U. S. Government RESEARCH REPORTS

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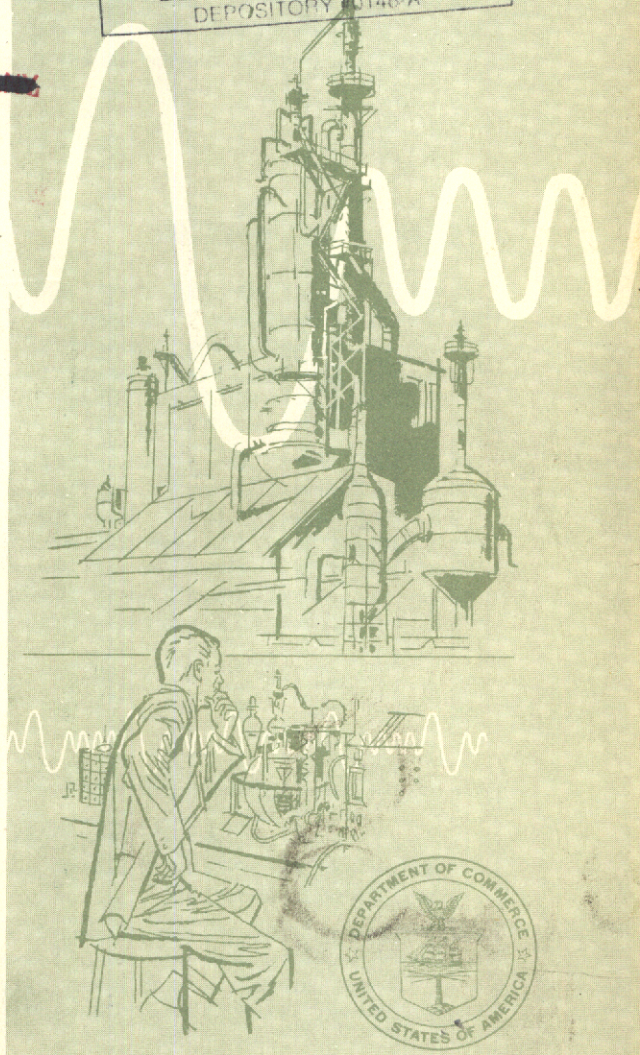

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U. S. GOVERNMENT RESEARCH REPORTS

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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

Vol. 26, No. 1 July 13, 1956

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Printed Reports Available from OTS Announced in This Issue

NOTICE TO SUBSCRIBERS

This issue contains the index to Volume 25. A similar index is published twice a year. Beginning with this issue, the semi-annual index is inserted in the center spread of the publication, rather than at the back, to facilitate removal for binding.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Adsorbirooemost na silikagele individooalneekh organicheskikh sernisteekh soedlnenly (Adsorbability of individual organic sulfur compounds on silica gel), by A. T. Sviatoshenko and A. S. Nekrasov. Translated by Lloyd G. Robbins and edited by F. A. Raven. Jan 1956. 10p graph, tables. Order from LC. Mi $1.80, ph $1.80. PB 120327

Translated from Doklady Akademii Nauk SSSR, vol. XCVII, no. 1, 1954, pp. 95-98.
1. Sulfur compounds - Organic - Absorption - Russia 2. Silica gels - Adsorption - Russia 3. Chromatographic analysis - Russia 4. NAVSHIPS T 594 5. STS 222.

Properties of desoxycholic acid at the air/water interface, by E. F. Hare and W. A. Zisman. U. S. Naval Research Laboratory. Apr 1956. 22p photos, diagrs, graphs. Order from OTS. 75 cents. PB 121062

The surface chemical properties of desoxycholic acid at the air/water interface have been investigated by means of the Langmuir-Adam hydrophil balance. The effect of varying the pH and the metallic ion content of the substrate on the force-area isotherm was also determined. The implications of this study in the intestinal absorption of fatty acids are discussed. NRL R 4734.

Plastics and Plasticizers

Development of a practical laboratory procedure to be used in evaluating the forming qualities of plastic sheet materials, by Paul H. Kaar. Armour Research Foundation, Chicago, Ill. Sep 1953. 74f photos, drawing, graphs, tables. Order from LC. Mi $4.50, enl pr $13.80. PB 120801

The purpose of this project was (1) to study the various factors which are of importance in the fabrication of flat plastic sheet material into useful shapes for a transparent aircraft enclosure, and (2) to develop a practical laboratory procedure for evaluating the forming qualities of these plastic materials. Covers period of work from Jan 1952 to Jan 1953. Includes data and comments taken from a summary report written by Dr. S. J. Fraenkel, Sep 30, 1952. Appendix A. Curve for bend forming tests. Appendix B. Drawings of test apparatus for thermosetting and thermoplastic materials. AF WADC TR 53-19. Contract AF 33(038)-27648.

Plasticized modifications of dipropylene glycol-castor oil-m-tolylene diisocyanate polyurethane as potting resins, by R. E. Christensen and D. S. Trifan. Princeton University. Plastics Laboratory. Nov 1953. 38p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122144

Plasticizers have been investigated for admixture to the 16.7% dipropylene glycol-modified castor oil-m-tolylene diisocyanate polyurethane resin to achieve a lowered viscosity while improving the mechanical properties and maintaining the electrical and heat resistance properties of the unmodified resin. A resin containing 10% by weight of dioctyl sebacate has been chosen as the best modification of this type, and extensive study of its heat resistance, rate of viscosity increase during potting, curing schedules, and other properties has shown the definite advantages of its use. Transformers potted with this material have successfully passed the salt water immersion test after 1000 hours at 125°C. Dept. of the Army project 3-00-15-022. Signal Corps project 32-152B. PU PL TR 31A. Contract DA-36-039-sc-133.

Theoretical investigation of the mechanism of transfer of materials through polyethylene, by Henry A. Bent and Jules Pinsky. Plax Corporation, West Hartford, Conn. Aug 1955. 93p graphs (2 fold), tables. Order from OTS. $2.50. PB 121194

Equations for permeability are established. Master plots for interpolating homologous materials and extrapolating for temperature changes are included. Selected bibliography on permeability, solubility, and diffusion in polymer systems. Project no. 7312, Task no. 73127. Covers work conducted from Apr 1952 to Jun 1954. For Part 1 see PB 111546. AF WADC TR 53-133, Part 2. Contract AF-33-(616)-112.

Thermal stability of polyester-styrene resin systems, by R. S. Holdsworth, H. W. Robinson, E. S. Ebers, W. F. Brucksch, Jr., and P. M. Elliott. United States Rubber Co. Naugatuck Chemical Division, Naugatuck, Conn. May 1949. 23f graphs, tables. Order from LC. Mi $2.70, enl pr $6.30. PB 122093

The heat aging resistance of the polyester-styrene resin laminates under non-oxidative conditions was found to be excellent, whereas under oxidative conditions it is only fair and relatively independent of chemical and physical structural changes, although chlorine and long chain alkyl substituents cause significant decreases. Absolute flexural strength of polyester resin laminates, however, is greatly influenced by chemical structure. Increased polarity produces improved flexural strength. Contract N8 onr-504, T. O. I, NR 033-248.

Paints, Varnishes and Lacquers

Development of a protective coating resistant to nitric acid and hydrocarbons, by D. F. Siddall, H. L. Cahn, E. Hillier and M. Gunther. United States Stoneware Co., Akron, Ohio. Feb 1956. 103p photos, tables. Order from OTS. $2.75. PB 121217

Numerous film-forming raw materials from solvent systems and nonvolatile filleting compounds have been screened for their resistance to white fuming nitric acid. Results show Fluorocarbon Resin X-200 from M. W. Kellogg Company is the only available resin meeting this contract requirement for coating and filleting compounds. Air dry, force dry or low temperature bake coatings have been tentatively formulated to provide the required protection. Studies of physical and chemical properties in conjunction with the compounding of this resin indicate the need for additional work to provide a more practical drying cycle and work is being continued concerning this phase. Project no. 7312, Task no. 73121. Covers the period from May 15, 1952 to May 15, 1954. AF WADC TR 54-527. Contract AF 33(616)-150.

Evaluation of surface treatment of low-alloy steels, by Sam Tour. Sam Tour & Co., Inc., New York, N. Y. Contract AF 33(616)-406. Project no. 7351. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1: Test method for heat-resistant corrosion protective coatings on steel. Nov 1954. 29p photos, tables. 75 cents. PB 121087

Test methods have been developed to compare the resistance to the exhaust products of kerosene combustion at 600-1000°F. The coatings tested included electroless and electroplated nickel, sicon paint, silicone aluminum paint, sprayed and hot-dipped aluminum, corronizing, chromizing, siliconizing, expoxy paint, and cadmium electroplate. Covers work done from May 1953 to June 1954. AF WADC TR 54-451, Part 1.

