug 1956. Contract AT(07-2)-1. 10p. Order from OTS. 15 cents. DP-173

Clarification of Redox feed (1AF) by filtration. A Semi-Works study progress report. Redox technical data study no. 8, by V. R. Cooper and E. M. Coleman. Hanford Works, Richland, Wash. Oct 1948. Decl. Feb 1956. Contract W-31-109-eng-52. 25p. Order from LC. Mi $3, ph $6.30. HW-10960

The mechanism of carrying Pu(III) on lanthanum fluoride (thesis), by Delebert Lloyd Ralphs. Hanford Works, Richland, Wash. Apr 1952. Decl. Feb. 1956. Contract W-31-109-eng-52. 53p. Order from LC. Mi $3.60, ph $9.30. HW-24115

Hanford Works analytical manual for reactor process water. Hanford Works, Richland, Wash. Feb 1953. Changed from Official Use Only Feb. 20, 1956. Contract W-31-109-eng-52. 75p. Order from LC. Mi $4.50, ph $12.30. HW-27229

The determination of Cu^{64} in reactor effluent water by electrodeposition, by R. W. Perkins. Hanford Atomic Products Operation, Richland, Wash. Sep 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. HW-29319

Radium determinations in soil, vegetation and water by radon counting, by H. G. Rieck and R. W. Perkins. Hanford Atomic Products Operation, Richland, Wash. May 1956. Contract W-31-109-eng-52. 17p. Order from OTS. 20 cents. HW-32210(Rev.)

The application of some ion exchange theories to the adsorption of trace elements, by Herman Schuyler Gile. Hanford Atomic Products Operation, Richland, Wash. Jun 1955. Decl. Feb 1956. Contract W-31-109-eng-52. 46p. Order from LC. Mi $3.30, ph $7.80. HW-32461-TH

A systematic approach to the solution of chromatographic problems, by J. E. Meinhard. Hanford Atomic Products Operation, Richland, Wash. Jun 1954. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-32983

The graphite-steam reaction, by D. M. Knott. Hanford Atomic Products Operation, Richland, Wash. Feb 1954. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-30693

IDO liquid waste plant, CPP 604 building operating equipment manual, by S. F. Fairbourne, V. W. Irvine, A. M. Larson, B. H. Macklin, L. G. Pearson, and H. L. Sexton, comps. American Cyanamid Co. Atomic Energy Div., Idaho Falls, Idaho. May 1952. Changed from Official Use Only May 29, 1956. Contract AT(10-1)-177. 164p. Order from LC. Mi $7.80, ph $25.80. IDO-14079

Distribution of uranium at low acid - low uranium concentrations into 4-1/2 percent TBP-AMSCO,

by R. L. Andelin, E. L. Anderson, W. H. McVey. Phillips Petroleum Co. Idaho Operations Office. Aug 1956. Contract AT(10-1)-205. 26p. Order from OTS. 35 cents. IDO-14381

Radioanalysis of the MTR process water off-gas stream, by R. L. Heath and T. O. Passell. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Oct 1955. Contract AT(10-1)-205. 6p. Order from LC. Mi $1.80, ph $1.80. IDO-16273

Measurement and significance of transport number in fused salts, by Richard W. Laity and Frederick R. Duke. Ames Lab. Iowa State College, Ames, Iowa. Jun 1955. Contract W-7405-eng-82. 64p. Order from OTS. 40 cents. ISC-654

Iodato-silver complexing equilibria, by James J. Renier and Don S. Martin. Ames Lab. Iowa State College, Ames, Iowa. Aug 1955. Contract W-7405-eng-82. 43p. Order from OTS. 35 cents. ISC-668

Temperature coefficient of electrical conductivity in the system potassium chloride-zinc chloride, by R. A. Fleming and F. R. Duke. Ames Lab. Iowa State College, Ames, Iowa. Dec 1955. Contract W-7405-eng-82. 37p. Order from OTS. 30 cents. ISC-686

Liquid-liquid extraction of molten uranium with silver, by C. W. Watson and G. H. Beyer. Ames Lab. Iowa State College, Ames, Iowa. Mar 1956. Contract W-7405-eng-82. 27p. Order from OTS. 25 cents. ISC-696

Some physical-metallurgical properties of scandium, yttrium and the rare earth metals, by Kenneth W. Herrmann, A. H. Daane, and F. H. Spedding. Ames Lab. Iowa State College, Ames, Iowa. Aug 1955. Contract W-7405-eng-82. 92p. Order from OTS. 50 cents. ISC-702

Thermal decomposition of the compound uranium tetrafluoride-ammonium fluoride, by H. A. Bernhardt, R. A. Gustison, and J. C. Posey. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Jun 1949. Decl. Oct 1955. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. K-410

Purification of methyl isobutyl ketone, by W. P. Jensen, D. W. Bartholomew, and E. J. Freeh. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Engineering Practice School. Feb 1950. Decl. May 1956. Contract W-7405-eng-26. 22p. Order from LC. Mi $2.40, ph $3.30. K-427(Rev.)

Separation of cesium from sodium by means of Fullers earth, by H. L. Bench and H. B. Weisblatt. Carbide and Carbon Chemicals Corp. K-25 Plant, Oak Ridge, Tenn. Jul 1949. Decl. May 1956. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. K-443

A report on the development and operation of a pilot incinerator for contaminated combustible solid wastes, by F. N. Schell. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1951. Changed from Official Use Only Jun 26, 1956. Contract W-31-109-eng-52. 65p. Order from LC. Mi $3.30, ph $7.80. KAPL-610

Preparation of boron trifluoride and filling of neutron counters, by E. B. Fehr. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1954. Contract W-31-109-eng-52. 19p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EBF-1

Evaluation of Norton non-metallic bonded boron carbide compacts, by E. E. Baldwin, G. L. Cutler, and F. W. Wiesinger. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1954. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EEB-11

The spectrophotometric determination of small quantities of oils and greases, by E. E. Swain, Jr. and F. K. Heumann. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1953. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EES-1

Preliminary experiments on the nitriding of reactor materials in sodium, by E. G. Brush and C. R. Rodd. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1955. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-EGB-21

A survey of the liquid waste storage facilities at KAPL with respect to costs and future requirements, by J. D. Evans and F. N. Schell. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1951. Decl. Feb 1956. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-FNS-3

The unit cell and space group of ammonium metavanadate, by Joseph S. Lukesh. Knolls Atomic Power Lab., Schenectady, N. Y. May 1950. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JSL-7

The crystal structure of ammonium metavanadate, A preliminary report, by Joseph S. Lukesh.

Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1951. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-JSL-9

The determination of ruthenium in uranium, by Lawrence R. Yetter. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1955. Contract W-31-109-eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LRY-1

The polarography of the lower oxidation states of ruthenium in perchloric acid solutions, by L. W. Niedrach and A. D. Tevebaugh. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1950. Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-LWN-2

Reaction rate of solid sodium with air, by William H. Howland and Leo F. Epstein. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1953. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WHH-3

Determination of trivalent chromium in the presence of chromate, by R. W. Cline, R. E. Simmons, and W. R. Rossmassler. Union Carbide Nuclear Co. Paducah Plant, Ky. Jul 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. KY-173

Comparison of direct evaporation and lanthanum fluoride methods for plutonium radiochemical analysis, by Karl S. Bergstresser and Rebecca M. Bradford. Los Alamos Scientific Lab., N. Mex. Mar 1950. Decl. Dec 1955. 31p. Order from LC. Mi $2.70, ph $4.80. LA-1082

The spectrophotometric determination of cerium in plutonium, by Maynard E. Smith. Los Alamos Scientific Lab., N. Mex. Jan 1956. Contract W-7405-eng-36. 20p. Order from OTS. 20 cents. LA-1995

The exchange reaction between substituted benzyl iodides and potassium iodide. VII. p-Fluorobenzyl iodide, by Milton Kahn and J. L. Riebsomer. Los Alamos Scientific Lab. Univ. of N. Mex., Albuquerque, N. Mex. Jun 1956. 9p. Order from OTS. 15 cents. LA-2048 UNM

Thermal decomposition of hydrated RO_4, by Charles A. Kraus. Brown Univ., Providence, R. I. Apr 1944. Decl. Jan 1956. 3p. Order from LC. Mi $1.80, ph $1.80. M-1047

The preparation and reactions of certain compounds of T (uranium). Monthly technical report for February 1, 1945 to March 1, 1945, by E. T. McBee. Purdue Univ., Lafayette, Ind. Mar 1945. Decl. Jan 1956. Contract W-7405-eng-74. 16p. Order from LC. Mi $2.40, ph $3.30. M-2102

The preparation and reactions of certain compounds of tuballoy (uranium). Monthly technical report for March 1, 1945 to April 1, 1945, by E. T. McBee and Z. D. Welch. Purdue Univ., Lafayette, Ind. Decl. Jan 1956. Contract W-7405-eng-74. 19p. Order from LC. Mi $2.40, ph $3.30. M-2103

Some factual considerations relating to the distribution of uranyl nitrate between water and diethyl ether, by N. H. Furman. Princeton Univ., N. J. Frick Chemical Lab. (1946?) Decl. Oct 1955. 11p. Order from LC. Mi $2.40, ph $3.30. M-3451

The mercury diaphragm electrolysis cell, by N. H. Furman and Bruce McDuffie. Princeton Univ., N. J. Frick Chemical Lab. 1946. Revised Nov 1947. Decl. Oct 1955. 7p. Order from LC. Mi $1.80, ph $1.80. M-4231

The distribution of molybdenum between diethyl ether and aqueous solutions, by N. H. Furman, R. J. Mundy, and G. H. Morrison. Princeton Univ., N. J. Frick Chemical Lab. Apr 1947. Decl. Oct 1955. 9p. Order from LC. Mi $1.80, ph $1.80. M-4232

Studies of the colorimetric determination of iron, by N. H. Furman and Bruce McDuffie. Princeton Univ., N. J. Frick Chemical Lab. 1945. Revised Dec 1947. Decl. Oct 1955. 12p. Order from LC. Mi $2.40, ph $3.30. M-4233

Studies of the colorimetric process for the estimation of nickel with dimethylglyoxime, by N. H. Furman and Bruce McDuffie. Princeton Univ., N. J. Frick Chemical Lab. 1946. Revised Dec 1947. Decl. Oct 1955. 14p. Order from LC. Mi $2.40, ph $3.30. M-4234

A colorimetric method for the determination of small amounts of cupferron, by W. E. Bunce and N. H. Furman. Princeton Univ., N. J. Frick Chemical Lab. Jan 1946. Decl. Oct 1955. 5p. Order from LC. Mi $1.80, ph $1.80. M-4235

Boiling point studies of solutions of uranyl nitrate in diethyl ether, by William E. Bunce and N. H. Furman. Princeton Univ., N. J. Frick Chemical Lab. Jul 1945. Decl. Oct 1955. 9p. Order from LC. Mi $1.80, ph $1.80. M-4237

The reduction of uranyl solutions by saturated liquid zinc amalgam, by N. H. Furman, W. B.

Mason, and J. S. Pekola. Princeton Univ., N. J. Frick Chemical Lab. May 1947. Decl. Oct 1955. Contract W-7405-eng-81. 10p. Order from LC. Mi $2.40, ph $3.30. M-4244

The loss of nitrogen during the solution of uranium in hydrochloric acid and hydrogen peroxide and the subsequent distillation, by N. H. Furman and R. J. Mundy. Princeton Univ., N. J. Frick Chemical Lab. 1946. Revised Sep 1947. Decl. Oct 1955. 10p. Order from LC. Mi $2.40, ph $3.30. M-4254

Acid leaching of low-grade uranium precipitates from Rand ores, by John J. Brunner, Robert L. Barnard, and Sara E. Bailey. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. Oct 1949. Decl. Apr 1956. Contract W-7405-eng-85. 27p. Order from LC. Mi $2.70, ph $4.80. MITG-A76

The solubility of tellurium(IV) oxide in hydrochloric acid. The potential of the tellurium electrode in chloride solutions, by J. H. Payne, Jr. Mound Lab., Miamisburg, Ohio. n.d. Decl. Apr 1956. 28p. Order from LC. Mi $2.70, ph $4.80. MLM-379-1(Extract)

Polarographic determination of biphenyl in binary mixtures with the three terphenyls and with meta-polyphenyl tetrahydrofuran as solvent, by Louis Silverman and Wanda Bradshaw. North American Aviation, Inc., Downey, Calif. Dec 1955. Contract AT-11-1-gen-8. 30p. Order from LC. Mi $2.70, ph $4.80. NAA-SR-1395

Basic chemistry of high temperature inorganic systems semiannual progress report July - December, 1955, by S. J. Yosim and T. A. Milne. Atomics International. North American Aviation, Inc., Canoga Park, Calif. Oct 1956. Contract AT-11-1-gen-8. 17p. Order from OTS. 20 cents. NAA-SR-1603

Corrosion of type 2S aluminum in distilled water, by G. M. Inman and J. J. Shyne. North American Aviation, Inc., Downey, Calif. Apr 1951. Decl. Apr 1956. Contract AT-11-1-gen-8. 15p. Order from LC. Mi $2.40, ph $3.30. NAA-SR-Memo-26

Electrodeposition of beryllium. Progress report for July 1, 1953 to September 30, 1953, by Gwendolyn B. Wood and Abner Brenner. National Bureau of Standards, Washington, D. C. Sep 1953. 9p. Order from LC. Mi $2.40, ph $3.30. NBS-2812

Solid-liquid equilibrium in the lithium-lithium hydride system. II. Freezing points over the composition range 5 to 90 per cent lithium hydride. Period covered: December 1, 1955 to June 1, 1956, by Charles E. Messer and Regina A. Seales. Tufts Univ., Medford, Mass. Jun 1956. Contract AT(30-1)-1410. 14p. Order from LC. Mi $2.40, ph $3.30. NYO-3959

Viscosity-temperature relationship for a 32% $Ca(NC_3)_2$ solution, by A. Grunewald. Mallinckrodt Chemical Works, St. Louis. Jan 1946. Decl. Oct 1955. Contract W-14-108-eng-8. 6p. Order from LC. Mi $1.80, ph $1.80. NYO-5157

A methane proportional counter system for natural radiocarbon measurements (thesis), by Ward Diethorn. Carnegie Inst. of Tech., Pittsburgh, Pa. Mar 1956. Contract AT(30-1)-844. 146p. Order from OTS. 75 cents. NYO-6628

Studies on coordination compounds. XVII. The chelating tendencies of some β-diketones toward beryllium and uranyl ions and of methoxyacetylacetone and curcumin toward a variety of divalent ions, by David M. Ericson and W. Conrad Fernelius. Pennsylvania State Univ., University Park. Coll. of Chemistry and Physics. May 1956. Contract AT(30-1)-907. 5p. Order from LC. Mi $1.80, ph $1.80. NYO-7711

Report on deuterocarbons. Report no. 4, by E. Charney. New York Operations Office, AEC. May 1949. Decl. Apr 1956. Contract AT-30-1-gen-292. 7p. Order from LC. Mi $1.80, ph $1.80. NYOO-63

Progress report for December 1949, by Gordon C. Williams, Simeon V. Galginaitis, E. G. Baker, Jr., A. H. Isaacs, E. W. Holzknecht, R. A. Gillespie, R. G. Moody, L. A. Graham, and R. Kaplan. Louisville, Ky. Univ. Inst. of Industrial Research. Decl. Jan 1956. 29p. Order from LC. Mi $2.70, ph $4.80. NYOO-1005

Photometric determination of titanium in zirconium metal, by R. H. Beaumont, Jr. New Brunswick Lab., AEC., N. J. Aug 1949. Decl. Jan 1956. 10p. Order from LC. Mi $1.80, ph $1.80. NYOO-2002

Scope of the raw materials cost evaluation studies, by E. F. Joseph, B. B. Klima, H. M. McLeod, Jr., A. D. Ryon, W. T. Ward, and R. R. Wiethaup. Oak Ridge National Lab., Oak Ridge, Tenn. Sep 1955. Decl. Jan 1956. Contract W-7405-eng-26. 8p. Order from OTS. 15 cents. ORNL-1927

Determination of boron in fluoride salts, by W. J. Ross, A. S. Meyer, Jr., and J. C. White. Oak Ridge National Lab., Tenn. Aug 1956. Contract W-7405-eng-26. 32p. Order from LC. Mi $2.70, ph $4.80. ORNL-2135

Determination of copper in solutions of uranyl sulfate by internal electrolysis, by O. Menis, D. L. Manning, and R. G. Ball. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 11p. Order from OTS. 15 cents. ORNL-2153

Chemistry Division semiannual progress report for period ending June 20, 1956, by E. H. Taylor and M. A. Bredig. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 92p. Order from OTS. 55 cents. ORNL-2159

Temperature effects of sublimation. TCl_4 (UCl_4), by M. Mueller, P. H. Davidson, and Iva Streeter. California. Univ., Berkeley. Radiation Lab. Feb 1945. Decl. Sep 1955. Contract W-7405-eng-48. 11p. Order from LC. Mi $2.40, ph $3.30. RL-4.6.910

Heats of formation of tuballoy (uranium) compounds. III. Mixed halides, TCl_3Br, TCl_2Br_2, and $TClBr_3$, by C. H. Barkelew. California. Univ., Berkeley. Radiation Lab. Apr 1945. Decl. Sep 1955. Contract W-7405-eng-48. 4p. Order from LC. Mi $1.80, ph $1.80. RL-4.6.913

The vapor pressure, molecular diameter, viscosity, and mean free path of tuballoy tetrachloride. Summary of data pertaining to the vaporization of other tetrahalides of tuballoy, by Manfred E. Meuller. California. Univ., Berkeley. Radiation Lab. Sep 1945. Decl. Sep 1955. Contract W-7405-eng-48. 28p. Order from LC. Mi $2.70, ph $4.80. RL-4.6.934

Uranium production process designs for leached zone plants. Volume IV. Uranium recovery section, by D. F. Clements, R. F. McCullough, and W. C. Knopf. International Minerals and Chemical Corp., Chicago. Jun 1953. Decl. Oct 1955. Contract AT-(49-1)-545. 40p. Order from LC. Mi $3.30, ph $7.80. RMO-2015

The solvent-solvent extraction of uranium from sulfuric acid solutions with oil soluble amines, by Al Preuss and Jean Saunders. Research Laboratories. Rohm and Haas Co., Philadelphia, Pa. Apr 1955. Decl. Dec 1955. Contract AT(49-1)-535. 39p. Order from OTS. 30 cents. RMO-2533

Factors influencing the reactivity of uranium trioxide, by R. B. Holden. Metallurgical Laboratories. Sylvania Electric Products, Inc., Bayside, N. Y. Oct 1951. Decl. Jan 1956. 4p. Order from OTS. 10 cents. TID-5063

The distribution of radium in nitric acid digestions of pitchblende, by Henry C. Thomas. Yale Univ., New Haven. Sterling Chemistry Lab. (1944?). Decl. Oct 1955. 19p. Order from LC. Mi $2.40, ph $3.30. TID-5196

A study of methods of controlling the molybdenum content of uranyl nitrate prepared by ether extraction from nitrate solutions obtained by a nitric acid attack of pitchblende, by Herbert M. Clark. Yale Univ., New Haven. Sterling Chemistry Lab. (1944?). Decl. Oct 1955. 21p. Order from LC. Mi $2.70, ph $4.80. TID-5198

Industrial technical information meeting on cold processing of enriched uranium, Oak Ridge, September 13-15, 1956. Oak Ridge Operations Office, Oak Ridge, Tenn. Sep 1956. 96p. Order from OTS. 50 cents. TID-7518(Pt. 1)

Preliminary studies for the separation of HD from H_2 by rectified absorption, by D. N. Hanson, C. d'A. Hunt, M. W. Cook, and J. L. Fick. California. Univ., Berkeley. Radiation Lab. Mar 1952. Decl. Apr 1956. Contract W-7405-eng-48. 25p. Order from LC. Mi $2.70, ph $4.80. UCRL-1723

Light isotopes of berkelium and californium (thesis), by Alfred Chetham-Strode, Jr. California. Univ., Berkeley. Radiation Lab. Jun 1956. Contract W-7405-eng-48. 94p. Order from LC. Mi $5.40, ph $15.30. UCRL-3322

Some physical properties of the hydrides, by Robert E. Elson, Howard C. Hornig, William L. Jolly, John W. Kury, William J. Ramsey and Allan Zalkin. Univ. of Calif. Radiation Lab., Livermore Site, Livermore, Calif. Jun 1956. Contract W-7405-eng-48. 56p. Order from OTS. 40 cents. UCRL-4519(Rev.)

Stripping of trace amounts of Xe^{133} from aqueous solution, by A. S. Kesten. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Jan 1956. Contract AT-11-1-gen-14. 7p. Order from LC. Mi $1.80, ph $1.80. WAPD-PWR-CP-1717

Radiation-induced reduction of chromium (VI) solutions, by H. A. Droll and W. T. Lindsay, Jr. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Aug 1956. Contract AT-11-1-gen-14. 22p. Order from OTS. 20 cents. WAPD-TM-12

Preparation of zirconium tetrafluoride. Progress report no. II, by Joe L. Williams. Oak Ridge National Lab., Y-12 Area, Tenn. Feb 1951. Decl. Jan 1956. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. Y-769

Engineering

The shape of a shock wave derived from a spherical shock wave incident on a concave wedge, by Jay Todd, Jr. and Ralph L. Schellenbaum. Sandia

Corp., Albuquerque, N. Mex. Jul 1954. 11p. Order from LC. Mi $2.40, ph $3.30. AECU-3221

Thickness vibrations in long rods of barium titanate, by C. V. Stephenson. Sandia Corp., Albuquerque, N. Mex. Jul 1955. 11p. Order from LC. Mi $2.40, ph $3.30. AECU-3224

Transit times of compression sound waves through aluminum plate, by Grant Montgomery and R. S. Claassen. Sandia Corp., Albuquerque, N. Mex. Jan 1953. 7p. Order from LC. Mi $1.80, ph $1.80. AECU-3225

The direct reading height gauge and its applications to inspection work. Model 1 and model 2, by P. W. Shew. Sandia Corp., Albuquerque, N. Mex. Dec 1953. 30p. Order from LC. Mi $2.70, ph $4.80. AECU-3226

Some observations on the "band pass" method of vibration analysis, by D. M. Ellett. Sandia Corp., Albuquerque, N. Mex. Jul 1953. 33p. Order from LC. Mi $2.70, ph $4.80. AECU-3231

Natural convection heat transfer in narrow vertical liquid metal annuli, by C. F. Bonilla. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 26 and Oct 21, 1954. 16p. Order from LC. Mi $2.40, ph $3.30. AECU-3291

Experimental boiling water reactor (EBWR) shield design, by M. Grotenhuis and J. W. Butler. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 42p. Order from OTS. 30 cents. ANL-5544

A brief literature survey relating temperature to boundary lubrication phenomena, by A. D. Varanelli. General Electric Co. Atomic Products Division. Aircraft Nuclear Propulsion Dept., Cincinnati, Ohio. Sep 1956. Contract AF 33(038)-21102 and Contract AT(11-1)-171. 35p. Order from OTS. 35 cents. APEX-265

Falling film heat exchanger, by Byron A. Kress. Chicago. Univ. Metallurgical Lab. May 1945. Decl. Feb 1956. Contract W-7401-eng-37. 21p. Order from LC. Mi $2.70, ph $4.80. CE-3503

Proposed experimental high temperature power pile—design 3, by C. Rogers McCullough. Oak Ridge National Lab., Tenn. Feb 1947. Decl. Feb 1956. 18p. Order from LC. Mi $2.40, ph $3.30. CF-47-2-36

Temperature distribution in a single plate which has a varying neutron flux from the edge to the center of the plate, by R. Van Winkle. Oak Ridge National Lab., Tenn. Dec 1948. Decl. Feb 1956. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-48-12-101

Pressure shell and closure design for the homogeneous reactor, by C. L. Segaser. Oak Ridge National Lab., Tenn. Nov 1949. Decl. Feb 1956. 9p. Order from LC. Mi $1.80, ph $1.80. CF-49-11-152

Calculations on the emergency cooling system, by R. H. Chapman. Oak Ridge National Lab., Tenn. May 1951. Decl. Feb 1956. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.40, ph $3.30. CF-51-5-12

Thermal shield and pressure shell design for 15 ft. homogeneous reactor tank at 50 kw per liter specific power, by C. L. Segaser. Oak Ridge National Lab., Tenn. Jun 1951. Decl. Feb 1956. Contract W-7405-eng-26. 24p. Order from LC. Mi $2.70, ph $4.80. CF-51-6-42

Tube flaring tool, by D. M. Paige. Oak Ridge National Lab., Tenn. Jul 1951. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-51-7-116

Pressurizer design, by T. A. Welton. Oak Ridge National Lab., Tenn. Aug 1951. Decl. Feb 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-51-8-31

Nucleation and rate of bubble growth in homogeneous reactor experiment, by D. L. Katz. Oak Ridge National Lab., Tenn. Aug 1951. Decl. Feb 1956. Contract W-7405-eng-26. 35p. Order from LC. Mi $3, ph $6.30. CF-51-8-266

HRE heat losses during normal operation, by Leon Cooper. Oak Ridge National Lab., Tenn. Sep 1951. Decl. Feb 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-51-9-70

Damping coefficients in the dump line to the reactor vessel, by R. E. Aven. Oak Ridge National Lab., Tenn. Oct 1951. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-51-10-107

Design of smoothly flowing gas and liquid mixtures, by C. D. Zerby. Oak Ridge National Lab., Tenn. Oct 1951. Contract W-7405-eng-26. 24p. Order from LC. Mi $2.70, ph $4.80. CF-51-10-130

The effects of scale-up on the hydrodynamics of reactors, by L. Cooper. Oak Ridge National Lab.,

Tenn. Jan 1952. Decl. Feb 1956. Contract W-7405-eng-26. 24p. Order from LC. Mi $2.70, ph $4.80. CF-52-1-180

Calculated pressure drop across reactor core vessels, by J. O. Bradfute. Oak Ridge National Lab., Tenn. Jan 1952. Decl. Feb 1956. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-52-1-209

Experimental heat transfer coefficients for molten sodium hydroxide, by H. W. Hoffman. Oak Ridge National Lab., Tenn. Apr 1952. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-52-4-37

Design of a bellows type transfer pump for the boiling homogeneous reactor, by J. D. Roarty. Oak Ridge National Lab., Tenn. May 1952. Decl. Feb 1956. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.70, ph $4.80. CF-52-5-90

Design of fractionation percolators, by Stanley H. Jury. Oak Ridge National Lab., Tenn. Jun 1952. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-52-6-164

Pressure vessel windows for use at high pressures, by C. C. Heisig. Oak Ridge National Lab., Tenn. Aug 1952. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-52-8-140

Hydrodynamic studies in three glass models, by L. B. Lesem. Oak Ridge National Lab., Tenn. Oct 1952. Decl. Feb 1956. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-52-10-134

Preliminary design of screens for the inlet of the ISHR core, by I. Spiewak. Oak Ridge National Lab., Tenn. Oct 1952. Decl. Feb 1956. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-52-10-181

Operational requirements for the Teapot recombiner, by Cyril G. Lawson. Oak Ridge National Lab., Tenn. Nov 1952. Decl. Feb 1956. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-52-11-18

Sample holder for irradiation test on Th—U alloy fuel plate, by F. C. Zapp. Oak Ridge National Lab., Tenn. Nov 1952. Decl. Feb 1956. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-52-11-240

Teapot recombiner, by J. R. McWherter. Oak Ridge National Lab., Tenn. Dec 1952. Decl. Feb 1956. Contract W-7405-eng-26. 3p. Order from LC. Mi $2.40, ph $3.30. CF-52-12-70

Boiling reactor shield design study, by J. R. McWherter. Oak Ridge National Lab., Tenn. Jan 1953. Decl. Feb 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-53-1-230

Causes of leakage in HRE flanges, by D. K. Taylor and J. D. Maloney. Oak Ridge National Lab., Tenn. May 1953. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-53-5-125

Hydrodynamic studies in an eight-foot sphere utilizing rotating flow, by L. B. Lesem, R. H. Wilson, and I. Spiewak. Oak Ridge National Lab., Tenn. Jul 1953. Decl. Mar 1956. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.40, ph $3.30. CF-53-7-29

Pressure drop across wire mesh packing, by R. H. Wilson. Oak Ridge National Lab., Tenn. Jul 1953. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-53-7-198

Calculation of wall stresses in the "A" tank of Oak Ridge research reactor, by J. J. Wallace. Oak Ridge National Lab., Tenn. Jul 1953. Contract W-7405-eng-26. 9p. Order from LC. Mi $2.40, ph $3.30. CF-53-7-205

Thorex: Valve test for steam service (Taylor no. 1V67804 and Minneapolis-Honeywell no. V053E), by G. A. West. Oak Ridge National Lab., Tenn. Aug 1953. Decl. Feb 1956. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-53-8-173

Pulsafeeder diaphragm studies, by Paul N. Stevens. Oak Ridge National Lab., Tenn. Sep 1953. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-53-9-199

Maximum outputs expected from turbogenerators operating on low pressure steam, by J. D. Maloney. Oak Ridge National Lab., Tenn. Oct 1953. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-53-10-198

The measurement of fluid velocity by a photographic technique, by John O. Bradfute. Oak Ridge National Lab., Tenn. Feb 1954. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-54-2-37

An RF system for a variable energy cyclotron, by N. F. Ziegler. Oak Ridge National Lab., Tenn.