Part 2: Paint chromizing, paint siliconizing and coating of titanium-boron low alloy steel. Nov 1954. 21p photos, tables. 75 cents. PB 121088

Diffusion coatings produced by chromizing or siliconizing offer considerable promise as heat resistant corrosion protective coatings for use on low to medium carbon, plain carbon or low alloy steels for service at temperatures up to 1200°F. Either of these types of coatings can be applied by the paint process. AF WADC TR 54-451, Part 2.

Optics of paints: Emissivity at 700°F. of Sherwin-Williams, McCloskey and Dupont heat resisting aluminum paints, by J. A. Sanderson. U. S. Naval Research Laboratory. Jul 1943. 13p photos, diagrs, table. Order from LC. Mi $2.40, ph $3.30. PB 120529

Report describes measurements which have been made of the heat emissivity of certain commercial aluminum paints designed for Naval use on hot surfaces at temperatures up to 850°F for the purpose of reducing the radiation of heat by those surfaces. Photos will not reproduce well. NRL H 2122.

Inorganic Chemicals

Apparatus for the disposal of fluorine on a laboratory scale, by G. Long. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1955. 6p diagrs. Order from British Information Services, 30 Rockefeller Plaza, New York, 20, N. Y. 18 cents. PB 119984

S. O. code no. 91-3-2-31.
1. Fluorine - Disposal - Gt. Brit. 2. AERE C/M 260.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Final report for the period 1 Jul 1953 to 30 Jun 1955 under Contract AF 19(604)-867, by John Koenig. Brush Laboratories Co., Cleveland, O. Jun 1955. 66p photos, drawings, diagr, graphs. Order from OTS. $1.75. Also available from LC on microcard. $2.40. PB 111934

Magnetite was successfully grown on several seeds at a rate of 0.05 mm. per day in steel autoclaves containing ammonium chloride solution. Details are given on this as well as on attempts to grow ferrites other than magnetite. Corrosion of the autoclave was investigated and means for minimizing it. Work continued under Contract AF 19(604)-1419. AF CRC TR-55-167.

Polymeric inorganic and organometallic compounds. Molecular motion in methyl silicones and chlorosilanes at very low temperatures, by Reed F. Riley and Eugene G. Rochow. Harvard University. Dept. of Chemistry. Dec 1954. 28p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 122088

A brief report on the present status of the investigation of the molecular structure of silicone materials by the method of nuclear magnetic resonance absorption is given. A full report of the work done by Dr. Reed F. Riley on the internal molecular motions of methyl siloxanes and methylchlorosilanes at very low temperatures (down to the temperature of liquid helium, 4°abs.) is given. Contract N5 ori-07661.

Preparation of thorium tetrafluoride by the thermal degradation of the hydrate, by R. W. M. D'eye, G. W. Booth and E. A. Harper. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1955. 5p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119318

1. Thorium fluorides - Thermodynamic properties - Gt. Brit. 2. Thorium tetrafluoride - Preparation - Gt. Brit. 3. AERE C/R 1735.

Relations between the particle size and energy content of magnesium oxide, by W. Weissenbach. Translated by F. Hudswell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. May 1955. 9p graphs, table. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119307

Translated from Radex Rundschau, no. 6, pp. 257-260, 1951. Work presented here was carried out in the Research Laboratory of the Austrian-American Magnesite Co., Radentheiu.
1. Crystals, Magnesia - Energy - Germany
2. Magnesia - Grain size - Distribution - Germany
3. AERE Lib/Trans 564.

Researches into the aging of hydrated oxides, by A. Lottermoser and Eckhard Lottermoser. Translated by R. S. Forsyth. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 42p photos, graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119303

Translated from Kolloid-Beihefte, vol. 37, (1933), pp. 2-39.
1. Oxides, Metallic - Aging - Germany 2. AERE Lib/Trans 521.

Ordnance Chemicals

Conductive adhesives for assembly of gimlet fuze primer components, by J. Parker and I. Silver. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1955. 14p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120873

Conductive adhesives for use in bonding primers and detonators in fuze bodies have been investigated. An adhesive formulation which approaches most closely the requirements of the application consists essentially of Epon VI resin modified with ninety parts of silver flake. Standard metal butt joints bonded with this adhesive showed shear strengths in the order of 6,000 psi and resistances of under one ohm. NAVORD 3878.

Thermal decomposition of nitroguanidine, by Jay L. Block. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1953. 43p photos, diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120787

The gaseous products of the thermal decomposition of nitroguanidine have been quantitatively analysed. Nitrous oxide, ammonia, water and some carbon dioxide were found. Various properties of the thermal decomposition have been determined, and a mechanism for decomposition proposed. The kinetic rate equation for the thermal decomposition of nitroguanidine has been determined. It appears that the nitroguanidine surface is poisoned by either gaseous or solid decomposition products. NAVORD 2705.

Analytical Chemistry

Determination of uranium by high-precision spectro-photometry, by A. Bacon and G. W. C. Milner. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 33p graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119328

1. Spectrophotometry, High-precision - Gt. Brit. 2. Uranium - Determination - Gt. Brit. 3. AERE C/R 1637.

Miscellaneous Chemicals

Studies on polydispersity and nucleation. Progress report no. 3 for the period Jun 1-Aug 31, 1950 under Contract no. AF 19(122)-124, by Victor K. La Mer. Columbia University. Central Aerosol Laboratories. Aug 1950. 29p diagr, graphs. Order from LC. Mi $2.70, ph $4.80. PB 122097

Contents: A. Abstract: The vapors of sulfuric acid-water mixtures as nucleating sources in aerosol formation, by V. K. La Mer and V. A. Gordieyeff. - B. Sulfuric acid as a nucleating source in aerosol formation, by V. K. La Mer and V. A. Gordieyeff. - C. Final progress report to Aug 31, 1950, by V. A. Gordieyeff. - D. Final progress report of work from May 15 to Aug 15, 1950, by S. S. Naistat (on construction of instruments for measuring particle size). - E. Final progress report to Aug 1, 1950 by Pierre R. Gendron (on improvements on monodisperse generators and some preliminary experiments on theory of formation). - F. Final progress report from Mar 20 to Aug 31, 1950, by Daniel R. Oldfield (on construction, operation and maintenance of three improved La Mer-Sinclair monodisperse generators to be used in differential sedimentation method for analyzing polydisperse mixtures. For 2d, 4th-6th reports see PB 117364, 117366, 116291, 112422.

ELECTRICAL MACHINERY

Communication Equipment

Bell system nationwide operator toll dialing system, by C. K. Chappuis. U. S. Air Force. Air Research and Development Command. Rome Air Development Center. Griffiss Air Force Base, Rome, N. Y. Nov 1955. 22p maps, tables. Order from LC. Mi $2.70, ph $4.80. PB 120007

Described in the report are the toll trunking system, toll switching system, and the system numbering plan which enable any operator to dial any telephone in the United States or Canada through automatic facilities. Applicability of this system to air defense requirements is emphasized since the network is so designed that any long distance call is virtually assured immediate completion so far as the toll switching facilities are concerned. AF RADC TN 55-361.

Electronics

Basic data of electrical discharges, by Sanborn C. Brown and W. P. Allis. Massachusetts Institute of Technology. Research Laboratory of Electronics. Jun 1954. 83f graphs, tables. Order from LC. Mi $4.80, enl pr $15.30. PB 122094

Discusses potential energies of atoms, collision probabilities, surface phenomena (secondary emission and ion conversions), motions of electrons and ions, production and decay of ionization, breakdown, electron energy loss, and discharge characteristics. Dept. of the Army project 3-99-10-022. Signal Corps project 8-102 B-0. MIT RLE TR 283. Contract DA 36-039-sc-100.

Determination of interference levels, by Ward E. Bower. U. S. Naval Research Laboratory. Jun 1939. 24p diagr, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120438

The problem consisted in determining relative levels at which interfering radio-code and radiophone signals would just preclude 100 per cent intelligibility of the desired phone or code signal. Also it is desirable to determine at what level a code signal may be copied 100 per cent intelligible by free-hand or pencil copy, and to what level the signal must be raised when a standard Navy typewriter is substituted for the "still" or pencil copy. NRL R 1537.

Diffraction by a circular aperture at high frequencies, by Harold Levine. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Sep 1955. 64p diagrs, graph, tables. Order from LC. Mi $3.90, ph $10.80. PB 120332

An investigation is made, based on integral equations and variational principles, for the purpose of determining the first correction to the plane wave geometrical transmission cross-section of a circular aperture in an infinite plane screen. The correction is sensitive to the screen boundary condition, and in this paper details are given, for normal incidence only, for the acoustically 'soft' screen, where the wave function vanishes. NYU RR EM-84. AF CRC TN 55-797. Contract AF 19(122)-42.

Diffraction by an infinite grating of arbitrary cylinders, by Samuel N. Karp. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Oct 1955. 29p diagr. Order from LC. Mi $2.70, ph $4.80. PB 120331

Diffraction by an infinite grating of congruent arbitrarily shaped conducting cylinders is shown to be related to single scattering by an isolated typical grating element, even when all interactions among elements are taken into account. Fourier amplitides of the diffracted field are given in terms of differential scattering amplitudes of the single cylinder. The solution is approximate, holding under the assumption of large spacing as compared with both wavelength and cylinder dimensions. NYU RR EM-85. AF CRC TN 55-799. Contract AF 19(122)-42.

Improved design for audio-type exponential attenuators, by Jack Bacon. Ohio State University. Dept. of Electrical Engineering. Antenna Laboratory, Columbus, Ohio. Mar 1955. 16p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120299

This paper is concerned with minimizing the positional error occurring in exponentially tapered ladder networks as a result of a linear approximation existing between taps. The improvements have particular significance in the design of continuously variable attenuators of the type used, for example, in logarithmic recording servos. Report 486-38. OSURF Proj 486, Report no. 38. Contract 18(600)-85.

Line-of-sight wave propagation in a randomly inhomogeneous medium, by B. M. Fannin. Texas. University. Electrical Engineering Research Laboratory. Dec 1955. 29p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120279

Theoretical calculations have been made, using the single-scattering approximation, for propagation in a randomly inhomogeneous medium in which the deviations of refractive index from the mean is small. The statistical quantities considered were the variance, correlation function, and power spectrum for the phase and relative amplitude of the field at a point and their difference at two points. Report no. 6-13. AF CRC TN 55-969. Contract AF 19(604)-494.

Method of wavelength measurement for the centimeter and millimeter wave regions, by M. B. Rapport, E. W. Ward and W. W. Balwanz. U. S. Naval Research Laboratory. Apr 1956. 16p photo, diagrs, graphs, table. Order from OTS. 50 cents. PB 111909

The method utilizes an intermediate medium interposed between a source and a receptor antenna to create an interference phenomenon which provides a measure of the free-space (air) wavelength. The results are independent of the antenna patterns and Fresnel zone effects and are not appreciably affected by the orientation or position of the interposed medium. Results accurate to approximately one percent were readily attained, and greater accuracy is possible with refinements of instrumentation. NRL R 4492.

On the errors in linear interpolation in R and Θ coordinates, by Roy C. Spencer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Antenna Laboratory, Cambridge, Mass. Aug 1953. 18f diagrs, graph. Order from LC. Mi $2.40, enl pr $4.80. PB 120790

1. Prediction - Theory 2. Equations, Linear 3. Linear systems - Computing methods.

On the exchange interaction of valency and inner electrons in crystals (the (s-d) exchange model of the transition metals), by S. V. Vonsovskii and E. A. Turov. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 12p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119308

Translated from Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki, Vol. 24, no. 4, pp. 419-428, 1953.
1. Electrons - Interactions - Russia 2. AERE Lib/Trans 547.

Optimization of a nonsaturating, single transistor flip-flop, by Richard K. Gerlach and Duane O. Miles. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Nov 1955. 33p diagrs, graphs, table. Order from LC. Mi $3, ph $6.30. PB 120238

This is a static analysis of the operating criteria, and the methods by which these operating criteria can be best met for (1) the broadest range of transistor parameters and (2) a practical variation of circuit component values from the ideal. The mathematical treatment is general, so that the final results can be used for the design of circuits with any reasonable range of transistor parameters and reasonable emitter current swing. The final equations are solved as an example, and a brief discussion is given of the practical aspects of transforming the solution into a circuit. An appendix is included which treats in greater detail certain aspects of the mathematical development. Dept. of the Army project no. 5B0306002. Ordnance research and development project no. TB3-0007. APG BRL M 945.

Phase difference variations in 9350 megacycle radio signals arriving at spaced antennas (Pikes Peak to Garden of the Gods), by A. P. Deam. Texas. University. Electrical Engineering Research Laboratory. Oct 1955. 23p graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 120333

Continuous recordings of relative phase difference occurring between radio signals arriving at spaced antennas have been made. The transmitter was a klystron oscillator emitting continuous waves and located on a line normal to and bisecting the receiving base line. A range of 10 miles was employed with the transmitter elevated approximately 9^{0} above the receivers. Recorded data were reduced and are presented in the form of phase difference spectra, RMS values, and normalized cross correlations with phase difference recordings at another frequency taken simultaneously. Report no. 6-11 under Contract AF 19(604)-494. AF CRC TN 55-771.

Prebreakdown current and noise in insulators, by D. A. Powers and T. Sula. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Jan 1955. 15p diagr, graphs. Order from LC. Mi $2.40, ph $3.30. PB 122143

The authors have investigated the origin of the noise and its frequency spectrum in detail. They find that most of the noise is due to surface discharges and can be eliminated by special types of electrodes and careful experimentation. The remaining noise has a frequency spectrum with the highest amplitudes at very low frequencies. This noise apparently originates from fluctuations in the field emission current. Printed in Journal of Applied Physics, vol. 26, p. 1244, 1955. Reprints available from MIT LIR. MIT LIR TR 91. Contract N5 ori-07801, NR 017-421.

Prediction of future position of a target track on four types of displays, by W. D. Garvey, W. B. Knowles, and E. P. Newlin. U. S. Naval Research Laboratory. Apr 1956. 11p photos, diagrs, graphs, tables. Order from OTS. 50 cents. PB 111808

The purpose of the present experiment is to measure the accuracy of prediction in terms of deviations in range and bearing between estimated and actual position plots on four different displays: (1) linear PPI, (2) non-linear PPI, (3) linear B-scan, and (4) non-linear B-scan. Thirty-two naval enlisted men, none of whom had any previous experience with radar tracking, received a total of sixty

problems. The results of this experiment differ drastically from a previous study conducted to answer the same practical question. An attempt is made to clarify the source of discrepancies between the two studies. NRL R 4721.

Some considerations of wide aperture localizer antennas, by Chester B. Watts, Jr. U. S. Civil Aeronautics Administration. Technical Development and Education Center, Indianapolis, Ind. Jan 1952. 13p diagrs, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 122140

The development of two possible types of wide aperture localizer antennas is outlined, both of which are based on the use of waveguide-fed slot elements. It is concluded that the methods described have promise and should receive experimental investigation. CAA TDR 155.

Technical data for Armed Services preferred list of electron tubes. U. S. Armed Services Electro-Standards Agency, Fort Monmouth, N. J. Mar 1956. 145p drawings, diagrs, graphs. Order from LC. Mi $7.20, ph $22.80. PB 120132

1. Tubes, Electron - Specifications 2. ASESA 52-6.

Test of model (RDH) panoramic search equipment, by R. W. Zeek. U. S. Naval Research Laboratory. Jun 1946. 50p photos, graphs. Order from LC. Mi $3.30, ph $7.80. PB 120777

1. RDH (Radar search equipment) 2. Radar, Panoramic - Tests 3. Radar, Search - Tests 4. NRL R 2875.

Test of model TDP-1 Loran transmitting equipment, by Ellsworth R. Rosen. U. S. Naval Research Laboratory. Jun 1946. 76p photos, tables. Order from LC. Mi $4.50, ph $12.30. PB 120775

TDP-1 (Loran equipment) 2. Loran - Transmitters - Tests 3. NRL R 2862.

Test of preliminary model TBS testing equipment, by J. M. Coe. U. S. Naval Research Laboratory. Jan 1939. 105p photos, graphs, tables. Order from LC. Mi $5.70, ph $16.80. PB 120458

Theory of switching. Bell Laboratories report. Harvard University. Computation Laboratory. Order separate parts described below from LC, giving PB number of each part ordered.

No. 6, covering the period 1 Jan-1 Apr 1954. Apr 1954. 169p diagrs, tables. Mi $7.50, ph $24.30. PB 122115

In this thesis a new mathematical model for the representation of switching networks is introduced based on the notion that the circuit element between two terminals i and j may be taken as an element a_{ij} of a matrix. The matrices for certain elementary circuits are examined in detail, canonical form matrices are developed and various transformations which leave the outputs of the circuit invariant are described. Finally, a sequence of theorems is presented, leading to a theoretical solution of the problem of designing a network using the minimum number of relay contacts while producing a prescribed output. Contains Bibliography of 47 pages. Bell Laboratories' report no. 6.