Mar 1954. Contract W-7405-eng-26. 21p. Order from LC. Mi $2.70, ph $4.80. CF-54-2-92

Estimated trend of thermal efficiency and real cost of steam power stations for the next 50 years, by J. D. Maloney. Oak Ridge National Lab., Tenn. Mar 1954. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. CF-54-3-67

Operating conditions of the ORR cooling system, by J. P. Sanders. Oak Ridge National Lab., Tenn. Mar 1954. Decl. Feb 1956. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-54-3-169

Steam system for the HRT—a study, by R. C. Robertson. Oak Ridge National Lab., Tenn. Apr 1954. Decl. Feb 1956. Contract W-7405-eng-26. 39p. Order from LC. Mi $3, ph $6.30. CF-54-4-194

Study of dump times, equilibrium pressures and minimum discharge capacities of proposed low pressure dump tank systems, by C. L. Segaser. Oak Ridge National Lab., Tenn. Apr 1954. Decl. Feb 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. CF-54-4-220

HRT evaporator design study, by C. L. Segaser. Oak Ridge National Lab., Tenn. May 1954. Decl. Feb 1956. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-54-5-2

Inner dump tanks, their piping and supports, by R. G. Pitkin. Oak Ridge National Lab., Tenn. Aug 1954. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-54-8-167

Performance test of HRT fuel solution evaporator, by P. H. Harley and I. Spiewak. Oak Ridge National Lab., Tenn. Aug 1954. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-54-8-232

Pressures in the HRT shield resulting from rupture of reactor, by P. F. Pasqua. Oak Ridge National Lab., Tenn. Sep 1954. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-54-9-30

Flexible mounting systems, by A. S. Thompson. Oak Ridge National Lab., Tenn. Apr 1955. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-55-4-124

Thermal stress in tube-header joints, by A. S. Thompson. Oak Ridge National Lab., Tenn. Apr 1955. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-55-4-159

A simplified heat transfer analysis of the bulk shielding reactor in the thermally induced turbulent flow regime, by D. C. Hamilton. Oak Ridge National Lab., Tenn. Jun 1955. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-55-6-108

Report on analysis of data obtained from the HRT dump test, phase I, by P. F. Pasqua. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-14

Temperature distribution in the ORR core housing, by F. T. Binford. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 18p. Order from LC. Mi $3, ph $6.30. CF-55-10-19

Lateral pressure and density of barytes aggregate and water mixture, by J. E. Euster. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-55-10-61

Pressure rise in chemical processing cell following a rupture of high pressure equipment, by H. O. Weeren. Oak Ridge National Lab., Tenn. Oct 1955. Decl. Feb 1956. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-81

Underflow sampler, by W. D. Burch. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-55-10-119

Determination of the optimum procedure for obtaining inert atmospheres in non-vacuum dryboxes, by S. I. Cohen and J. M. Peele. Oak Ridge National Lab., Tenn. Oct 1955. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-55-10-132

Use of SO_2 rather than F-11 as secondary refrigerant in HRT cold traps and permanent freeze jackets, by Roy C. Robertson. Oak Ridge National Lab., Tenn. Dec 1955. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-55-12-50

Redox ventilation study recommendation report, by B. O. Shaver and L. J. Nitteberg. Hanford Atomic Products Operation, Richland, Wash. Sep 1955. Contract W-31-109-eng-52. 45p. Order from LC. Mi $3.90, ph $10.80. HW-38837

A new approach to pulse column piping, by R. C. Hollingshead and J. Oliver Ludlow. Hanford Atomic Products Operation, Richland, Wash.

Oct 1955. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-39560

Field corrosion tests in purex acid uranium and waste concentrators, by N. D. Groves and K. M. Haws. Hanford Atomic Products Operation, Richland, Wash. Jun 1956. Contract W-31-109-eng-52. 10p. Order from OTS. 15 cents. HW-42884

Evaluation of CPP jet samplers. Investigation order no. 133, by A. E. Erhard. American Cyanamid Co. Atomic Energy Div., Idaho Falls, Idaho. Feb 1953. Decl. Apr 1956. Contract AT(10-1)-177. 13p. Order from LC. Mi $2.40, ph $3.30. IDO-14218

The organic loop program at the materials testing reactor. Final status report, by W. C. Francis. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Mar 1955. Decl. Feb 1956. Contract AT(10-1)-205. 7p. Order from LC. Mi $1.80, ph $1.80. IDO-16264

Remote controlled milling machine for MTR hot cell, by F. L. Petree. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. May 1955. Contract AT(10-1)-205. 11p. Order from LC. Mi $2.40, ph $3.30. IDO-16278

Leak testing of type 347 stainless steel welds, by W. L. Fleischmann and A. J. Herd. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1955. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-AJH-2

Flow velocity in secondary plenum of sandwich plates, by Dominic P. Timo. Knolls Atomic Power Lab., Schenectady, N. Y. (1953). Contract W-31-109-eng-52. 21p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-DPT-2

Determination of the natural frequencies of vibration in the breeze bellows. Second phase, by D. B. Vail. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1954. Contract W-31-109-eng-52. 44p. Order from LC. Mi $3.30, ph $7.80. KAPL-M-DBV-4

Natural convection in sodium in an 8'' horizontal pipe, by F. C. Steiner. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1954. Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-FCS-3

Use of a d-c electromagnetic pump as a throttling device in a sodium system, by F. N. Schell. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1953. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-FNS-6

Thermal stresses in long, thin-walled cylinders, by G. Horvay and B. J. Montague. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1951. Contract W-31-109-eng-52. 20p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-GH-9

Stresses and deformation of flanged shells, by G. Horvay and I. M. Clausen. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1952. Contract W-31-109-eng-52. 74p. Order from LC. Mi $4.50, ph $12.30. KAPL-M-GH-14

Report of literature survey on liquid-gas-entrainment problems, by Gilbert H. Epstein. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1955. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-GHE-1

Hydrogenous loop: Water injection test SDT-3 on run no. W.I.-1, by H. F. Karnes. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1955. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-HFK-3

Relationships between power transferred to coolants from cylindrical containers and ρC_p, volume fraction, and $V \Delta T$ of the coolants, by I. Bornstein and L. A. Berger. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1953. Contract W-31-109-eng-52. 11p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-IB-11

An investigation of electromagnetic pump failures, by J. J. Marguin. Knolls Atomic Power Lab., Schenectady, N. Y. May 1954. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-JJM-1

The effect of scheduling on the steam pressure transients occurring in a steam power plant, by J. E. Barnes. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1951. Decl. Feb 1956. Contract W-31-109-eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JRB-1

Analysis of the sodium and water performance of the Atwood-Morrill swing check valve, by K. D. Lantz and D. B. Vail. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1953. Contract W-31-109-eng-52. 31p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-KDL-1

X-ray diffraction study of type 347 Arcrods electrodes of the a-c/d-c and d-c class, by L. M. Osika and W. L. Fleischmann. Knolls Atomic Power Lab., Schenectady, N. Y. n.d. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LMO-1

Calculations on a d.c. electromagnetic pump, by Lewi Tonks. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1948. Decl. Feb 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LT-3

Freeze seals, by P. M. Clark. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1952. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-PMC-1

Nautral convection flow and heat transfer in porous media, by R. G. Kennison. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1953. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RGK-11

Surface roughness criteria for smooth pipe flow, by R. G. Kennison. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1953. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RGK-12

Flow loss coefficients in small conical mouth orifices, by R. G. Kennison and P. R. Matthews. Knolls Atomic Power Lab., Schenectady, N. Y. (1953). Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-RGK-14

Method of calculation of temperature transients in a solid, by R. J. Fritz. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1952. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-RJF-6

Free convection through parallel risers, by F. C. Steiner. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1955. Contract W-31-109-eng-52. 20p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-SCT-4

Mark B pump cleaning report, by R. Demers. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1955. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SCT-8

Valve operating system, by E. R. Hottenstein. Knolls Atomic Power Lab., Schenectady, N. Y. May 1955. Contract W-31-109-eng-52. 31p. Order from LC. Mi $3.60, ph $9.30. KAPL-M-SMS-5

SAR radioactive accessibility investigative program, by V. L. Galezunas. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1955. Contract W-31-109-eng-52. 23p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-SMS-6

Emergency cooling test program, by A. J. Arker and D. E. Davidson. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1955. Contract W-31-109-eng-52. 20p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SMS-12

Technical study of gas entrapment in orifices and in vertical passages, by W. A. Boothe. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1953. Contract W-31-109-eng-52. 43p. Order from LC. Mi $3.30, ph $7.80. KAPL-M-WAB-1

Report on static seal test, by Walter A. Heywood. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1949. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WAH-2

Design stress analysis, S_{IR} (Mark B) container assembly, by W. E. Cooper. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1953. Contract W-31-109-eng-52. 148p. Order from LC. Mi $7.50, ph $24.30. KAPL-M-WEC-2

Structural design basis, SAR reactor components, by W. E. Cooper. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1955. Revised Nov. 15, 1955. Contract W-31-109-eng-52. 33p. Order from LC. Mi $3, ph $6.30. KAPL-M-WEC-7(Rev. 1)

Fracture behavior of welded carbon steel plate. A literature survey and a suggested test program investigating the effectiveness of low temperature treatment to overcome some of the embrittling effect, by W. L. Fleischmann. Knolls Atomic Power Lab., Schenectady, N. Y. May 1952. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WLF-2

Recleaning sodium heat transfer systems, by W. H. Bruggeman, H. F. Karnes, and F. C. Hanny. Knolls Atomic Power Lab., Schenectady, N. Y. (1956). Contract W-31-109-eng-52. 31p. Order from LC. Mi $3, ph $6.30. KAPL-P-1511

An evaluation of the sodium—water reaction in heat transfer systems, by D. D. Adams, G. J. Barenborg, and W. W. Kendall. Knolls Atomic Power Lab., Schenectady, N. Y. (1956). Contract W-31-109-eng-52. 32p. Order from LC. Mi $3, ph $6.30. KAPL-P-1512

Flow through valves and orifices, by M. Benedict. Kellex Corp., N. Y. Jun 1943. Decl. Nov 1953. 6p. Order from LC. Mi $1.80, ph $1.80. M-4321

The design of a combination-process mill, by Charles Leroy Sollenberger. Massachusetts Inst. of Tech., Cambridge. Dept. of Metallurgy.

May 1947. Decl. Apr 1956. 56p. Order from LC. Mi $3.60, ph $9.30. MITG-A31

Sodium graphite reactor quarterly progress report April-June, 1956, by L. E. Glasgow and V. R. DeMaria. Atomics International. Division of North American Aviation, Inc.,Canoga Park, Calif. n.d. Contract AT(04-3)-49. 67p. Order from OTS. 40 cents. NAA-SR-1690

Investigations to determine the feasibility of ultrasonic liquid-liquid extraction. Progress report no. 1 covering period from June 1 to July 31, 1955. Aeroprojects, Inc., West Chester, Penna. Aug 1955. Contract AT(30-1)-1798. 15p. Order from LC. Mi $2.40, ph $3.30. NYO-7487

Investigations to determine the feasibility of ultrasonic liquid-liquid extraction. Progress report no. 2 covering period from August 1 to September 30, 1955. Aeroprojects, Inc., West Chester, Penna. n.d. Contract AT(30-1)-1798. 29p. Order from LC. Mi $2.70, ph $4.80. NYO-7488

Investigations to determine the feasibility of ultrasonic liquid-liquid extraction. Interim report no. 1 covering period from June 1 to November 30, 1955. Aeroprojects, Inc., West Chester, Penna. Dec 1955. Contract AT(30-1)-1798. 59p. Order from LC. Mi $3.60, ph $9.30. NYO-7489

The organization, administration, and operation of a radiochemical pilot plant, by G. S. Sadowski. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 94p. Order from OTS. 50 cents. ORNL-2132

Investigation of the effect of a parallel channel on flow and burnout flux, by H. S. Jacket, J. D. Roarty, and G. Sonnemann. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Dec 1955. 11p. Order from LC. Mi $2.40, ph $3.30. WAPD-TH-162

Average and local heat transfer coefficients for parallel flow through a rod bundle, by J. R. Parrette and R. E. Grimble. Westinghouse Electric Corp. Bettis Plant, Pittsburgh. Mar 1956. 36p. Order from LC. Mi $3, ph $6.30. WAPD-TH-180

Geology and Mineralogy

An investigation of the Chattanooga black shale of Tennessee as a source of uranium. Progress report for January 1, 1956 to June 30, 1956, by Paris B. Stockdale. Univ. of Tenn., Knoxville, Tenn. Jul 1956. Contract AT(40-1)-1337. 10p. Order from OTS. 15 cents. ORO-154

Uranium occurrences in the Ambrosia Lake Area, McKinley County, New Mexico, by Robert G. Young and Gene K. Ealy. Exploration Division. Grand Junction Operations Office, Grand Junction, Colorado. Mar 1956. 15p. Order from OTS. 20 cents. RME-86

Hollow Creek monazite placer, Aiken County, South Carolina, by M. H. Kline, R. F. Griffith, and L. A. Hansen. Bureau of Mines, Washington, D. C. Mar 1954. 29p. Order from OTS. 25 cents. RME-3127

Health and Safety

A human engineering guide to the arrangement of elements on a control panel, by H. L. Williams. Sandia Corp., Albuquerque, N. Mex. Dec 1954. 6p. Order from LC. Mi $1.80, ph $1.80. AECU-3215

A discussion on the layout of elements on a control panel, by J. R. Beeler. Sandia Corp., Albuquerque, N. Mex. Aug 1955. 17p. Order from LC. Mi $2.40, ph $3.30. AECU-3216

A study of location times for positions arranged on a panel in a random and an ordered manner, by J. R. Beeler. Sandia Corp., Albuquerque, N. Mex. May 1955. 8p. Order from LC. Mi $1.80, ph $1.80. AECU-3217

Aerial surveying with light aircraft for the detection of radioactive contamination on the ground, by D. M. Davis, J. C. Hart, and K. Z. Morgan. Oak Ridge National Lab., Tenn. Apr 1952. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. CF-52-4-87

Slurry pump for waste metal removal from underground storage in the 200 areas. Final report, by Gardner L. Locke. Hanford Atomic Products Operation, Richland, Wash. Sep 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. HW-29364

Normal abundance of radium in cadavers from the Pacific Northwest, by R. F. Palmer and F. B. Queen. Hanford Atomic Products Operation, Richland, Wash. Jul 1956. Contract W-31-109-eng-52. 21p. Order from OTS. 20 cents. HW-31242

Penetration of respiratory protective equipment by ruthenium at building 202-S, by W. E. Gill. Hanford Atomic Products Operation, Richland, Wash. Feb 1955. Decl. Feb 1956. Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.70, ph $4.80. HW-35043

Radiological sciences department research and development activities quarterly progress report for January-March 1955, by H. M. Parker. Hanford Atomic Products Operation, Richland, Wash. Apr 1955. Decl. with deletions Dec. 7, 1955. Contract W-31-109-eng-52. 28p. Order from LC. Mi $2.70, ph $4.80. HW-36301(Del.)

Physiological parameters for assessing the hazard of exposure to ruthenium radioisotopes, by R. C. Thompson, M. H. Weeks, O. L. Hollis, J. E. Ballou, and Willa D. Oakley. Hanford Atomic Products Operation, Richland, Wash. Mar 1956. Contract W-31-109-eng-52. 59p. Order from LC. Mi $3.60, ph $9.30. HW-41422

Basic anatomical, dietary, and physiological data for radiological calculations, by L. K. Bustad and J. L. Terry. Hanford Atomic Products Operation, Richland, Wash. Feb 1956. Contract W-31-109-eng-52. 12p. Order from OTS. 15 cents. HW-41638

Beta energy dependence correction factors for Cutie Pie and Juno survey meters, by C. M. Hastings, C. G. Detwiler, and J. J. Fitzgerald. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1956. Contract W-31-109-eng-52. 32p. Order from OTS. 25 cents. KAPL-1571

Procedure for the determination of plutonium in human urine, by L. B. Farabee. Clinton Labs., Oak Ridge, Tenn. Apr 1947. Decl. Jan 1956. Contract W-35-058-eng-71. 17p. Order from LC. Mi $2.40, ph $3.30. MonH-218

Background radiation. A literature search, by Wayne M. Lowder and Leonard R. Solon. U. S. Atomic Energy Commission. New York Operations Office. Health and Safety Laboratory. Jul 1956. 43p. Order from OTS. 30 cents. NYO-4712

Thyroid uptake calibration. I. Mock-iodine, a radioactive iodine gamma-ray standard, by Marshall Brucer, T. H. Oddie, and James S. Eldridge. Oak Ridge Inst. of Nuclear Studies, Inc., Oak Ridge, Tenn. Jul 1956. Contract AT-40-1-gen-33. 94p. Order from OTS. 50 cents. ORINS-14

Incorporation of phosphorus-32 into DNA of regenerating liver; the effect of irradiation, by Lola S. Kelly, J. Dorothy Hirsch, Genevieve Beach, and Wynne Palmer. Univ. of Calif. Radiation Lab., Berkeley, Calif. Jul 1956. Contract W-7405-eng-48. 13p. Order from OTS. 20 cents. UCRL-3480

C- and N- terminal amino acids of human serum lipoproteins, by Bernard Shore. Univ. of Calif. Radiation Lab., Berkeley, Calif. Aug 1956. Contract W-7405-eng-48. 11p. Order from OTS. 15 cents. UCRL-3489

Some late effects of external radiation on growing and adult mammals, by J. B. Hursh and T. R. Noonan. Rochester, N. Y. Univ. Atomic Energy Project. Aug 1956. Contract W-7401-eng-49. 15p. Order from LC. Mi $2.40, ph $3.30. UR-445

Studies on the radioactive aerosol produced by radon in air, by Jacob Shapiro. Rochester, N. Y. Univ. Atomic Energy Project. Aug 1956. Contract W-7401-eng-49. 32p. Order from LC. Mi $3, ph $6.30. UR-461

Instrumentation

High-frequency pulse generator, by Philip E. Ohmart. Monsanto Chemical Co., Dayton, Ohio. Jul 1947. Decl. Nov 1955. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-3783

An ion chamber for the determination of small amounts of tritium in other gases, by H. C. Mattraw. Knolls Atomic Power Lab., Schenectady, N. Y. May 1951. Decl. with deletions Dec 6, 1955. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-3821

The effect of geometry and voltage variations on the operation of the Philips ion gage, by C. R. McKinney, D. T. Eggen, A. Bishop, W. A. Arnold, and C. Starr. Tennessee Eastman Corp., Oak Ridge, Tenn. Aug 1945. Decl. Feb 1956. 65p. Order from LC. Mi $3.90, ph $10.80. AECD-4154

Practical methods for the reduction of strain gage data, by Richard C. Dove. Sandia Corp., Albuquerque, N. Mex. Sep 1955. 14p. Order from LC. Mi $2.40, ph $3.30. AECU-3206

Auto-edit (Automatic Information Editor), by G. R. Bussey. Sandia Corp., Albuquerque, N. Mex. Jul 1953. 51p. Order from LC. Mi $3, ph $6.30. AECU-3234

A capacitive manometer, by R. S. Jamieson. Sandia Corp., Albuquerque, N. Mex. Mar 1954. 9p. Order from LC. Mi $1.80, ph $1.80. AECU-3239

Development of equipment for detection of atmospheric xenon, by S. A. Kline. Chicago, Univ. Metallurgical Lab. Jan 1945. Decl. Feb 1956. Contract W-7401-eng-37. 21p. Order from LC. Mi $2.70, ph $4.80. CE-2674

Use of commercial grade methane in asp counting instruments, by M. J. Rasmussen. Hanford Atomic Products Operation, Richland, Wash. Oct 1953. Decl. Jul 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-29587

Design notes and component recommendations for gamma-scintillation monitoring systems, by R. E. Connally. Hanford Atomic Products Operation, Richland, Wash. Sep 1955. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-38636

Calibration of 8" magnetic flowmeter by use of a calibrated orifice, by E. J. Duffy and J. J. Marguin. Knolls Atomic Power Lab., Schenectady, N. Y. May 1955. Contract W-31-109-eng-52. 34p. Order from LC. Mi $3, ph $6.30. KAPL-M-SCT-5(Rev. 1)

Mark B, inert gas bubbler-type liquid level indicator performance testing with 99.99% nitrogen, by R. W. Wood. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1955. Contract W-31-109-eng-52. 31p. Order from LC. Mi $3, ph $6.30. KAPL-M-SCT-6

A remote controlled quartz-fiber microbalance: Fabrication of quartz components, by R. G. Olt, H. R. DuFour, M. I. Gray, and J. H. Wright. Mound Lab., Monsanto Chemical Co., Miamisburg, Ohio. Dec 1954. Contract AT-33-1-gen-53. 41p. Order from OTS. 30 cents. MLM-1023

A note concerning the interpretation of reports and reflectograms made using the supersonic reflectoscope, by D. M. Barten. Chicago. Univ. Metallurgical Lab. (194?). Decl. Jan 1956. Contract W-7401-eng-37. 3p. Order from LC. Mi $1.80, ph $1.80. N-1289f

The sampling of alkali metal systems with the modified MSA sampler, by G. Goldberg, A. S. Meyer, Jr., and J. C. White. Oak Ridge National Lab., Tenn. Sep 1956. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. ORNL-2147

Factors influencing dial operation: Three-digit multiple-turn dials, by Roger J. Weldon and G. M. Peterson. Univ. of N. Mex., Albuquerque, N. Mex. Feb 1955. Contract AT(29-1)-789. 84p. Order from OTS. 45 cents. SC-3659A(TR)

Transistor circuit theory and applications, by Richard Madey. Univ. of Calif., Berkeley, Calif. Jun 1953. Contract W-7405-eng-48. 126p. Order from OTS. 65 cents. UCRL-1985

Effect of space charge on focusing properties in a partially neutralized mass spectrograph beam, by Mozelle Rankin and Raymond Murray. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Nov 1949. Decl. Jan 1956. Contract W-7405-eng-26. 22p. Order from LC. Mi $2.40, ph $3.30. Y-529

The assay of microgram samples of lithium with a mass spectrometer, by Richard E. Sladky. Union Carbide Nuclear Co. Y-12 Plant, Oak Ridge, Tenn. Sep 1956. Contract W-7405-eng-26. 12p. Order from OTS. 15 cents. Y-1143

Metallurgy and Ceramics

Bismuth casting and canning. (Information report), by Paul Engle. Mound Lab., Miamisburg, Ohio. Jun 1952. Decl. with deletions Dec. 7, 1955. Contract AT-33-1-gen-53. 8p. Order from LC. Mi $1.80, ph $1.80. AECD-3835

Processing tests in granular resistance furnaces for preparing high purity graphite, by G. T. Sermon. United Carbon Products, Inc., Bay City, Mich. Mar 1948. Decl. Dec 1955. 19p. Order from LC. Mi $2.40, ph $3.30. AECD-3915

The uranium—zirconium (binary system). Metallurgy Division final report, by R. W. Buzzard, R. B. Liss, and D. P. Fickle. National Bureau of Standards, Washington, D. C. n.d. Decl. Jan 1956. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4008

Report on National Bureau of Standards ceramic coatings on Inconel and stainless steel, by R. E. Tate. Tennessee Eastman Corp., Oak Ridge, Tenn. Jul 1945. Decl. Jan 1956. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4073

Tantalum-rich alloys of tuballoy (uranium), by J. W. Sausville and C. E. Larson. Tennessee Eastman Corp., Oak Ridge, Tenn. Jan 1946. Decl. Feb 1956. Contract W-7401-eng-23. 31p. Order from LC. Mi $2.70, ph $4.80. AECD-4177

Hot coining beryllium, by Robert M. Linsmayer and Alan U. Seybolt. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1948. Decl. Feb 1956. Contract W-31-109-eng-52. 21p. Order from LC. Mi $2.70, ph $4.80. AECD-4228

Principles and techniques of ultrasonic inspection, by Harold C. Psillas. Sandia Corp., Albuquerque, N. Mex. May 1955. 87p. Order from LC. Mi $4.80, ph $13.80. AECU-3202

Principles and techniques of ultrasonic inspection, by H. C. Psillas and D. W. Ballard. Sandia Corp.,

Albuquer que, N. Mex. Jul 1953. 23p. Order from LC. Mi $2.40, ph $3.30. AECU-3208

A non-destructive test for the identification of cadmium plating, by W. B. Leslie. Sandia Corp., Albuquerque, N. Mex. Jun 1953. 5p. Order from LC. Mi $1.80, ph $1.80. AECU-3214

Some preliminary considerations concerning the expected over-all expansion of barium titanate ceramic, by D. C. Kleinecke. Sandia Corp., Albuquerque, N. Mex. Feb 1955. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3218

Low temperature release of stored energy in cold worked copper (thesis). Technical report no. 8, by James W. Henderson. Illinois. Univ., Urbana. May 1956. Contract AT-11-1-182. 40p. Order from LC. Mi $3, ph $6.30. AECU-3270

The system thorium—mercury. Progress report no. 1, for April 1, 1955—June 1, 1955, by R. F. Domagala and W. Rostoker. Armour Research Foundation. Jun 1955. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. AECU-3285

The system thorium—mercury. Progress report no. 2, for June 1, 1955—July 31, 1955, by R. F. Domagala and W. Rostoker. Armour Research Foundation. Aug 1955. Contract W-7405-eng-26. 15p. Order from LC. Mi $2.40, ph $3.30. AECU-3286

The system thorium—mercury. Progress report no. 3, for August 1, 1955—September 30, 1955, by R. F. Domagala and W. Rostoker. Armour Research Foundation. Oct 1955. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. AECU-3287

The system thorium—mercury. Progress report no. 4, for October 1, 1955—November 30, 1955, by R. F. Domagala and W. Rostoker. Armour Research Foundation. Dec 1955. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. AECU-3288

The system thorium—mercury. Interim summary report no. 5 for April 1, 1955—February 29, 1956, by R. F. Domagala and W. Rostoker. Armour Research Foundation. Mar 1956. Contract W-7405-eng-26. 27p. Order from LC. Mi $2.70, ph $4.80. AECU-3289

The system thorium—mercury. Progress report no. 6 for March 1, 1956—April 30, 1956, by R. F. Domagala and W. Rostoker. Armour Research Foundation. May 1956. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. AECU-3290

The thermal expansion of high density beryllia shapes, by J. G. Malm and J. R. Gilbreath. Argonne National Lab., Lemont, Ill. Jun 1949. Decl. Jan 1956. Contract W-31-109-eng-38. 17p. Order from LC. Mi $2.40, ph $3.30. ANL-4241

Fin tube project and G. E. washer project progress report for the period May 1 to May 31, 1948, by D. T. Doll. Brush Beryllium Co., Cleveland. Decl. Feb 1956. Contract AT-30-1-gen-155. 24p. Order from LC. Mi $2.70, ph $4.80. BBC-15

Fin tube project, G. E. washer project, and large sintered shapes progress report for the period June 1 to June 30, 1948, by D. T. Doll. Brush Beryllium Co., Cleveland. Decl. Feb 1956. Contract AT-30-1-gen-155. 67p. Order from LC. Mi $3.90, ph $10.80. BBC-18

Production of uranium-beryllium alloys. Progress report, by D. T. Doll. Brush Beryllium Co., Cleveland, Jan 1949. Decl. Apr 1956. 25p. Order from LC. Mi $2.70, ph $4.80. BBC-39

High density inclusions in sintered shapes. Progress report for the period September 1948 to February 1949, by C. G. Hoffman. Brush Beryllium Co., Cleveland. Mar 1949. Decl. Feb 1956. 21p. Order from LC. Mi $2.70, ph $4.80. BBC-43

The solid solubility of uranium in thorium and the allotropic transformation of thorium—uranium alloys, by Wendell B. Wilson, Alfred E. Austin, and Charles M. Schwartz. Battelle Memorial Inst., Columbus, Ohio. Jul 1956. Contract W-7405-eng-92. 14p. Order from LC. Mi $2.40, ph $3.30. BMI-1111

The constitution of delta-phase alloys of the system uranium-molybdenum-titanium, by Henry A. Saller, Frank A. Rough, Arthur A. Bauer, and J. Robert Doig. n.d. 15p. Order from OTS. 20 cents. BMI-1134

Corrosion newsletter no. 2, by J. L. English. Oak Ridge National Lab., Tenn. May 1951. Decl. Feb 1956. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-51-5-37

Corrosion newsletter no. 5, by J. L. English. Oak Ridge National Lab., Tenn. Sep 1951. Decl. Feb 1956. Contract W-7405-eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. CF-51-9-40

Report on results of impact tests performed on Ti 75A and on iodide titanium specimens, by W. J. Fretague. Oak Ridge National Lab., Tenn. Nov 1952. Decl. Feb 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-52-11-121

Empirical correlation for fatigue stresses, by A. S. Thompson. Oak Ridge National Lab., Tenn. Apr 1955. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-55-4-34

Examination of Inconel-316 stainless steel-sodium pump loops 4689-5 and 4689-6, by G. M. Adamson and R. S. Crouse. Oak Ridge National Lab., Y-12 Area, Tenn. Jun 1955. Decl. Apr 1956. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-55-6-24

Observations on the behavior of a pressed thorium amalgam compact during the retorting cycle, by E. S. Bomar. Oak Ridge National Lab., Tenn. Aug 1955. Decl. Apr 1956. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-55-8-170

Zircaloy-to-stainless steel transition pipe joint design study, by C. L. Segaser. Oak Ridge National Lab., Tenn. Dec 1955. Contract W-7405-eng-26. 32p. Order from LC. Mi $3, ph $6.30. CF-55-12-72

HRP dynamic slurry corrosion studies: Quarter ending April 30, 1956, by E. L. Compere, H. C. Savage, S. A. Reed, G. E. Moore, R. M. Warner, R. M. Pierce, and S. R. Buxton. Oak Ridge National Lab., Tenn. Apr 1956. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. CF-56-4-139

A study of the mechanisms of heat treatment of zirconium-base alloys. Summary report no. 3 for July 1, 1955—June 30, 1956. Armour Research Foundation. Jul 1956. Contract AT(11-1)-315. 82p. Order from LC. Mi $4.50, ph $12.30. COO-211

Extrusion of compound tubes of aluminum and B_4C, by E. C. Creutz. Chicago. Univ. Metallurgical Lab. Jul 1944. Decl. Feb 1956. Contract W-7401-eng-37. 9p. Order from LC. Mi $1.80, ph $1.80. CP-1829