No. 8. May 1954. 163p diagrs, tables. Mi $7.50, ph $24.30. PB 122116

This thesis attacks one aspect of this problem of design of sequential circuits through the medium of a detailed study of a certain class of relay circuits operated in a sequential manner; to them is applied the term rattle circuits. The term rattle functions is applied to the switching functions which occur as their outputs. Bell Laboratories' report no. 8.

Theory of the development of the channel in the spark discharge, by S. I. Drabkina. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Translated by J. B. Sykes. 1955. 13p graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119961

Translated from Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki, Vol. 21, no. 4, pp. 473-483, 1951.
1. Discharges, Electric - Theory - Russia
2. Discharges, Electric - Development - Russia
3. AERE Lib/Trans 621.

Travelling wave systems with different particle and wave velocities, by L. B. Mullett. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1955. 11p diagrs, graph. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119311

1. Waves, Traveling - Acceleration - Gt. Brit.
2. AERE GP/R 1742.

Type test of TD-4/APS-3 target discriminator, by I. W. Fuller and M. L. Burnett. U. S. Naval Research Laboratory. Jun 1946. 11p photo, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120776

1. TD-4/APS-3 (Target detector) 2. Targets - Detection equipment 3. Antennas, Radar - Mounts 4. NRL R 2867.

Volscan, air traffic control central, AN/GSN-3, the solution to the air traffic control phase of return-to-base, by Ben F. Greene, Phyllis M. Barnes

and James H. Mollenauer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. RF Components Laboratory, Cambridge, Mass. Nov 1953. 25f photos, diagrs. Order from LC. Mi $2.70, enl pr $6.30. PB 120788

1. AN/GSN-3 (Air traffic control central) 2. Airports-Air traffic control 3. Airports - Control towers - Transmitters.

Wide-band directivity of receiving arrays, by James J. Faran and Robert Hills, Jr. Harvard University. Acoustics Research Laboratory. May 1953. 29f diagrs, table. Order from LC. Mi $2.70, enl pr $6.30. PB 120800

Method of maximizing the directional gain of a receiving array (heretofore useful only at a single frequency) is extended to the case of operation at a finite bandwidth. It is shown how to design for maximum effective gain in the presence of noise which might arise within the individual transducers or their preamplifiers. Some necessary noise-field correlations are computed, and numerical examples are included to show the effects of bandwidth and self-noise on the over-all gain for reception which can be achieved. Appendix: Computation of background noise cross-correlations in an isotropic noise field. HU ARL TM 31. Contract N5 ori-76, T. O. X, NR 384-903.

Generators, Motors, Transmission

Study of voltage-regulating systems for aircraft alternating-current generators. Part I: Analogue-computer study and specifications, by Henry C. Bourne, Jr. and David C. White. Massachusetts Institute of Technology. Servomechanisms Laboratory. Aug 1954. 119p diagrs (1 fold), graphs, table. Order from LC. Mi $6, ph $18.30. PB 120268

Dynamic representations of the components of aircraft a-c generator-regulator systems are derived. These components include the a-c generator, d-c exciter, and magnetic amplifier regulator. An integrated system composed of these components is studied both analytically and on an analog computer. New methods are developed in Part II to cope analytically with the basic nonlinearities of the aircraft generator-regulator system. Appropriate parts of this detailed mathematical quasi-linerization technique are included in Part I when they are directly applicable to the particular system under study. As a result of this analytical and computer study, specifications are written for the components of the system. For the purpose of these specifications the system is divided into two groups, (1) the exciter-alternator and (2) the regulator. Performance specifications are written using frequency-response transfer functions. Steady-state and power specifications are defined and quantitative values are tentatively suggested. AF WADC TR 54-298, Part 1. Contract AF 33(616)-2190.

FOOD AND KINDRED PRODUCTS

Dry whole milk. Symposium sponsored by the Quartermaster Food and Container Institute for the Armed Forces, Quartermaster Research and Development Command, U. S. Army Quartermaster Corps, at the Oriental Institute, University of Chicago, Sep 22, 23, 1954. Edited by J. M. McIntire, W. K. Stone, and Martin S. Peterson. National Research Council. Advisory Board on Quartermaster Research and Development. Committee on Foods. Jul 1955. 198p photos, drawing, graphs, tables. Order from the Quartermaster Food and Container Institute for the Armed Forces, 1819 W. Pershing Road, Chicago 9, Ill. PB 120355

Cover-title: Dry milk products. Contents: I. Introduction--the problem in review. Importance of dry milk products to the Armed Forces, by John D. Peterman. - Purpose and scope of the symposium, by Donald K. Tressler. - Review of the quartermaster contract research work on flavor aspects of dry whole milk, by Junius M. McIntire. - II. Chemical aspects. Chemistry of dry milk products during processing and storage, by Robert Jenness and S. T. Coulter. - Chemical changes in fat and lactose of milk products with special reference to flavor, by Stuart Patton, Philip G. Keeney, and Frank E. Potter. - Physical-chemical properties of the proteins in skimmilk powder, by K. K. Fox, Q. Van Winkle, I. A. Gould, and W. I. Slatter. - III. Manufacturing and processing. Development and manufacture of dry cream products, by O. F. Garrett. - Fundamentals of spray drying, by W. R. Marshall, Jr. - IV. Dispersibility. Review of research on the dispersibility of dry whole milk at the Quartermaster Food and Container Institute, by W. K. Stone. - Influence of processing procedures on the dispersing properties of dry milks, by U. S. Ashworth. - Methods for improving the dispersibility of dry whole milk, by H. A. Hollender. - Effect of processing on particle size of dry milk and relationship to dispersibility, by A. M. Swanson. - V. Final considerations. Production of powdered milk products and the inspection service, by M. C. Lockwood. - Current status of nonfat dry milk solids, by R. J. Remaley. - Summary of discussions, by S. T. Coulter.

Safety of artificial sweeteners for use in foods, report by the Food Protection Committee of the Food and Nutrition Board. National Research Council. Division of Biology and Agriculture. Food and Nutrition Board. Aug 1955. 13p. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. Free. PB 120303

Use potentials, toxicology, evaluation and conclusions are given. Bibliography attached. NRC 386.

FUELS AND LUBRICANTS

Corrosion preventive additives, by M. Feinleib and H. T. Francis. Armour Research Foundation, Chicago, Ill. Jul 1952. 22p diagrs, graphs, tables. Order from OTS. 75 cents. PB 121072

A reproducible test for ball bearing corrosion in instrument oils has been developed. Test conditions, including brass-to-52100 steel coupling, simulate field conditions, and correlation with service performance has been good. AF TR 6591. Contract AF 33(038)-9202.

Determining the effect of pressure, humidity, temperature, fuel/air ratio on the explosiveness of the atmosphere, by Donald J. Babicz. Cook Electric Co. Inland Testing Laboratories, Chicago, Ill. Dec 1955. 37p photos, graphs, table. Order from OTS. $1. PB 121134

The effects of varying fuel to air ratio, humidity, air velocity, pressure, and ambient temperature on the explosiveness of the atmosphere are presented in this report. The fuels selected for study were aviation gasoline 100/130, commercial butane, and commercial propane. Using the ignition temperature of a mixture as a criterion, the optimum explosive atmosphere for each of the three fuels was determined. Ignition temperatures were recorded by means of a chormel-alumel thermocouple that was heli-arc welded to the sheath of a cartridge heater used as a source of ignition. Project 1111, Task 11117. Work performed between Oct 1954 and Nov 1955. AF WADC TR 56-5. Contract AF 33(616)-2691

High temperature project. Final report, by Joseph B. Conway and Aristid V. Grosse. Temple University. Research Institute, Philadelphia, Pa. Jul 1954. 65p photos, drawings, diagr, graphs, tables. Order from OTS. $1.75. PB 121024

Although it is not possible to predict with any accuracy which metal will produce the highest temperature during combustion, it would seem that this distinction belongs to either lanthanum, zirconium or thorium. Of these zirconium is most readily available and because of its extreme reactivity with oxygen, tests were made to burn this metal and thus produce one of the highest temperatures obtainable at atmospheric pressure by a metal combustion. Final report under Contract no. N9 onr-87301. Includes Oxy-zirconium torch and flame, by W. L. Doyle.