The preparation of small dense crucibles of magnesia, by H. B. Barlett. Massachusetts Inst. of Tech., Cambridge. Sep 1945. Decl. Feb 1956. Contract W-7405-eng-175. 22p. Order from LC. Mi $2.70, ph $4.80. CT-3372

The production of crucibles from cerium sulfide, CeS, by I. Amdur, G. Kavanagh, T. T. Magel, L. O. Mitchell, and W. C. Schumb. Massachusetts Inst. of Tech., Cambridge. Sep 1945. Decl. Aug 1953. Contract W-7405-eng-175. 21p. Order from LC. Mi $2.70, ph $4.80. CT-3374

Long tube cartridge. (A phase of P. A. N. 181-ML-55-6), by Alonzo C. Rand. Chicago. Univ. Metallurgical Lab. Jun 1945. Decl. Feb 1956. Contract W-7401-eng-37. 62p. Order from LC. Mi $3.90, ph $10.80. CT-3515

Technical and experimental aspects of metal production on the microgram and milligram scale, by H. L. Baumbach, S. Fried, Z. V. Jasaitis, P. L. Kirk, H. P. Robinson, R. S. Rosenfels, and E. F. Westrum, Jr. Chicago. Univ. Metallurgical Lab. May 1946. Decl. Feb 1956. Contract W-7401-eng-37. 37p. Order from LC. Mi $3, ph $6.30. CT-3899

Progress report for July—August 1956, by R. H. Bailes, Research Dept. Dow Chemical Co. Western Div., Pittsburg, Calif. Sep 1956. Contract AT-30-1-gen-236. 28p. Order from LC. Mi $2.70, ph $4.80. DOW-147

Round robin tests to compare electrolytic oxalic acid etch with boiling nitric acid test as in designation A-262-44T for evaluation of stainless steel, by N. Endow. Hanford Works, Richland, Wash. Feb 1953. Contract W-31-109-eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. HW-27683

Four and one-half month corrosion tests of spring steel wire in simulated neutralized Purex process waste solution, by N. Endow. Hanford Atomic Products Operation, Richland, Wash. Apr 1954. Decl. Feb 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. HW-31405

Investigation of the use of nitrogen as a purging gas for welding. (Report no. 4). Final report, by E. B. LaVelle. Hanford Atomic Products Operation, Richland, Wash. Sep 1953. Contract W-31-109-eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. HW-32424

Bronze furnace history 313 building, by Thomas B. Correy. Hanford Works, Richland, Wash. Feb 1951. Contract W-31-109-eng-52. 31p. Order from LC. Mi $3, ph $6.30. HW-40087

Preparation of zirconium from zirconium tetrafluoride, by C. J. Baroch and G. H. Beyer. Ames Lab. Iowa State College, Ames, Iowa. May 1956. Contract W-7405-eng-82. 18p. Order from OTS. 20 cents. ISC-720

Summary of journal bearing tests with copper bearings and tungsten carbide journals operating in sodium—potassium alloy, by D. B. Vail. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1953. Decl. Jan 1956. Contract W-31-109-eng-52. 27p. Order from LC. Mi $2.70, ph $4.80. KAPL-877

Transition welds between austenitic and ferritic steel pipe, by B. M. Smith. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1955. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-BMS-1

Hydrogen embrittlement of carbon steel, by Carl M. Erb. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1955. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-CME-1

Preparation and fabrication of manganese-nickel alloy brazing wire, by D. W. White, R. V. Gray, C. J. Beck, and A. P. Beard. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1954. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-DWW-3

The thermal expansion and elevated temperature mechanical strength of hafnium. Report no. 1 on investigation of mechanical properties of materials. Sub-project no. 7, by E. E. Baldwin. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1954. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EEB-7

The polarography of the lower oxidation states of ruthenium in perchloric acid solutions, by L. W. Niedrach and A. D. Tevebaugh. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1950. Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EEB-12

Determination of anti-galling techniques for austenitic stainless steels, by E. G. Brush. Knolls Atomic Power Lab., Schenectady, N. Y. May 1952. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-EGB-2

Resistance of titanium carbide bearing materials to corrosion in sodium. Report no. 5 on evaluation of the behavior of various materials in sodium. (Problem no. 21), by E. G. Brush. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1953. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-EGB-14

Aluminum bearing alloys in sodium. Report no. 2 on evaluation of the behaviour of aluminum in sodium. Problem no. 28, by E. G. Brush. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1954. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-EGB-16

Corrosion resistance of ferritic and austenitic steels in lithium at 500°C. Report no. 1, by E. G. Brush. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1954. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-EGB-17

The stress-rupture strength of zirconium-base alloys in sodium at 1000°F (538°C), by E. E. Baldwin and F. W. Weisinger. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1954. Contract W-31-109-eng-52. 26p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-FWW-1

Tensile, impact, and compressive tests of welded molybdenum tubing, by F. W. Weisinger and E. E. Baldwin. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1954. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-FWW-2

A technique for producing boron-aluminum compacts, by Harold Hirsch. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-HHH-1

Be thermal stress test, by H. H. Winkler. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-HHW-2

Wear and galling tests of plug seal tubing. Report no. 1, by E. G. Brush and H. L. Tymchyn. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1954. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-HLT-1

Titanium—boron systems: A literature survey, by Janet M. Cisar. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1955. Contract W-31-109-eng-52. 22p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-JMC-2

Removal of mercury from SIR coolant (E-3 experiments), by John R. Gould and J. G. Gratton. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1955. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JRG-2

On the crystal structure of graphite, by J. S. Lukesh. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1949. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JSL-5

A note on aluminum oxide as a bearing material, by L. F. Coffin, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1954. Contract W-31-109-eng-52. 8p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LFC-7

Estimated critical constants, extrapolated vapor pressure, and equation of state of sodium, by Leo F. Epstein. Knolls Atomic Power Lab., Schenec-

tady, N. Y. Sep 1951. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-LFE-7

Expansion characteristics of type-347 Arcos weld, by L. L. Wyman and J. E. Farrell. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1952. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LLW-4

The thermal conductivity of UO_2 powder, by M. H. Shackelford. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1954. Supplement May 24, 1954. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-MHS-23

Evaluation of welded molybdenum tubing, by C. V. Donnelly and R. G. Towsend. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1954. Contract W-31-109-eng-52. 19p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RCD-25

Evaluation of methods of preventing the galling of stainless steel threads in sodium, by R. F. Koenig. Knolls Atomic Power Lab., Schenectady, N. Y. May 1952. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-RFK-5

Investigation of low ductility of nickel-manganese brazing wire, by Richard L. Mehan. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1953. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RLM-1

Investigation of cracking of Sir Mark A rotating plug shield can welds, by R. L. Mehan. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1954. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-RLM-3

Tensile properties of stainless steel, zirconium and titanium alloyed with boron, by R. D. Hildebrand and W. D. Valovage. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1955. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WDV-2

The fabrication of an expansion joint with an Inconel "X" bellows, by Walter L. Fleischmann. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1952. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-WLF-1

Summary of the results of KAPL's slow bend fatigue test, by W. L. Fleischmann. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1953. Contract W-31-109-eng-52. 28p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-WLF-3

Thermal stress in a beryllium washer, by Warren F. Witzig and William A. Riemen. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 17p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WW-2

Materials for fluorine generator anode assemblies, by R. E. Simmons, W. R. Rossmassler, C. W. Hoskins, and R. A. Johnston. Union Carbide Nuclear Co. Paducah Plant, Paducah, Ky. Sep 1956. 12p. Order from OTS. 20 cents. KY-191

Progress (A-1) report for month of September 1945. Massachusetts Inst. of Tech., Cambridge. Oct 1945. Decl. Feb 1956. Contract W-7405-eng-175. 15p. Order from LC. Mi $2.40, ph $3.30. M-4100

Graphite structure tests (monstrosity tests), by R. W. Powell. Brookhaven National Lab., Upton, N. Y. Nov 1949. Decl. Jan 1956. Contract AT-30-2-gen-16. 79p. Order from LC. Mi $4.80, ph $13.80. M-4615

Fluorimetric determination of uranium. Part II. A rapid method for the purification of uranium in solutions where impurity to uranium ratio is high, by Julia M. Grandfield. Massachusetts Inst. of Tech., Watertown, Mass. Mineral Engineering Lab. Nov 1950. Decl. Dec 1952. Contract AT-30-1-gen-211. 25p. Order from LC. Mi $2.70, ph $4.80. MITG-251

Chemical stability of Be_2C under cyclotron irradiation, by M. H. Feldman and L. Silverman. North American Aviation, Inc., Downey, Calif. May 1951. Decl. Jul 1955. Contract AT-40-1-gen-1064. 20p. Order from OTS. 20 cents. NAA-SR-114(Del.)

X-ray measurements of irradiated graphite annealed at elevated temperatures, by S. B. Austerman and J. R. Clark. Atomics International, Division of North American Aviation, Inc., Canoga Park, Calif. Sep 1956. Contract AT-11-1-gen-8. 14p. Order from OTS. 20 cents. NAA-SR-1627

A laboratory for the high-temperature creep testing of metals and alloys in controlled environments, by D. A. Douglas and W. D. Manly. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 29p. Order from OTS. 30 cents. ORNL-2053

Impact behavior of thorium, by J. A. Milko. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 15p. Order from OTS. 20 cents. ORNL-2122

Final report — development and testing of vacuum melted nickel — molybdenum alloys with minor alloying additions, by O. Preston, N. J. Grant, and C. F. Floe. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 37p. Order from OTS. 30 cents. ORNL-2181

Progress report no. 10 for period April 1—April 30, 1947, by P. R. Kalischer. Brush Beryllium Co., Cleveland. Jul 1947. Decl. Feb 1956. Contract W-22-075-eng-11. 26p. Order from LC. Mi $2.70, ph $4.80. P-809

Welding and brazing. A bibliography of unclassified report literature. Technical Information Service Extension, Oak Ridge, Tenn. Jul 1956. 32p. Order from OTS. 25 cents. TID-3301

Corrosion. A bibliography of unclassified report literature. Technical Information Service Extension, Oak Ridge, Tenn. Jul 1956. 36p. Order from OTS. 30 cents. TID-3302

Zirconium. A bibliography of unclassified report literature. Technical Information Service Extention, Oak Ridge, Tenn. Jul 1956. 43p. Order from OTS. 30 cents. TID-3304

Zirconium fire and explosion hazard evaluation. Interim report. Safety and Fire Protection Branch. Division of Organization and Personnel, Washington, D. C. Aug 1956. 30p. Order from OTS. 25 cents. TID-5365

Mechanical properties and microstructure of annealed zirconium, by W. L. Hudge, Jr. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jun 1953. Decl. with deletions Feb. 28, 1956. Contract AT-11-1-gen-14. 24p. Order from LC. Mi $2.70, ph $4.80. WAPD-T-46(Del.)

Preliminary study of the pyrophoric properties of zirconium machinings, by W. W. Allison. Bettis Plant, Pittsburgh, Penna. Sep 1956. Contract AT-11-1-gen-14. 13p. Order from OTS. 20 cents. WAPD-TM-14

Physics

Experimental . . . and theoretical nuclear physics divisions report for January, February and March, 1948. Argonne National Lab., Lemont, Ill. Apr 1948. Decl. with deletions Dec. 13, 1955. Contract W-31-109-eng-38. 83p. Order from LC. Mi $4.80, ph $13.80. AECD-3844

Advanced seminar in reactor physics, by Nicholas M. Smith, Jr. Carbide and Carbon Chemicals Co. Y-12 Plant, Oak Ridge, Tenn. Jul 1950. Decl. Jan 1956. Contract W-7405-eng-26. 16p. Order from LC. Mi $2.40, ph $3.30. AECD-4158

Criticality in untamped uranium solutions, by Raymond Murray and George W. Schmidt. Tennessee Eastman Corp., Oak Ridge, Tenn. Feb 1947. Decl. Feb 1956. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4190

Critical conditions in cylindrical vessels, by John W. Morfitt, Raymond Murray, and George W. Schmidt. Tennessee Eastman Corp., Oak Ridge, Tenn. Jan 1947. Decl. Feb 1956. 16p. Order from LC. Mi $2.70, ph $4.80. AECD-4191

Properties of uranium-bismuth reactors for computer programs, by B. Mozer. Brookhaven National Lab., Upton, N. Y. Jan 1955. Decl. Feb 1956. 13p. Order from LC. Mi $2.40, ph $3.30. AECD-4215

The effects of internal conversion on critical mass and operating life of a thermal reactor, by T. M. Snyder. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1952. Decl. Feb 1956. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. AECD-4217

The decay of induced activity in Portland, barytes, and Brookhaven cements, by W. H. Bowman, D. L. James, and J. D. Roarty. Massachusetts Inst. of Tech., Oak Ridge, Tenn. Aug 1950. Decl. Feb 1956. Contract W-7405-eng-26. 26p. Order from LC. Mi $2.70, ph $4.80. AECD-4233

Relativistic tables of energy and angle relationships for the $T(p,n)He^3$, $D(d,n)He^3$ and $T(d,n)He^4$ reactions, by L. Blumberg and S. I. Schlesinger. Los Alamos Scientific Lab., Los Alamos, N. Mexico. May 1956. Contract W-7405-eng-36. 287p. Order from OTS. $1.50. AECU-3118

Determination of (d,alpha) reaction cross sections, by Kenneth Lynn Hall. Univ. of Mich., Ann Arbor, Mich. Sep 1955. Contract AT(11-1)-70. 222p. Order from OTS. $1.25. AECU-3126

The propagation of spherical shock waves, by Erie E. Ungar. Sandia Corp., Albuquerque, N. Mex. May 1953. 68p. Order from LC. Mi $3.90, ph $10.80. AECU-3201

A comparison of the neutron yields from low-voltage sources, by John N. Cooper. Sandia Corp., Albuquerque, N. Mex. Oct 1954. 12p. Order from LC. Mi $2.40, ph $3.30. AECU-3204

Radial vibrations in short, hollow cylinders of barium titanate, by C. V. Stephenson. Sandia Corp., Albuquerque, N. Mex. Dec 1954. 19p. Order from LC. Mi $2.40, ph $3.30. AECU-3227

Path of triple point for spherical shocks above a rigid plane, by Jay Todd, Jr. and Ralph L. Schellenbaum. Sandia Corp., Albuquerque, N. Mex. Jul 1954. 11p. Order from LC. Mi $1.80, ph $1.80. AECU-3228

An error analysis of R-C timers, by R. P. Stromberg. Sandia Corp., Albuquerque, N. Mex. Aug 1954. 13p. Order from LC. Mi $2.40, ph $3.30. AECU-3229

Thermal annealing of neutron-induced discomposition in artificial graphite. I. Rate of healing experiments, by T. J. Neubert. Argonne National Lab., Lemont, Ill. Nov 1949. Decl. Nov 1955. Contract W-31-109-eng-38. 36p. Order from OTS. 30 cents. ANL-4369

Thermal annealing of neutron induced discomposition in artificial graphite. II. Asymptotic annealing experiments, by T. J. Neubert. Argonne National Lab., Lemont, Ill. Jul 1950. Decl. Nov 1955. Contract W-31-109-eng-38. 36p. Order from OTS. 30 cents. ANL-4477