O trenil honosho smazanneekh tverdeekh tel i o glavneekh rezooltatakh opeetov nad vnootrennim i vneshnim treniem nekotoreekh smazeevauschikh zhidkostey (Concerning the friction of solid bodies and principal results of experiments relative to the internal and external friction of lubricants), by N. Petrov. Translated by Josef Rysan and edited by F. A. Raven. Jan 1956. 9p. Order from LC. Mi $1.80, ph $1.80. PB 120326

Translated from Zhurnal Russkoe Fiziko-Khimicheskoe Obshchestvo, vol. 16, 1884, pp. 14-20.
1. Lubricants - Friction - Theory - Russia
2. NAVSHIPS T 600 3. STS 229.

Storage stability of gasoline, 1937-1938, by Dan Fore, Jr. U. S. Naval Research Laboratory. Oct 1938. 18p diagr, tables. Order from LC. Mi $2.40, ph $3.30. PB 120380

A study of the storage stability of several high test aviation gasolines in current or prospective use by the Navy has been made. Under conditions approximating, though probably more severe than, the storage practices aboard ship, the gasolines examined have been found perfectly stable for a period of six months. NRL Problem no. P-47. NRL P-1481.

Vapor-phase oxidation and spontaneous ignition: Correlation and effect of variables, by Donald E. Swarts and Milton Orchin. U. S. National Advisory Committee for Aeronautics. Apr 1956. 32p photos, drawing, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120410

The spontaneous ignition temperatures of eight structurally different hydrocarbons were determined and correlated with the behavior of the same hydrocarbons toward vapor-phase oxidation. Since good correlation of the two phenomena was obtained, it is likely that similar oxidative mechanisms are operative in both. NACA TN 3579.

INSTRUMENTS

Adiabatic compressor built by Autoclave Engineers, Inc., by J. M. Wack and Donna Price. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1951. 33p photos, drawings, diagr, graph. Order from LC. Mi $3, ph $6.30. PB 120868

It was found that the compressor, as supplied, was too poorly machined to be put into operation. The necessary modifications are explained and these are now underway. All available information on materials, manufacture, and predicted behavior of

the compressor has been collected in this report. It is intended to serve as a guide in testing the apparatus and in making subsequent modifications. NAVORD 2219.

Application of the steel plate dent test to the quality control of the Mark 63 detonator, by W. M. Slie and R. H. Stresau. U. S. Naval Ordnance Laboratory, White Oak, Md. Dec 1954. 19p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120872

The output of a number of different production samples of the Mark 63 detonator was measured in a dent test under several conditions of external confinement. The results indicated that the small scale plate dent test can be used as a measure of output quality control for the Mark 63 detonator. NAVORD 3879.

Cable-type rocket launcher, by C. L. Pettengill. U. S. Naval Ordnance Laboratory, White Oak, Md. Nov 1952. 44p photos, drawings, diagrs, graph, tables. Order from LC. Mi $3.30, ph $7.80. PB 120805

A cable-type rocket launcher for tests requiring great accuracy at target impact has been built at the Naval Ordnance Laboratory Experimental Facility, Hiwassee Dam, North Carolina. The present launcher uses a 1285-foot length of high strength, 1 3/8-inch diameter "locked coil" aerial tramway cable secured to anchors of reinforced concrete. A tension of 150,000 pounds is applied by hydraulic cylinders. The starting end is higher than the release end in order to provide horizontal flight at the release point. The rocket is suspended from the cable by two pairs of shoes. Each pair is held together by explosive bolt. The rocket may be released at any preselected point along the cable by electrically initiating the explosive bolts to throw off the shoes. Fin stabilized rockets up to the 5.0-inch HVAR have been successfully fired and released at velocities up to about 1100 feet per second. NAVORD 2690.

Computer components fellowship no. 347. Quarterly report no. 8, Jul 11, 1952 to Oct 10, 1952 under Contract no. CLN AF 19/122/-376, by J. R. Bowman, F. A. Schwertz, A. Milch, B. Moffat, R. T. Steinback, Leo W. Nickel and B. O. Marshall, Jr. Mellon Institute of Industrial Research, Pittsburgh, Pa. Nov 1952. 114f photos, diagrs, graphs. Crder from LC. Mi $6, enl pr $19.80. PB 120804

Report is in 7 sections: I. Nonlinear resistors in logical switching circuits. II. Components, inertia, and information. III. Analogue calculator for trinomial roots. IV. Bistable optical elements. V. Saturable reactors as gates. VI. Nonlinear semiconductor resistors. VII. Morphology of electronic circuits. For 1st-7th, 9th-12th and final reports under this Contract see PB 109935-109936, 108646, 109937-109940, 119729, 110761, 110930, 112801, 113794.

Development of alarm, carbon monoxide, automatic, E23 (u), by H. E. Moore and R. G. Schwartz. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Aug 1955. 34p photos, drawing, diagr, graph. Order from OTS. $1. PB 111846

The alarm is required by the Army Field Forces for use by small units in the Arctic, where danger from carbon monoxide arises from the use of heaters in poorly ventilated structures. Project 4-08-06-014. CC CRL R 228.

Electromagnetic pumps and flowmeters, by M. Greenhill. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119971

1. Pumps, Electromagnetic - Bibliography - Gt. Brit. 2. Meters, Flow - Bibliography - Gt. Brit. 3. AERE Inf/Bib. 93 (3rd edition).

Ferroelectric applications to digital computers, by Ramon Alonso and Thomas Conley. U. S. Aberdeen Proving Ground. Ballistics Research Laboratories, Aberdeen, Md. Dec 1955. 36p diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 120239

This report is a survey of ferroelectric applications to digital computers. It discusses both the storage and switching properties of ferroelectric materials. Storage of information utilizing the principle of a coincident voltage matrix is explained, and methods of preparing such a matrix with ferroelectrics is described. Finally, the utilization of ferroelectric material for multi-position switching is presented. Dept. of the Army project no. 5B0306002. Ordnance Research and Development project no. TB3-0007. APG BRL M 902.

Fire control research. Princeton University, Princeton, N. J. NDRC Div 7. Order separate parts described below from LC, giving PB number of each part ordered.

Report no. 10: Mikhalyi comparative test. Revised. Jul 1942. 33p diagrs, graphs, tables. Mi $3, ph $7.80. PB 120795

A series of performance tests were conducted to compare the accuracy of the M1 stereoscopic height finder with that of an experimental ortho-pseudo (Mihalyi) height finder in ranging on fixed ground targets and moving aerial targets. CSRD 9352.

Report no. 12: Comparative test of coincidence and steroscopic heightfinders, by Merrill M.

Flood. Revised. Aug 1942. 21f diagrs, graphs, tables. Mi $2.70, enl pr $6.30. PB 120792

Performance tests were conducted to obtain a comparison of the accuracy of the American stereoscopic height finder M1 with that of the British coincidence-type height finders FQ25 and UB7, in ranging on fixed ground targets, moving naval targets and moving aerial targets. OSRD 9265.

Report no. 12: Comparison of instrument types, subject 1: Coincidence vs. stereo height-finders. Feb 1942. 14f graphs, tables. Mi $2.40, enl pr $4.80. PB 120791

This investigation was conducted in order to determine the advantages and disadvantages of coincidence type heightfinders as compared with stereo. On the basis of the tests here analyzed, the two types of instruments are comparable in their results as far as overall performance is concerned. Neither type can be rated ahead of the other, although particular phases of performance show some differences. OSRD 9262.

Report no. 12: Comparison of instrument types, subject 2: Mihalyi vs. stereo height-finders. n.d. 41f graphs, tables. Mi $3.30, enl pr $9.30. PB 120796

1. Fire control equipment - Tests 2. Range-finders, Stereoscopic - Tests 3. M1-187 (Rangefinder) 4. M1-172 (Rangefinder) 5. OSRD 9353.

Report no. 13: Description of instruments for use in the selection of stereoscopic range finder operators, by Henry A. Imus. May 1942. 5f. Mi $1.80, enl pr $3.30. PB 120793

1. Rangefinder operators - Testing equipment 2. Rangefinder operators - Selection and training 3. OSRD 9290.

Guide to instrumentation literature, by W. G. Brombacher, Julian F. Smith and Lyman M. Van der Pyl. U. S. National Bureau of Standards. Dec 1955. 160p. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $1. PB 122145

Revision of "Instrumentation literature and its uses", by Julian F. Smith of the Library of Congress (PB 108952) and Sources of information on instruments", issued by the American Society of Mechanical Engineers in 1945. Contains over 1200 references, including abstract journals, bibliographies, 660 books on technology, directories of manufacturers, guides to and indexes of technical literature, dissertations, patents and specifications. Revision of PB 108952 and "Sources of information on instruments", by American Society of Mechanical Engineers. NBS C 567.

High-threshold scintillation detector of neutrons, by P. S. Baranov and V. I. Gol'danskii. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p diagr, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119963

Translated from Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, Vol. 28, no. 5, pp. 621-623, 1955.
1. Detectors, Scintillation - Russia 2. Radiation counters - Russia 3. AERE Lib/Trans 587.

Investigation of a simple autocorrelator, by J. L. Jones and C. E. Kelly. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1952. 18p photos, diagrs, graph. Order from LC. Mi $2.40, ph $3.30. PB 120810

A simple autocorrelator for detecting sinusoids in noise has been constructed and studied. It does not appear that this type of correlator offers significant advantages over conventional filtering techniques for such applications. NAVORD 2279.

Investigation of tape materials for use in the MK 11 (Aiken) calculator, by I. Silver. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1952. 16p tables. Order from LC. Mi $2.40, ph $3.30. PB 120809

Plastic, paper and aluminum foil materials were investigated for use in the Mk 11 (Aiken) calculator. The present paper tape designated as Armite is unsatisfactory due to poor dimensional stability. No satisfactory material was found which would meet all the requirements set forth by the Naval Proving Ground. Recommendation was made for the support of a program in industry for the development of a vinyl or aluminum foil tape. NAVORD 2284.

Investigations on an evaporative condenser, parts 1 and 2, by R. Coers. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 22p diagr, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119988

Translated from Kaltetechnik, vol. 7, no. 2, pp. 34-38, and vol. 7, no. 3, pp. 71-74, 1955.
1. Condensers, Evaporative - Germany 2. AERE Lib/Trans 592.

Method for the measurement of the flow of air by means of series of electric sparks, by H. J. Bomelburg. Maryland. University. Institute for Fluid Dynamics and Applied Mathematics. Feb 1955. 43p photos, diagrs. Order from LC. Mi $3.30, ph $7.80. PB 120300

A technique has been developed in which series of electric sparks of low current are used to render

visible the flow of air. Sparks traversing the air at very high frequency render visible successive displacement profiles; their photographic records furnish a large amount of detailed information. The method is applicable to both subsonic and supersonic flow. The technique has been investigated in detail. Its merits and limitations are appraised as compared with other methods. Technical note BN-68. AF OSR TN 56-38. Contract AF 18(600)-893.

Monthly progress report, by Herman H. Goldstine. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N. J. Project no. TB3-9538. Contract DA-36-034-ORD-1646. Order separate parts described below from LC, giving PB number of each part ordered.

Nov 1955. 15p diagrs, table. Mi $2.40, ph $3.30. PB 120321

For other reports on this contract see PB 118659-118660, 119072, 120319.
1. Computers, Electronic - Coding 2. Computers, Electronic - Components.

Jan 1956. 5p table. Mi $1.80, ph $1.80. PB 120319

MPR 1-56.
1. Computers, Electronic 2. Algorithms.

NCL narrow-band multichannel analyzer (XL-3B), by C. E. Kelly and A. Z. Robinson. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1953. 18p photo, diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120784

An instrument has been developed for making a narrow-band analysis of complex signals over the frequency range between 1 cps and 200 cps. This instrument is of the heterodyne type and is capable of simultaneously analyzing six separate frequency bands each having an effective band-width of about 3 cps. This report describes the analyzer and includes instructions for its operation. NAVORD 2804.

On-line automatic data reduction tunnel E-1 gas dynamics facility, by C. L. Hall and R. E. Klautsch. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Apr 1956. 27p photos, drawing, diagrs, graphs, table. Order from OTS. 75 cents. PB 111810

This report describes an automatic data reduction system which is capable of measuring, scanning, computing, and presenting the results of a wind tunnel test in one continuous operation. Operating modes of the components of the system are described as they apply to an actual test in Tunnel E-1 of the Gas Dynamics Facility. The versatility, reliability, and efficiency of the system and its components, which are commercially available equipment, are discussed. Possible refinements in the system are pointed out. Contract AF 40-(600)-620. AF AEDC TN-56-4.

Power atomizer, by William J. McNeil. U. S. Air Force. Air Research and Development Center. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1953. 11p photos. Order from OTS. 50 cents. PB 121083

Development of an insecticide spray machine commonly known as the power atomizer is described. It is expected that this equipment will greatly facilitate the control of insecticides at ground installations. AF WADC TR 53-448.

Pulse tube for acoustic measurements, by W. S. Cramer and K. S. Bonwit. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1952. 33p photos, drawings, diagrs, graphs. Order from LC. Mi $3, ph $6.30. PB 120811

An apparatus was constructed with which the acoustic impedance and other acoustic properties of a sample in water can be measured at normal incidence. The specific acoustic impedance of the surface is calculated from the reduction in amplitude and change in phase experienced by the sound wave on reflection. These measurements are made electronically by a null method by comparing the properties of the unknown sample with a control sample which is an essentially perfect reflector. NAVORD 2257.

Rate measurement of marine chronometers, gimbal-mounted chronometer watches, and non-gimbal navigating watches under controlled climatic conditions. Part IV: Rate-pressure and rate-temperature trends, by H. M. Suski. U. S. Naval Research Laboratory. Apr 1956. 33p graphs, tables. Order from OTS. $1. PB 121008

The method of selecting the data and factors relating to their presentation are discussed. Since the data contain appreciable measuring errors, only the trend of the characteristics is considered significant and the results are presented graphically as unconnected plotted points. A general conclusion concerning the variation of rate with pressure has been reached for five timepieces. While no general rate-temperature trend was found (this is attributed to temperature compensation of the balance system) the following results were obtained: (1) For the three marine chronometers, the rate decreases as temperature increases; (2) for one gimbal-mounted chronometer watch and for one non-gimbal navigating watch, the rate increases as the temperature increases. Use is made of data obtained by following the elaborate rating procedure developed by the observatory at Neuchatel to indicate that both of the rate-temperature trends ob-

tained experimentally can be expected in practice. For Parts 1-3 see PB 118513-118514, 111774. NRL R 4716.

Some recent developments of self-recording gages for measuring the intensity of mechanical shock, by Irwin Vigness. U. S. Naval Research Laboratory. May 1956. 20p photos, diagrs, graphs. Order from OTS. 50 cents. PB 121043

Several self-recording mechanical gages, useful for specific types of measurements of shock intensity, have been recently developed. These include impulsive-velocity gages which indicate the magnitude of a velocity change, various types of gages that indicate only if a certain magnitude of velocity change has been exceeded, and a modified version of the reed gage. The performances of the gages, when subjected to a step-velocity change, are given. NRL R 4724.

Use of an inhomogeneous magnetic field to increase the resolution of the mass-spectrometer, by N. E. Alekseevski, G. P. Prudkovskii, G. I. Kosourov and S. I. Filimonov. Translated by V. Beak. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 6p diagrs, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119962

Translated from Doklady Akademii Nauk S.S.S.R., Vol. 100, no. 2, pp. 229-232, 1955.
1. Mass spectrometers - Uses - Russia 2. AERE Lib/Trans 629.

Vernier timer, by John P. O'Connor. U. S. Naval Research Laboratory. Apr 1956. 16p photos, diagrs (1 fold), graph, table. Order from OTS. 50 cents. PB 121009

This timer uses magnetic disc recording and is capable of measuring in true time the position of a shaft when its position is proportional to time. A prototype of the timer, using two magnetic discs was built. This timer measured time intervals from 10 milliseconds to 20,000 milliseconds with an accuracy largely dependent on the constancy of the frequency supply to the disc drive motor. Data presented indicate that the timer, when used with a constant frequency supply, is accurate to within ± 1 millisecond. NRL R 4741.

LUMBER AND WOOD PRODUCTS

Container size and pallet pattern selection criteria for use on 40" X 48" pallets, by J. P. Akrep and S. Stambler. U. S. Naval Supply Research and Development Facility, Bayonne, N. J. Dec 1955. 140p drawings, tables. Order from OTS. $3. PB 111845

A method of container size and pallet pattern selection is developed for the 40" x 48" pallet through graphical construction of a selection chart system. This constitutes a new and simplified method of presentation of the large amount of data involved in comparative areas, dimensions and efficiencies to permit improved area and cube utilization on the 40" x 48" pallet. In accordance with good materials handling practice, overhang is permitted to a maximum of 43" x 52". Six master selection charts are presented covering 108 patterns in 20,000 sizes with area efficiencies greater than 80%. These will permit the selection of the most efficient pattern for any given container size, and will also allow selection of the most efficient container size when alternates are permissible. Project NT 003-016(r), sub-project SE 54-97, Selectivity of container sizes, Engineering report no. 2.5001 (Report no. 2). See also PB 111998.