UNIVAC programs for the solution of one-dimensional multigroup reactor equations, by M. K. Butler and J. M. Cook. Argonne National Lab., Lemont, Ill. n.d. Contract W-31-109-eng-38. 408p. Order from OTS. $1.75. ANL-5437

Physics Division summary report November 1955 through March 1956, by Louis A. Turner. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 143p. Order from OTS. 70 cents. ANL-5554

The Soviet 10-Bev proton synchrotron, by John Marshall. Argonne National Lab., Lemont, Ill. Sep 1956. Contract W-31-109-eng-38. 21p. Order from OTS. 25 cents. ANL-5615

Investigation of neutron scattering for the complex potential model, by Jack Sokoloff. Argonne National Lab., Lemont, Ill. Aug 1956. Contract W-31-109-eng-38. 191p. Order from OTS. $1. ANL-5618

Table of sin θ and $\sin^2 \theta$ for values of θ from 2° to 87°, prepared by H. Anne Plettinger. Argonne National Lab., Lemont, Ill. Mar 1956. Contract W-31-109-eng-38. 45p. Order from OTS. 30 cents. ANL-5634

A study of the fast effect, by B. Mozer. Brookhaven National Lab., Upton, N. Y. Apr 1954. Decl. Feb 1956. Contract AT(30-2)-gen-16. 28p. Order from LC. Mi $2.70, ph $4.80. BNL-2741

Effects of uranium buildup in the LMFR breeding blanket, by B. Mozer. Brookhaven National Lab., Upton, N. Y. Mar 1955. Decl. Feb 1956. Contract AT(30-2)-gen-16. 14p. Order from LC. Mi $2.40, ph $3.30. BNL-2742

Externally moderated LMFR's (non-breeding type), by B. Mozer. Brookhaven National Lab., Upton, N. Y. Jun 1955. Decl. Feb 1956. Contract AT-(30-2)-gen-16. 17p. Order from LC. Mi $2.40, ph $3.30. BNL-2744

Relaxation lengths in light water lattices (1.3% metal), by Herbert Kouts. Brookhaven National Lab., Upton, N. Y. Sep 1953. Decl. Feb 1956. Contract AT(30-2)-gen-16. 3p. Order from LC. Mi $1.80, ph $1.80. BNL-2745

"Eyewash" calculations for the LMFR breeder, by B. Mozer. Brookhaven National Lab., Upton, N. Y. May 1953. Decl. Feb 1956. Contract AT(30-2)-gen-16. 19p. Order from LC. Mi $2.40, ph $3.30. BNL-2746

The diffusion length in the beryllium oxide pile, by D. J. Hughes, W. D. B. Spatz, C. Eggler, N. Goldstein, E. Goldfarb, H. Murdock, and J. Wallace. Argonne National Lab., Lemont, Ill. Jul 1946. Decl. Feb 1956. Contract W-31-109-eng-38. 16p. Order from LC. Mi $2.40, ph $3.30. CF-3562

Research pile experimental facilities, by J. T. Weills. Oak Ridge National Lab., Tenn. Apr 1947. Decl. Dec 1955. Contract W-7405-eng-26. 15p. Order from LC. Mi $4.80, ph $13.80. CF-47-4-34

Superlattice presence in Cu_3Au and FeCo systems, by Sidney Siegel and C. G. Shull. Oak Ridge National Lab., Tenn. 1948. Decl. Dec 1954. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-48-6-34

MTR shutdown cooling requirements, by J. A. Lane. Oak Ridge National Lab., Tenn. Dec 1949. Decl. Feb 1956. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-49-12-84

Thermal column graphite, by J. A. Lane. Oak Ridge National Lab., Tenn. Jan 1950. Decl. Feb 1956. Contract W-7405-eng-26. 2p. Order from LC. Mi $1.80, ph $1.80. CF-50-1-20

Homogeneous reactor corrosion studies, by J. L. English. Oak Ridge National Lab., Tenn. Apr 1950. Decl. Feb 1956. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-50-4-98

Boiling reactors. Variation of reactor stability with operating power level and average bubble size, by P. R. Kasten. Oak Ridge National Lab., Tenn. Nov 1951. Decl. Feb 1956. Contract W-7405-eng-26. 9p. Order from LC. Mi $1.80, ph $1.80. CF-51-11-130

Neutron diffraction and atomic distribution in liquid lead and liquid bismuth at two temperatures, by G. P. Smith and P. C. Sharrah. Oak Ridge National Lab., Tenn. Mar 1952. Decl. Feb 1956. Contract W-7405-eng-26. 14p. Order from LC. Mi $2.40, ph $3.30. CF-52-3-16

Critical calculations for half-filled ISHR sphere, by M. Tobias and P. Haubenreich. Oak Ridge National Lab., Oak Ridge, Tenn. May 1952. Decl. Dec 1955. Contract W-7405-eng-26. 9p. Order from OTS. 15 cents. CF-52-5-230

Reactivity changes caused by compression of an MTR type lattice, by L. C. Noderer. Oak Ridge National Lab., Tenn. Jan 1953. Decl. Feb 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-53-1-253

The attenuation of capture gammas in a plane limited medium of finite thickness, by F. H. Abernathy and H. L. F. Enlund. Oak Ridge National Lab., Tenn. Feb 1953. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-53-2-50

Nuclear safety of the HRE, by S. Visner. Oak Ridge National Lab., Tenn. Feb 1953. Decl. Feb 1956. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-53-2-76

Specifications and stress calculations for ISHR screens, by L. B. Lesem. Oak Ridge National Lab., Tenn. Feb 1953. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-53-2-93

The slow-neutron flux in the vicinity of a strongly-absorbing, fine wire, by C. H. Barkelew. Oak Ridge National Lab., Tenn. Mar 1953. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-53-3-36

360° cyclotron, by John S. Luce. Oak Ridge National Lab., Y-12 Area, Tenn. Jun 1953. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-53-6-224

Self-adjointness for diffusion problems, by W. C. Sangren. Oak Ridge National Lab., Tenn. Aug 1953. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-53-8-40

A theory of continuous centrifugation, by S. H. Jury. Oak Ridge National Lab., Tenn. Sep 1953. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-53-9-191

A note on the maximum total cross section for resonance reactions, by A. Simon and T. A. Welton. Oak Ridge National Lab., Tenn. Oct 1953. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-53-10-7

H.R.E. heat exchanger behavior, by H. F. Poppendiek. Oak Ridge National Lab., Tenn. Nov 1953. Decl. Feb 1956. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-53-11-62

Notes on the calculation of the attenuation of neutrons through thick shields, by F. H. Murray. Oak Ridge National Lab., Tenn. Nov 1953. Contract W-7405-eng-26. 40p. Order from LC. Mi $3, ph $6.30. CF-53-11-64

The behavior of certain functions related to the inhour formula of circulating fuel reactors, by W. K. Ergen. Oak Ridge National Lab., Tenn. Jan 1954. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-54-1-1

Hypergeometric functions for a pair of differential equations, by W. C. Sangren. Oak Ridge National Lab., Tenn. Jan 1954. 31p. Order from LC. Mi $3, ph $6.30. CF-54-1-31

The measurement and the calculation of the liquid helium vapor pressure-temperature scale from 1° to 4.2°K+, by R. A. Erickson and L. D. Roberts. Oak Ridge National Lab., Tenn. Jan 1954. Contract W-7405-eng-26. 24p. Order from LC. Mi $2.70, ph $4.80. CF-54-1-46

Critical concentration of U-235 in core of HRT, by R. B. Briggs. Oak Ridge National Lab., Tenn. Feb 1954. Decl. Feb 1956. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-54-2-165

Optimization techniques applied to reactor calculations, by H. F. McDuffie. Oak Ridge National Lab., Tenn. Mar 1954. Decl. Feb 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-54-3-126

HRT criticality calculations—D_2O reflector and 633 Gm/Kg D_2O thorium—D_2O blanket, by Phillip M. Wood. Oak Ridge National Lab., Tenn. Mar 1954. Contract W-7405-eng-26. 3p. Order from LC. Mi $1.80, ph $1.80. CF-54-3-174

Analysis of the response characteristics of the fast-neutron dosimeter integrating circuit, by J. E. Faulkner. Oak Ridge National Lab., Tenn. Apr 1954. Contract W-7405-eng-26. 13p. Order from LC. Mi $2.40, ph $3.30. CF-54-4-17

An estimate of the contribution to the radiation intensity above the surface of the research reactor due to the presence of nitrogen^{16}, by F. T. Binford. Oak Ridge National Lab., Tenn. Apr 1954. Decl. Feb 1956. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-54-4-171

Bases for cost evaluation, by J. A. Lane. Oak Ridge National Lab., Tenn. May 1954. Decl. May 1956. Contract W-7405-eng-26. 4p. Order from LC. Mi $1.80, ph $1.80. CF-54-5-6

Effect of using ordinary water in the HRT with 500 gm/lt (At 280°C) ThO_2 slurry blanket, by P. M. Wood. Oak Ridge National Lab., Tenn. May 1954. Decl. Feb 1956. Contract W-7405-eng-26. 2p. Order from LC. Mi $1.80, ph $1.80. CF-54-5-197

An automatic cyclotron-tuning system, by N. F. Ziegler. Oak Ridge National Lab., Tenn. Apr 1955. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-55-4-71

Heat generation in the blanket region of the HRT with D_2O reflector and ThO_2 slurry blanket, and buildup of U-233 in the ThO_2 blanket, by Phillip M. Wood. Oak Ridge National Lab., Tenn. Jun 1954. Decl. Feb 1956. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-54-6-184

Oracle code for the two-group, two region homogenous reactor calculation, by T. B. Fowler and R. A. Willoughby. Oak Ridge National Lab., Tenn. Jul 1954. Contract W-7405-eng-26. 8p. Order from LC. Mi $1.80, ph $1.80. CF-54-7-38

Single isotropic air scattering of neutrons in the presence of the ground (unshielded detector), by J. E. Faulkner. Oak Ridge National Lab., Tenn. Aug 1954. Contract W-7405-eng-26. 9p. Order from LC. Mi $2.40, ph $3.30. CF-54-8-96

Oak Ridge Research Reactor shadow shield experiment, by R. G. Cochran, K. M. Henry, and J. D. Flynn. Oak Ridge National Lab., Tenn. Aug 1954. Decl. Feb 1956. Contract W-7405-eng-26. 11p. Order from LC. Mi $2.40, ph $3.30. CF-54-8-102

A further study of pressure rise in HRT shield, by Phillip M. Wood. Oak Ridge National Lab., Tenn. Jan 1955. Decl. Feb 1956. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-55-1-3

HRT safety calculations, by Paul R. Kasten. Oak Ridge National Lab., Oak Ridge, Tenn. Feb 1955. Decl. May 1956. Contract W-7405-eng-26. 17p. Order from OTS. 20 cents. CF-55-2-75

Preliminary critical tests using aquarium fuel elements in the BSR grid, by K. M. Henry, E. B. Johnson, and F. C. Maienschein. Oak Ridge National Lab., Tenn. May 1955. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-55-5-189

Economic requirements for radioactive waste disposal in a nuclear power economy, by H. R. Zeitlin. Oak Ridge National Lab., Oak Ridge, Tenn. Jun 1955. Contract W-7405-eng-26. 12p. Order from OTS. 15 cents. CF-55-6-152

On the behavior of solutions of ordinary finite difference equations, by A. C. Downing, T. W. Hildebrandt, and W. C. Sangren. Oak Ridge National Lab., Tenn. Jul 1955. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. CF-55-7-9

Electrical measurements on a multiple-particle cyclotron model, by N. F. Ziegler. Oak Ridge National Lab., Tenn. Aug 1955. Contract W-7405-eng-26. 28p. Order from LC. Mi $2.70, ph $4.80. CF-55-8-73

Reactor studies in two dimensions and two regions, by C. L. Bradshaw. Oak Ridge National Lab., Tenn. Sep 1955. Contract W-7405-eng-26. 17p. Order from LC. Mi $2.40, ph $3.30. CF-55-9-8

Symmetrically loaded cylindrical shell with fixed ends, by L. E. Anderson. Oak Ridge National Lab., Tenn. Sep 1955. Contract W-7405-eng-26. 7p. Order from LC. Mi $1.80, ph $1.80. CF-55-9-37

The zeros of Bessel functions and $x J_\gamma + 1(\%)/J_\gamma(x) =$ constant, by Joseph S. Rosen. Oak Ridge National Lab., Tenn. Sep 1955. Contract W-7405-eng-26. 10p. Order from LC. Mi $1.80, ph $1.80. CF-55-9-41

The calculation of coolant circuits for turbulent flow conditions, by William R. Smith. Oak Ridge National Lab., Tenn. Nov 1955. Contract W-7405-eng-26. 25p. Order from LC. Mi $2.70, ph $4.80. CF-55-10-34

Survey of some recent data on transuranics, by J. O. Blomeke and J. Halperin. Oak Ridge National Lab., Tenn. Nov 1955. Decl. Apr 1956. Contract W-7405-eng-26. 12p. Order from LC. Mi $2.40, ph $3.30. CF-55-11-151

Effect of heat generation on dumping of HRT, by M. W. Rosenthal and H. C. Claiborne. Oak Ridge National Lab., Tenn. Dec 1955. Contract W-7405-eng-26. 6p. Order from LC. Mi $1.80, ph $1.80. CF-55-12-48

TBR plant turbogenerator system study, by W. F. Taylor. Oak Ridge National Lab., Tenn. Jun 1956. Contract W-7405-eng-26. 27p. Order from LC. Mi $2.70, ph $4.80. CF-56-7-127

Heat transfer experiments for helium plant, by R. N. Lyon. Chicago. Univ. Metallurgical Lab. Feb 1943. Decl. Feb 1956. 21p. Order from LC. Mi $2.40, ph $3.30. CE-501

Temperature coefficient of the reproduction factor for different lattice arrangements, by P. Morrison. Chicago. Univ. Metallurgical Lab. Feb 1943. Decl. Feb 1956. 6p. Order from LC. Mi $1.80, ph $1.80. CP-478

Determination of neutron density with bismuth foils. Final report—Problem Assignment 131-X21P, by L. F. Curtiss. Clinton Labs., Oak Ridge, Tenn. May 1944. Decl. Feb 1956. Addendum, Aug 1944. 21p. Order from LC. Mi $2.70, ph $4.80. CP-1626

The stopping power of metals, by M. L. Goldberger. Chicago. Univ. Metallurgical Lab. Jul 1945. Decl. Feb 1956. Contract W-7401-eng-37. 22p. Order from LC. Mi $2.70, ph $4.80. CP-3082

The pile oscillator for capture cross section measurements. Problem Assignment no. PX6-1, by C. D. Moak, L. A. Pardue, John Strong, and E. O. Wollan. Clinton Labs., Oak Ridge, Tenn. Jun 1945. Decl. Feb 1956. Contract W-7405-eng-39. 16p. Order from LC. Mi $2.40, ph $3.30. CP-3722

Diffusion of fission products from beryllia fuel rod material, by J. E. Wilson. Argonne National Lab., Lemont, Ill. Jan 1947. Decl. Feb 1956. Contract W-31-109-eng-38. 10p. Order from LC. Mi $2.40, ph $3.30. CT-3765