MEDICAL RESEARCH AND PRACTICE

Inadequacy of visual search in avoiding mid-air collisions, by George O. Emerson, Robert D. Metcalf and Harold C. Glover. U. S. Air Force, Air Research and Development Command, Wright Air Development Center, Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1956. 11p diagrs, graphs. Order from OTS. 50 cents. PB 121130

Visual search is inadequate for the certain detection of other aircraft in sufficient time to avoid collision. Monocular and binocular blind areas as produced by aircraft structural members are described and illustrated. Graphs are presented which illustrate comparative danger from various azimuthal positions expressed as a function of time to collision. Suggestions on improving and augmenting visual search are included. Project no. 7157. AF WADC TN 56-145.

Relationship of methionine to brain metabolism, by Jay S. Roth. Hahnemann Medical College, Division of Biological Chemistry, Philadelphia, Pa. n.d. 3p. Order from LC. Mi $1.80, ph $1.80. PB 119919

Final report. Date is 1954 or later.
1. Medical research 2. Brain - Metabolism 3. Methionine - Physiological effects 4. Contract Nonr-211(00), Final report.

Response of the human skull to mechanical vibrations, by Ernst K. Franke. U. S. Air Force, Air Research and Development Command, Wright Air Development Center, Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1954. 23p diagrs, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120271

This report describes measurements of the mechanical impedance and of the resonance frequencies of the human skull. The measurements were made in the frequency range from 200 to 1,600 cps, the skull being excited to vibration by means of an electrodynamically driven piston with a small contact area. Data were obtained from living subjects, a dry skull preparation and a human cadaver. The modulus of elasticity of skull bone, calculated from the resonance frequency of the skull, is consistent with the value obtained by static measuring methods. The propagation velocity of bending waves in the skull bones, also calculated from the resonance frequency, agrees satisfactorily with the experimental determined propagation velocity. It is shown, finally, that a vibrating spherical shell is a suitable model for the skull and describes its vibration patterns with good approximation. Project no. 7210, Task no. 71704. AF WADC TR 54-24.

METALS AND METAL PRODUCTS

Borides as tool materials. Final report, Apr 1, 1951 to Dec 31, 1953, under Contract Nonr-295-(02), by Ira Binder and Robert Steinitz. American Electro Metal Corporation, Yonkers, N. Y. Oct 1954. 89p photos, drawing, diagrs, graphs, tables. Order from OTS. $2.25. PB 111749

Boride base materials were developed suitable for manufacture of cutting tool tips. Principal work has been based on 90% Mo_2B plus 10% Ni. Additional work is still necessary to develop any of the borides for making commercially usable cutting tools. Section XII, Reprints of publications, not included. For reports under previous Contract see PB 117522 and PB 118675.

Chemistry of ruthenium, by J. M. Fletcher and F. S. Martin. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Aug 1955. 7p table. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119322

Paper P/437 presented at Geneva Conference with minor modifications.
1. Ruthenium - Chemical properties - Gt. Brit.
2. AERE C/M 256.

Corrosion studies in high-temperature water by a hydrogen effusion method, by M. C. Bloom, M. Krulfeld, W. A. Fraser and P. N. Vlannes. U. S. Naval Research Laboratory. Mar 1956. 12p photos, diagr, graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 119527

Data obtained by application of the method to ferrous systems include the corrosion rate of low-carbon steel in distilled water at 600°F, the effect of raising the pH in such systems, the effect of thermal shock and of temperature rise on the corrosion rate, and the effect of heat treatment of the metal on the corrosion rate. Comparison is made between the corrosion rates of low-carbon steel and stainless steel and some data are included on the effect of the wall thickness of low-carbon steel specimens on the rate of hydrogen effusion resulting from corrosion at 600°F. NRL R 4711.

Creep behavior of magnesium and magnesium alloy single crystals at room and elevated temperatures. Quarterly progress report no. 3 for the period 1 Jan-31 Mar 1955 under Contract no. DA-30-115-ORD-549, by W. F. Sheely and R. R. Nash. Rensselaer Polytechnic Institute. Dept. of Metallurgical Engineering, Troy, N. Y. Mar 1955. 8p. Order from LC. Mi $1.80, ph $1.80. PB 120323

Equipment for the shaping and stressing of spherical crystals to shapes suitable for testing in shear was designed and constructed. Preliminary experience with the acid machining apparatus indicated suitable operation in the preparation of a cylindrical shear-type specimen from a spherical single crystal.

Design properties of high-strength steels in the presence of stress-concentrations. Effects of a number of variables on the mechanical properties of aircraft high-strength steels, by G. Sachs, B. B. Muvdi, and E. P. Klier. Syracuse University, Syracuse, N. Y. Jan 1956. 130p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.25. PB 121155

This report presents a large amount of test data on a number of low-alloy steels, heat treated to strength values between 210,000 and 290,000 psi. The tests performed were the following: a) Tension, which yielded information concerning the tensile and yield strengths as well as the ductility (reduction of area and elongation) of the steels studied. b) Notch-tension, from which the notch strength, notch-strength ratio and information on the notch sensitivity of the steels were obtained. c) Impact, which permitted evaluation of impact characteristics of the steels at various test temperatures, as well as some information regarding the transition from impact-ductile to impact-brittle behavior. d) Fatigue and notch-fatigue, from which the endurance limit and the fatigue strength at various numbers of cycles were obtained for both smooth and notched specimens. e) Stress-rupture, which permitted investigating the behavior of high-strength steels under sustained load conditions. In addition, hardness measurements as well as metallographic studies were performed on all steels. Project 7360. Covers work performed between Mar 1954 and Jun 1955. AF WADC TR 55-103. Contract AF 33(616)-2362.

Dimensioning of risers for nodular iron castings, by H. F. Bishop and C. G. Ackerlind. U. S.

Naval Research Laboratory. Apr 1956. 22p photos, drawings, diagrs, graphs, tables. Order from OTS. 75 cents. PB 121091

Riser requirements for hypoeutectic iron castings are a function of the carbon equivalent and of casting geometry. Casting geometry is described by a shape factor expressed in terms of the length, width, and thickness of the casting (SF= (L+W)/T); empirical graphs are used to interrelate riser volume, casting volume, shape factor, and carbon equivalent. Procedures are described also for the risering of complex, hypoeutectic iron castings consisting of joined sections of different thicknesses and geometries. Riser requirements for hypereutectic irons are found to be independent of casting configuration and are a function only of casting volume. The relation of the solidification characteristics of the two types of irons to risering requirements is discussed. NRL R 4737.

Effect of holes in a crystal lattice on the electrical resistance of a metal, by B. G. Lazarev and O. N. Ovcharenko. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 6p graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119960

Translated from Doklady Akedemii Nauk S.S.S.R., Vol. 100, no. 5, pp. 875-8, 1955.
1. Crystals - Lattices - Defects - Russia
2. Crystals - Lattices - Theory - Russia
3. Metals - Electrical properties - Russia
3. AERE Lib/Trans 602.

Effect of prior creep on the mechanical properties of Alclad 2024-T3 aluminum alloy sheet, by Clark E. Beck. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1955. 34p photo, drawings, graphs, tables. Order from OTS. $1. PB 121250

Tensile tests at room temperature and at 500°F. were conducted on Alclad 2024-T3 (formerly designated as clad 24S-T3) aluminum alloy sheet specimens after they had been subjected to various amounts of creep deformation. There was a notable decrease in ultimate tensile and tensile yield strength values as the amount of prior creep deformation increased. This was particularly true for those specimens in which the prior deformation had been obtained in 90 hours. Project no. 7360, Task no. 73605. AF WADC TN 55-49.

Effect of size and notch sensitivity on fatigue characteristics of two metallic materials, by H. F. Moore. Illinois. University. Talbot Materials Testing Laboratory, Urbana, Ill. Apr 1946. 160p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $7.50, ph $24.30. PB 120371

This document includes two final reports by the University of Illinois on the fatigue characteristics of two metallic materials. Part I deals with data in reversed bending (rotating cantilever beam) and in reversed torsion of a high strength aluminum alloy 75S-T6 (old designation 75S-T) prepared on Contract No. W-33-038-ac-9225(14082). Part II deals with data in reversed bending (rotating cantilever beam) of S.A.E. 4340 alloy steel heat-treated to 160,000 psi, prepared on Contract No. W33-ac-14712(16159). Comparison is also made with data from previous work on S.A.E. 4130 steel heat treated to 147,000 psi. AF TR 5726. AF TSEAM M 5407.