Neutron diffusion and random walk. Part II, by G. E. Duvall. Hanford Atomic Products Operation, Richland, Wash. May 1953. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. HW-27986

Measurement of neutron flux spectra inside reactors, by R. E. Heineman. Hanford Atomic Products Operation, Richland, Wash. Aug 1953. Decl. Apr 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. HW-29135

Multiplication of enriched loading in exponential pile, by W. B. Farrand and R. C. Lloyd. Hanford Atomic Products Operation, Richland, Wash. Sep 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. HW-29453

Estimated power generation in MTR slug test facility, by Herschel Neumann. Hanford Atomic Products Operation, Richland, Wash. Dec 1953. Decl. Feb 1956. Contract W-31-109-eng-52. 5p. Order from LC. Mi $1.80, ph $1.80. HW-30390

Addendum. . . Estimated power generation in MTR slug test facility, by Herschel Neuman. Hanford Atomic Products Operation, Richland, Wash. Dec 1953. Decl. Feb 1956. 3p. Order from LC. Mi $1.80, ph $1.80. HW-30390AD

Temperature calculations to facilitate the design of uranium specimens for MTR exposure, by S. R. Fields. Hanford Atomic Products Operation, Richland, Wash. Jul 1954. Decl. Feb 1956. Contract W-31-109-eng-52. 11p. Order from LC. Mi $2.40, ph $3.30. HW-32347

Resonance capture by a standard Hanford natural-uranium slug, by R. K. Cole. Hanford Atomic Products Operation, Richland, Wash. Sep 1954. Decl. Jan 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-33108

Computed fission product decay, by J. W. Healy, G. E. Pilcher, and C. E. Thompson. Hanford Atomic Products Operation, Richland, Wash. Dec 1954. Contract W-31-109-eng-52. 102p. Order from LC. Mi $5.70, ph $16.80. HW-33414

Flexure tests on irradiated teflon bellows, by P. B. McCarthy. Hanford Atomic Products Operation, Richland, Wash. Feb 1955. Changed from Official Use Only Feb. 2, 1956. Contract W-31-109-eng-52. 4p. Order from LC. Mi $1.80, ph $1.80. HW-35284

Carbon steel program for high temperature reactor systems, by W. L. Pearl. Hanford Atomic Prod-

ucts Operation, Richland, Wash. Apr 1955. Changed from Official Use Only May 29, 1956. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30. HW-36422

Spectral hardening correction to [illegible], by E. E. Jones. Hanford Atomic Products Operation, Richland, Wash. May 1955. Decl. Feb 1956. Contract W-31-109-eng-52. 3p. Order from LC. Mi $1.80, ph $1.80. HW-36503

Particle distribution from a unit source. Part A, by G. W. Anthony. Hanford Atomic Products Operation, Richland, Wash. Apr 1955. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. HW-36822

Buckling of an elliptic cylinder; first roots of the zero order, modified Mathieu function, by Paul F. Gast and Anthony Bournia. Hanford Atomic Products Operation, Richland, Wash. Jul 1955. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-38698

Improved calibration facility, by E. E. Donaldson. Hanford Atomic Products Operation, Richland, Wash. Aug 1955. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. HW-38918

Operation and maintenance manual: In-line analytical instruments, Purex plant. Hanford Atomic Products Operation, Richland, Wash. Feb 1956. Contract W-31-109-eng-52. 116p. Order from LC. Mi $6, ph $18.30. HW-41093

Physics research quarterly report January, February, March 1956, by The Staff of Physics Research Sub-Section. Hanford Atomic Products Operation, Richland, Wash. May 1956. Contract W-31-109-eng-52. 69p. Order from OTS. 45 cents. HW-43441

Pulse magnetization of the magnet for the CPP mass spectrometer, by F. L. Petree. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Mar 1955. Contract AT(10-1)-205. 5p. Order from LC. Mi $1.80, ph $1.80. IDO-14371

Neutron resonance parameters and total cross sections in U^{235}, by O. D. Simpson, R. G. Fluharty, F. B. Simpson, and R. M. Brugger. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Nov 1955. Contract AT(10-1)-205. 12p. Order from LC. Mi $2.40, ph $3.30. IDO-16268

Energy dependency of [illegible] for U^{235} in the region 0.04 - 1.0 ev, by J. R. Smith and E. H. Magleby. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Nov 1955. Contract AT(10-1)-205. 7p. Order from LC. Mi $1.80, ph $1.80. IDO-16269

Calibration of silver activated phosphate glass gamma dosimeters, by C. H. Hogg. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Feb 1955. Contract AT(10-1)-205. 7p. Order from LC. Mi $1.80, ph $1.80. IDO-16271

Production of carrier-free cobalt-58 in the MTR, by T. O. Passell. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Apr 1955. Contract AT(10-1)-205. 7p. Order from LC. Mi $1.80, ph $1.80. IDO-16274

Total neutron cross sections of Np^{237} in the 0.02 to 3 ev region, by M. S. Smith, R. R. Smith, E. G. Joki, and J. E. Evans. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Apr 1955. Contract AT(10-1)-205. 7p. Order from LC. Mi $1.80, ph $1.80. IDO-16277

Xenon behavior with linearly decreasing power, by J. W. Webster and G. A. Cazier. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Sep 1955. Contract AT(10-1)-205. 3p. Order from LC. Mi $1.80, ph $1.80. IDO-16282

Effect of neutron interaction on criticality of unequal size vessels, by J. W. Webster and G. A. Cazier. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Sep 1955. Contract AT-(10-1)-205. 4p. Order from LC. Mi $1.80, ph $1.80. IDO-16283

MTR technical branch quarterly report, by W. P. Conner. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Aug 1956. Contract AT-(10-1)-205. 119p. Order from OTS. 70 cents. IDO-16297

Secondary electron emission due to positive ion bombardment, by John W. Murdock and Glenn H. Miller. Ames Lab., Iowa State College, Ames, Iowa. Jun 1955. Contract W-7405-eng-82. 28p. Order from OTS. 25 cents. ISC-652

Measurement of the ionization yield of low energy atomic particles in gases, by Ralph Lowry and Glenn H. Miller. Ames Lab. Iowa State College, Ames, Iowa. Jun 1955. Contract W-7405-eng-82. 67p. Order from OTS. 45 cents. ISC-655

The crystal structure of zirconium tetrafluoride, by R. D. Burbank and F. N. Bensey, Jr. Oak Ridge Gaseous Diffusion Plant. Union Carbide Nuclear Co., Oak Ridge, Tenn. Oct 1956. Contract W-7405-eng-26. 19p. Order from OTS. 20 cents. K-1280

The problem of Kundsen flow. Part I. General theory, by W. C. DeMarcus. Oak Ridge Gaseous

Diffusion Plant, Tenn. Sep 1956. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.40, ph $3.30. K-1302(Pt. I)

A xenon calculation procedure adaptable to digital computers, by P. L. Hofmann, H. Hurwitz, Jr., and E. Wachspress. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1956. Contract W-31-109-eng-52. 21p. Order from OTS. 25 cents. KAPL-1594

The scattering of slow neutrons by hydrogenous moderators, by T. J. Krieger and M. S. Nelkin. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1956. Contract W-31-109-eng-52. 31p. Order from OTS. 30 cents. KAPL-1597

Report on study of various electrical analogue techniques for solving transient heat conduction problems, by Clevis E. Kinkous. Knolls Atomic Power Lab., Schenectady, N. Y. (195?). Contract W-31-109-eng-52. 28p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-CEL-1

Permissible shield voids in off-hull servicing equipment, by D. G. Chappell. Knolls Atomic Power Lab., Schenectady, N. Y. Dec 1955. Contract W-31-109-eng-52. 18p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-DGC-23

Tensile testing facility at Radioactive Materials Laboratory, by D. J. Ruggiero. Knolls Atomic Power Lab., Schenectady, N. Y. May 1955. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-DJR-1

Notes on a streaming problem, by E. L. Wachspress. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1954. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-ELW-4

Calculations of required speeds of control and safety rods, by F. E. Crever and J. H. Pigott. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1948. Decl. Feb 1956. Contract W-31-109-eng-52. 28p. Order from LC. Mi $2.70, ph $4.80. KAPL-M-FEC-3

Prompt and delayed power changes resulting from a reactivity variation, by G. Dessauer. Knolls Atomic Power Lab., Schenectady, N. Y. Sep 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-GD-5

A two group calculation for reactivity trends in the critical experiment, by Henry Hurwitz, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1947. Decl. Feb 1956. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-HH-2

Escape of radiation from blanket, by John B. Sampson. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1948. Decl. Feb 1956. Contract W-31-109-eng-52. 9p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JBS-4

Study of interstitial atoms and vacancies in irradiated crystals using X-ray measured lattice parameter together with density measurements, by J. B. Sampson and C. W. Tucker, Jr. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1954. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JBS-8

Anisotropy correction for beryllium transport cross sections and the average lethargy increase per scattering collision (ξ), by J. J. Bulmer. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1955. Contract W-31-109-eng-52. 18p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-JJB-1

Summary of multigroup equations for bare cubical reactors, by J. J. Bulmer and R. Siegel. Knolls Atomic Power Lab., Schenectady, N. Y. Aug 1955. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-JJB-2

Improving the convergence of series: Application to some elliptic integrals, by Leo F. Epstein and Nancy E. French. Knolls Atomic Power Lab., Schenectady, N. Y. Feb 1955. Contract W-31-109-eng-52. 16p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-LFE-14

Calculation of the error function, by Leo F. Epstein. Knolls Atomic Power Lab., Schenectady, N. Y. Jan 1955. Contract W-31-109-eng-52. 6p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-LFE-15

Control mockup, by J. H. Pigott and L. M. Loeb. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1949. Decl. Feb 1956. Contract W-31-109-eng-52. 39p. Order from LC. Mi $4.50, ph $12.30. KAPL-M-LML-1

Neutron thermalization by a heavy gaseous moderator, by Mark S. Nelkin. Knolls Atomic Power Lab., Schenectady, N. Y. Jul 1955. Contract W-31-109-eng-52. 10p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-MSN-2

Self-shielding factors for heterogeneous geometries at low energies, by P. L. Hofmann. Knolls Atomic

Power Lab., Schenectady, N. Y. Dec 1951. Decl. Feb 1956. Contract W-31-109-eng-52. 10p. Order from LC. Mi $1.80, ph $1.80.
KAPL-M-PLH-1

Approximate selection of mechanical fuses, by R. B. McCalley. Knolls Atomic Power Lab., Schenectady, N. Y. Nov 1955. Contract W-31-109-eng-52. 18p. Order from LC. Mi $2.40, ph $3.30.
KAPL-M-RBM-1

Pressure resonance in fluid-filled cavities, by R. G. Kennison. Knolls Atomic Power Lab., Schenectady, N. Y. n.d. Contract W-31-109-eng-52. 23p. Order from LC. Mi $2.70, ph $4.80.
KAPL-M-RGK-17

Inelastic neutron scattering of zirconium, by R. W. Deutsch. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1955. Contract W-31-109-eng-52. 12p. Order from LC. Mi $2.40, ph $3.30.
KAPL-M-RWD-3

Basic sub-cooled light water properties. Knolls Atomic Power Lab., Schenectady, N. Y. Apr 1955. Contract W-31-109-eng-52. 14p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SMS-3

The conversion of fast neutron flux to dose, by S. Pearlstein and M. J. Abrams. Knolls Atomic Power Lab., Schenectady, N. Y. Jun 1954. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SP-4

Estimation of pile irradiation time, by S. Pearlstein. Knolls Atomic Power Lab., Schenectady, N. Y. Oct 1955. Contract W-31-109-eng-52. 15p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-SP-7

Preliminary plans for a uranium chain reactor for experimental use. Knolls Atomic Power Lab., Schenectady, N. Y. n.d. Decl. Feb 1956. Contract W-31-109-eng-52. 21p. Order from LC. Mi $3, ph $6.30. KAPL-M-VW-1

Semi-conductivity of uranium dioxide, by William H. Howland and Leo F. Epstein. Knolls Atomic Power Lab., Schenectady, N. Y. Mar 1952. Contract W-31-109-eng-52. 13p. Order from LC. Mi $2.40, ph $3.30. KAPL-M-WHH-1

Pressure rise in a confined volume of molten sodium upon addition of heat, by W. M. Knox. Knolls Atomic Power Lab., Schenectady, N. Y. May 1953. Contract W-31-109-eng-52. 7p. Order from LC. Mi $1.80, ph $1.80. KAPL-M-WMK-2

Fission comparison of U^{238} and U^{235} for 2.5 Mev neutrons, by G. A. Jarvis. Los Alamos Scientific Lab., N. Mex. Jul 1953. Decl. Feb 1956. Contract W-7405-eng-36. 10p. Order from LC. Mi $1.80, ph $1.80. LA-1571

Instruments for the monitoring of tritium in the atmosphere, by B. C. Eutsler, G. L. Evans, R. D. Hiebert, R. N. Mitchell, Chain Robbins, and R. J. Watts. Los Alamos Scientific Lab., N. Mex. Apr 1955. Contract W-7405-eng-36. 20p. Order from LC. Mi $2.40, ph $3.30. LA-1909

First collision source infinite reflector study, by Karl Bernstein and Richard H. Graham. California Research and Development Co., Livermore, Calif. Mar 1952. Decl. Apr 1956. 10p. Order from LC. Mi $1.80, ph $1.80. LWS-24220

Studies on the preparation and properties of a long-lived isotope of element 43 produced by the neutron irradiation of molybdenum metal. Progress report for February 15 to September 15, 1946. Problem Assignment no. CX5-7, by G. E. Boyd. Clinton Labs., Oak Ridge, Tenn. Sep 1946. Decl. Feb 1956. Contract W-35-058-eng-71. 17p. Order from LC. Mi $2.40, ph $3.30. MonC-169

Operating characteristics of main circulating system—the Daniels experimental power pile, Design I, by N. J. Palladino. Clinton Labs., Oak Ridge, Tenn. Dec 1946. Revised Feb 1947. Decl. Jan 1956. Contract W-35-058-eng-71. 29p. Order from LC. Mi $2.70, ph $4.80.
MonN-232(Rev.)

Physics Division monthly report for January 1947, by L. W. Nordheim. Clinton Labs., Oak Ridge, Tenn. Feb 1947. Decl. Jan 1956. Contract W-35-058-eng-71. 37p. Order from LC. Mi $3, ph $6.30. MonP-250

Penetration of fission neutrons through water, by E. P. Wigner and G. Young. Clinton Labs., Oak Ridge, Tenn. Apr 1947. Decl. Jan 1956. Contract W-35-058-eng-71. 7p. Order from LC. Mi $1.80, ph $1.80. MonP-283

Crystal structure of NpF_6, by W. H. Zachariasen. Chicago. Univ. Metallurgical Lab. Jan 1946. Decl. Jan 1956. 1p. Order from LC. Mi $1.80, ph $1.80. N-1817

The NAA exponential assembly. Part I. Apparatus and preliminary procedure, by A. T. Biehl and E. R. Cohen. North American Aviation, Inc., Downey, Calif. Jun 1951. Decl. Apr 1956. Contract AT-11-1-gen-8. 44p. Order from OTS. 30 cents. NAA-SR-103

Stored energy release in graphite irradiated at low temperatures, by S. B. Austerman. Atomics

International. Division of North American Aviation, Inc., Canoga Park, Calif. Oct 1956. Contract AT-11-1-gen-8. 37p. Order from OTS. 30 cents. NAA-SR-1564

An experiment proposed for the NAA statitron I. Ag self diffusion in a radiation field, by G. J. Dienes and M. H. Feldman. North American Aviation, Inc., Downey, Calif. Mar 1951. Decl. Apr 1956. Contract AT-11-1-gen-8. 15p. Order from LC. Mi $2.40, ph $3.30. NAA-SR-Memo-22

The effect of fission fragment poisons on the breeding gain for HTR, by Ralph Balent. North American Aviation, Inc., Downey, Calif. Aug 1951. Decl. Apr 1956. 5p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-85

Plutonium production in fused fluoride capsules bombarded by deuterons, by R. L. Ashley. North American Aviation, Inc., Downey, Calif. n.d. Decl. Apr 1956. 4p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-186

The radial expansion due to thermal stresses in a long uranium rod, by J. Brandstatter. North American Aviation, Inc., Downey, Calif. Feb 1952. Decl. Apr 1956. 3p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-199

Physics of the converter reactor blankets, by W. J. Houghton. North American Aviation, Inc., Downey, Calif. Jun 1952. Decl. Jan 1956. 31p. Order from LC. Mi $3, ph $6.30. NAA-SR-Memo-339

Shielding for the converter reactor, by W. C. Cooley. North American Aviation, Inc., Downey, Calif. Jun 1952. Decl. Jan 1953. 9p. Order from LC. Mi $1.80, ph $1.80. NAA-SR-Memo-355

Preliminary outline of the critical assembly and initial operational testing of L-3 reactor, by M. E. Remley. North American Aviation, Inc., Downey Calif. Sep 1953. 26p. Order from LC. Mi $2.70, ph $4.80. NAA-SR-Memo-784

Blast damage to air cleaning devices. (Filter tests). Progress report for July 1, 1953 to June 30, 1955, by Charles E. Billings, Richard Dennis, and Leslie Silverman. Harvard Univ., Boston, Mass. Nov 1955. Contract AT(30-1)-841. 30p. Order from OTS. 30 cents. NYO-1595

Air cleaning studies. Progress report for July 1, 1953 to June 30, 1954, by Richard Dennis, Leslie Silverman, Charles E. Billings, August T. Rossano, Jr., Edward Connors, Jr., Richard D. Coleman, David M. Anderson, William R. Samples, and Philip Drinker. Harvard Univ., Boston, Mass. Jan 1956. Contract AT(30-1)-841. 53p. Order from OTS. 40 cents. NYO-4608

The status of the reactor safety program. Technical Operations, Inc., Arlington, Mass. Jul 1956. Contract AT(30-1)-1889. 7p. Order from LC. Mi $1.80, ph $1.80. NYO-4720

Spallation yields from chlorine with 45—430 Mev protons; a search for unknown medium-light even-even nuclides; and beta lifetime statistics (thesis), by John W. Jones. Carnegie Inst. of Tech., Pittsburgh, Penna. May 1956. Contract AT(30-1)-844. 106p. Order from OTS. 60 cents. NYO-6627

Radiation flux transformation as a function of density of an infinite medium with anisotropic point sources, by C. D. Zerby. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 12p. Order from OTS. 20 cents. ORNL-2100

Mathematics panel semiannual progress report for period ending June 30, 1956. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 23p. Order from OTS. 25 cents. ORNL-2134

A survey of plutonium spectrum data, by J. R. McNally, Jr. Oak Ridge National Lab., Tenn. Sep 1956. Contract W-7405-eng-26. 151p. Order from LC. Mi $7.20, ph $22.80. ORNL-2154

A flux depression experiment in the MTR, by J. B. Trice. Oak Ridge National Lab., Tenn. n.d. Contract W-7405-eng-26. 34p. Order from OTS. 30 cents. ORNL-2164

Electromagnetic radiations of cesium 132, by Berol L. Robinson and Richard W. Fink. University of Arkansas, Fayetteville, Arkansas. Jul 1956. Contract AT(40-1)-277. 15p. Order from OTS. 20 cents. ORO-151

Radiation shields and shielding. A bibliography of unclassified report literature. Technical Information Service Extension, Oak Ridge, Tenn. Jul 1956. 20p. Order from OTS. 20 cents. TID-3303

A criterion for the experimental optimization of two-component unit shields, by Herbert Goldstein and E. P. Blizard. Nuclear Development Associates, Inc., White Plains, N. Y. and Oak Ridge National Lab., Tenn. May 1951. Decl. Jan 1956. 6p. Order from LC. Mi $1.80, ph $1.80. TID-5018

AEC materials management-contractor representatives meeting, Washington, D. C., May 7-9, 1956.

Division of Nuclear Materials Management, Washington, D. C. Sep 1956. 270p. Order from OTS. $1.50. TID-7516(Pt. 1)

Space charge expansion of ion bunches drifting down a conducting pipe, by A. Garren. California. Univ. Berkeley. Radiation Lab. Jul 1951. Decl. Feb 1956. Contract W-7405-eng-48. 15p. Order from LC. Mi $2.40, ph $3.30. UCRL-1394

Nuclear evaporation from uranium, by Warren Heckrotte. California. Univ., Berkeley. Radiation Lab. Apr 1953. Decl. Mar 1956. Contract W-7405-eng-48. 21p. Order from LC. Mi $2.70, ph $4.80. UCRL-2184

Slow and fast structure of secondary-particle beams of the bevatron, by Harry G. Heard. Univ. of Calif. Rad. Lab., Berkeley, Calif. Jul 1956. Contract W-7405-eng-48. 18p. Order from OTS. 20 cents. UCRL-3428

Mnemonic and calculating device for relativistic particle dynamics, by Frank S. Crawford, Jr. California. Univ., Berkeley. Radiation Lab. Jul 1956. Contract W-7405-eng-48. 7p. Order from LC. Mi $1.80, ph $1.80. UCRL-3462

Beam storage in the 184-inch cyclotron, by Frank S. Crawford, Jr., and Warren Fenton Stubbins. Univ. of Calif. Rad. Lab., Berkeley, Calif. Jul 1956. Contract W-7405-eng-48. 34p. Order from OTS. 30 cents. UCRL-3463

Nuclear internal momentum distribution, by John M. Wilcox. Univ. of Calif. Rad. Lab., Berkeley, Calif. Jul 1956. Contract W-7405-eng-48. 8p. Order from OTS. 15 cents. UCRL-3475

Experimental study of ionized matter projected across a magnetic field, by Winston H. Bostick. California. Univ., Livermore. Radiation Lab. May 1956. Contract W-7405-eng-48. 32p. Order from LC. Mi $3, ph $6.30. UCRL-4695

Escape probability and capture fraction for gray slabs, by D. Schiff and S. Stein. Bettis Plant. Westinghouse Electric Corp., Pittsburgh, Penna. Jun 1956. Contract AT-11-1-gen-14. 43p. Order from OTS. 30 cents. WAPD-149

Problem 54—the Cuthill Code, by R. S. Varga. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jun 1955. Changed from Official Use Only May 28, 1956. Contract AT-11-1-gen-14. 20p. Order from LC. Mi $2.40, ph $3.30. WAPD-LSR(P)-30

The theoretical build-up factor for ordinary concrete, by F. E. Obenshain. Westinghouse Electric Co. Atomic Power Div., Pittsburgh. Mar 1955. 6p. Order from LC. Mi $1.80, ph $1.80. WAPD-P-646

Hydrogen gauge development in D loop. Final report, by W. Godsin. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. 1956. Contract AT-11-1-gen-14. 17p. Order from LC. Mi $2.40, ph $3.30. WAPD-SFR-PD-107

Further comparison and simplification of cell theory and exact solution for control rods, by L. Friedman. Westinghouse Electric Co. Atomic Power Div., Pittsburgh. Nov 1955. 13p. Order from LC. Mi $2.40, ph $3.30. WAPD-SF-Ph-124

A table of the integral. Volume I, by M. E. Rose, W. Miranker, P. Leak, L. Rosenthal, and J. K. Hendrickson. New York Univ., New York, N. Y., and Applied Mathematics Lab. David W. Taylor Model Basin, Carderock, Md. Oct 1954. Contract AT-11-1-gen-14. 85p. Order from OTS. 50 cents. WAPD-SR-506(Vol. I)

Crud collector, by G. B. Rosenblatt, Jr. Westinghouse Electric Corp. Atomic Power Div., Pittsburgh. Jul 1955. 9p. Order from LC. Mi $1.80, ph $1.80. WAPD-STR(C)-168

Few group constants for delayed neutrons, by Lionel Friedman. Bettis Plant. Westinghouse Electric Corp., Pittsburgh, Penna. Jun 1956. Contract AT-11-1-gen-14. 42p. Order from OTS. 30 cents. WAPD-TM-6

Fundamentals conferences—December 1948 to September 1949, by F. T. Howard, comp. Carbide and Carbon Chemicals Div. Y-12 Plant, Oak Ridge, Tenn. Nov 1950. Decl. Feb 1956. Contract W-7405-eng-26. 158p. Order from LC. Mi $7.50, ph $24.30. Y-B20-81

Collection of ions in cyclorator, by Raymond Murray. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Nov 1948. Decl. Feb 1956. Contract W-7405-eng-26. 5p. Order from LC. Mi $1.80, ph $1.80. Y-B22-18

Mathematical discussion of collection properties in cyclorator considering magnetic field effect, by Mozelle Rankin. Carbide and Carbon Chemicals Corp. Y-12 Plant, Oak Ridge, Tenn. Mar 1949. Decl. Feb 1956. Contract W-7405-eng-26. 23p. Order from LC. Mi $2.70, ph $4.80. Y-B22-27

Miscellaneous

Processing requirements, buildup of fission product activity, and liquid radiochemical waste volumes in a predicted nuclear power economy, by H. R. Zeitlin, E. D. Arnold, and J. W. Ullmann. Oak Ridge National Lab., Tenn. Jan 1956. Contract W-7405-eng-26. 18p. Order from LC. Mi $2.40, ph $3.30. CF-56-1-162

A bibliographic file of technical report abstracts useful to reactor control system engineering, by Francis P. Green. Oak Ridge National Lab., Tenn. Oct 1956. 17p. Order from OTS. 20 cents. CF-55-5-103

Criticality of unreflected, infinitely-long cylinders of uranyl nitrate solution, by J. W. Webster, G. A. Cazier, and M. A. Wahlgren. Phillips Petroleum Co. Atomic Energy Div., Idaho Falls, Idaho. Oct 1955. Decl. Jun 1956. Contract AT(10-1)-205. 4p. Order from LC. Mi $1.80, ph $1.80. IDO-16296

Report announcement bulletin. Unclassified reports for civilian applications. Technical Information Service Extension, Oak Ridge, Tenn. Aug 1956. 20p. Free. Order from OTS. TID-1910

Permissible fuel costs with reprocessing, by J. M. Stein. Westinghouse Electric Corp. Industrial Atomic Power Group, Pittsburgh. May 1953. 4p. Order from LC. Mi $1.80, ph $1.80. WIAP-M-18

U. S. DEPARTMENT OF COMMERCE

Field Offices

ALBUQUERQUE, N. MEX.
Rm. 321, Post Office Bldg.

ATLANTA 23, GA.
Room 340
Peachtree and Seventh St. Bldg.

BOSTON 9, MASS.
Room 1416
U. S. Post Office & Courthouse

BUFFALO 3, N. Y.
504 Federal Bldg.
117 Ellicott Street

CHARLESTON 4, S. C.
Area 2 Sergeant Jasper Bldg.
West End Broad Street

CHEYENNE, WYO.
307 Federal Office Bldg.

CHICAGO 6, ILL.
226 West Jackson Blvd.

CINCINNATI 2, OHIO
442 U. S. Post Office & Courthouse

CLEVELAND 14, OHIO
1100 Chester Avenue

DALLAS 22, TEX.
1114 Commerce Street

DENVER 2, COLO.
142 New Custom House

DETROIT 26, MICH.
438 Federal Bldg.

HOUSTON 2, TEX.
430 Lamar Avenue

JACKSONVILLE 1, FLA.
425 Federal Bldg.

KANSAS CITY 6, MO.
Federal Office Bldg.

LOS ANGELES 15, CALIF.
Room 450
Western Pacific Bldg.
1031 South Broadway

MEMPHIS 3, TENN.
212 Falls Bldg.
22 North Front St.

MIAMI 32, FLA.
316 U. S. Post Office Bldg.
300 NE. First Avenue

MINNEAPOLIS 1, MINN.
319 Metropolitan Bldg.
2d Avenue South & 3d Street

NEW ORLEANS 12, LA.
333 St. Charles Avenue

NEW YORK 17, N. Y.
4th Floor, 110 E. 45th St.

PHILADELPHIA 7, PA.
Jefferson Bldg.
1015 Chestnut Street

PHOENIX, ARIZ.
137 North Second Avenue

PITTSBURGH 22, PA.
817 Fulton Bldg.
107 Sixth St.

PORTLAND 4, OREG.
217 Old U. S. Courthouse

RENO, NEV.
1479 Wells Avenue

RICHMOND 19, VA.
1103 East Main Street

ST. LOUIS 1, MO.
910 New Federal Bldg.

SALT LAKE CITY 1, UTAH
Room 105
222 S. W. Temple St.

SAN FRANCISCO 11, CALIF.
419 Customhouse
555 Battery St.

SAVANNAH, GA.
235 U. S. Courthouse & Post Office Bldg.

SEATTLE 4, WASH.
809 Federal Office Bldg.
909 First Avenue

5-4-56

Beginning this Month, A New Source of Research Information—

THE MEDICAL AND ALLIED SCIENCES

Reports from the Air University School of Aviation Medicine, U. S. Air Force

PB 121585 Studies in Abstractive Generalization, 50 cents.

PB 121586 Correlation of Blood Histamine Release and Skin Test Response to Multiple Antigens, 50 cents.

PB 121587 Intracellular Oxidative Enzymes, 50 cents.

PB 121588 Transthoracic Pressure in Man During Rapid Decompression, 50 cents.

PB 121589 The Discrimination Hypothesis and Cue Reversal, 50 cents.

PB 121590 Probability and Statistics in Item Analysis and Classification, $1.50.

PB 121591 Chromatography as a Method for Identifying Bacteria, 50 cents.

PB 121592 Tissue Citric Acid Content and Susceptibility to Infection in Mice Acclimatizing to and Recovering from Altitude, 50 cents.

PB 121593 Postmortem Changes in The Vestibular and Cochlear Receptors, 50 cents.

PB 121594 A Discrete-Frequency Automatic Audiometer Simulating Manual Technic, 50 cents.

PB 121595 Probability and Statistics in Item Analysis and Classification Problems, 50 cents.

Watch Future Issues of USGRR for More School of Aviation Medicine Reports.

U. S. Department of Commerce, Office of Technical Services, Washington 25, D. C.