Evaluation of high strength weldable titanium-base alloys, by C. Robert Lillie. Armour Research Foundation, Chicago, Ill. Dec 1955. 62p photos, drawing, diagrs, graphs, tables. Order from OTS. $1.75. PB 121069

Six alloy compositions were investigated to determine their suitability as high strength weldable sheet to be used at elevated temperature. These compositions were: Ti-4 Al-2 V, Ti-4 Al-4 V, Ti-6 Al-2 V, Ti-6 Al-4 V, Ti-7 Al-4 V and Ti-6 Al. Tensile tests were performed on these alloys, after suitable heat treatment, both at room temperature and at 700° and 900°F, and in both welded and unwelded conditions. Bend tests were employed as a measure of the formability of the material. All bend tests were carried out at room temperature on heat treated material in both welded and unwelded conditions. Metallographic structure of the alloys after various heat treatments was correlated with the mechanical properties. Project no. 7351, Task no. 73510. Covers work during the period Jan 1954 through Nov 1954, under Contract AF 33(616)-2321. AF WADC TR 54-547.

Interaction of precipitation, solid-solution content, and creep in magnesium-aluminum alloys. Dow Chemical Co., Midland, Mich. Jun 1954. 24p photos, graphs. Order from LC. Mi $2.70, ph $4.80. PB 120269

Microstructural studies of a Mg-10.3% Al alloy showed that discontinuous precipitation during aging multiplies the grain boundary area available for easy deformation in elevated temperature creep. An increase of strain rate for a 6.2% Al alloy at 400F, where precipitation and creep are concurrent, caused an increase in the volume percent discontinuously precipitated at the completion of the process. Aluminum in solid solution was found to have little or no strengthening effect when deformation in creep is localized at the grain boundaries. The relatively poor elevated temperature creep resistance of heat-treated alloys of the Mg-Al-Zn type was explained in these structural terms. AF WADC TR 54-295. Contract AF 33-(038)-16655.

Investigation of metallurgical and mechanical effects in the development of hot tearing, by H. F. Bishop, C. G. Ackerlind, and W. S. Pellini. U. S. Naval Research Laboratory. Apr 1956. 21p photos, diagrs, graphs, tables. Order from OTS. 75 cents. Also available from LC on microcard. $1.80. PB 121049

This paper is aimed at developing further information concerning the role of strain rate, as established by the contracting characteristics of the solidifying metal, on the development of hot cracking in castings. Three types of tests were conducted on a variety of alloys in order to establish a correlation between their observed hot-tearing characteristics and their metallurgical and mechanical characteristics which lead to hot tearing. NRL R 4730.

Investigation of modified 12% chromium steels for intermediate temperature applications, by Paul Shahinian and Joseph R. Lane. U. S. Naval Research Laboratory. Apr 1956. 26p photos, graphs, tables. Order from OTS. 75 cents. Also available from LC on microcard. $1.80. PB 121226

An investigation was made of the creep-rupture properties of 12% chromium steels modified by additions of molybdenum, vanadium, columbium, titanium, and carbon. Tests were conducted at 1100° and 1200° F for materials in various conditions, including: as cast; cast and homogenized; forged and normalized; and forged, normalized, and tempered. The room-temperature tensile properties of the alloys were also determined. One of the modifications, containing 1.0% molybdenum and 0.7% vanadium, possesses creep-rupture properties which compare favorably with those of the best columbium-free alloys developed thus far. NRL R 4731.

Investigation of nickel base precipitation hardening alloys, by David I. Sinizer. National Research Corp., Cambridge, Mass. Sep 1955. 45p drawing, graphs, tables. Order from OTS. $1.25. PB 111791

The present investigation had for its purpose an extension of our knowledge of the stress-rupture behavior of vacuum-melted, nickel-base precipitation-hardening alloys of the Waspaloy type. Specifically, it was desired to determine the effect of varying titanium and aluminum content on the forgeability and stress-rupture properties of Waspaloy. Six heats were melted having the same nominal Waspaloy composition with the exception of titanium and aluminum contents. Specimens of all these six heats were forged to bars, machined to stress-rupture specimens, heat treated, and tested to failure in stress-rupture. Project 7351. Covers period of work from 10 Aug 1953 to 1 Feb 1955 under Contract AF 33(616)-2144. AF WADC TR 55-218.

Joining of molybdenum, by W. M. Platte. Westinghouse Research Laboratories, East Pittsburgh, Pa. Nov 1955. 130p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.25. PB 111833

A study of the factors which influence the physical properties, especially the ductility, of molybdenum welds is discussed in this report. Welds in both arc-cast and vacuum sintered molybdenum made in commercially pure inert atmospheres and in contaminated inert atmospheres are examined. The effects of several deoxidizers on the welding properties of vacuum sintered molybdenum are examined. The specific requirements of deoxidizing agents are established and it is shown that titanium between 0.2 and 0.5% meets these requirements. The effects of interstitial elements, oxygen, nitrogen and carbon, on the weld properties of arc-cast molybdenum have been examined. Project no. 1252, Task no. 73012. Covers work conducted from Sep 1953 to Sep 1954 under Contract AF 18(600)-114. AF WADC TR 54-17, Part 2.

Lightweight steel invasion tubing, 6 5/8-inch flush OD, by L. L. Stark and Ned R. Daniels. U. S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Ft. Belvoir, Va. Jul 1954. 67p photos, drawings, tables. Order from LC. Mi $3.90, ph $10.80. PB 120324

This report covers engineering and service tests of 6 5/8-inch flush, outside-diameter, lightweight steel tubing which was developed to provide a greater fuel throughput capacity than that obtainable with the 6-inch outside-diameter, lightweight steel invasion tubing used in the military pipeline systems of World War II. The new design tubing has approximately 25 percent greater capacity with a net increase in weight of only 6 percent and no increase in cubage. Project 8-53-03-001. ERDL R 1363.

Mechanism of plastic flow in titanium at low and high temperatures, by F. D. Rosi, F. C. Perkins, and L. L. Seigle. Sylvania Electric Products, Inc., New Gardens, N. Y. Jun 1954. 38p photos, diagrs, tables. Order from LC. Mi $3, ph $6.30. PB 120270

An investigation was made of the mechanism of plastic flow in coarse-grained specimens of both sponge and iodide titanium extended at low (196°C) and high (500° and 800°C) temperatures. The crystallographic habit of the predominant twin type is temperature dependent, and deformation by twinning increases as the temperature of testing is lowered. Kink bands were not observed at -196°C, and rarely at the high temperature. AF WADC TR 54-127. Contract AF 33(616)-422.

Notch ductility of malleable irons, by G. A. Sandoz, N. C. Howells, H. F. Bishop and W. S. Pellini. U. S. Naval Research Laboratory. May 1956.

22p photos, graphs, tables. Order from OTS. 75 cents. PB 121033

The notch ductility of malleable irons was investigated for conditions entailing the presence of sharp notches. The drop-weight test was used to establish nil ductility transition (NDT) temperatures and the explosion crack-starter test was applied to establish the resistance to fracture propagation at temperatures above the NDT temperature. The results obtained from these tests were correlated with Charpy V notch tests. Similar findings have been reported by the authors for the case of nodular irons and for steels. NRL R 4725.

On the kinetics of the isothermal martensite transformation close to absolute zero, by B. Ya. Lyubov and Yu. A. Osip'yan. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Sep 1955. 6p graph. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119301

Translated from Doklady Akademii Nauk S.S.S.R., Vol. 101, no. 5, pp. 853-6, 1955.
1. Steel - Transformation - Russia 2. Martensite - Formation - Theory - Russia 3. AERE Lib/ Trans 585.

Powder fabrication of aluminum alloys, by J. B. Hess and R. S. Mateer. Kaiser Aluminum and Chemical Corp. Dept. of Metallurgical Research, Oakland, Calif. Sep 1955. 29p photos, graphs, tables. Order from CTS. 75 cents. Also available from LC on microcard. $1.80. PB 121138

A fabrication method, combining powder metallurgy techniques and conventional extrusion, was developed for the purpose of alloying aluminum with refractory compounds and other unusual constituents. Additions of B_4C, αAl_2O_3, TiC, SiC, ZrO_2, WC, TlAl, $MnAl_6$, $FeAl_3$, Mo, Cr, Si and Cu were made to a base of commercial atomized aluminum powders, and the resulting alloy properties were determined. Current attempts to improve these tensile properties by utilizing prealloyed powders as bases for the refractory additions are still in preliminary stages of study. Project no. 7351, Task no. 73513. Covers work conducted from Dec 1953 to Dec 1954 under Contract AF 33(616)-2296. AF WADC TR 54-590.

Properties of magnesium and magnesium alloy single crystals at room and other temperatures. Quarterly status report no. 3 for the period 1 Jan-31 Mar 1955 under Contract no. DA-30-115-ORD-546, by A. E. Bibb, Jr. and R. R. Nash. Rensselaer Polytechnic Institute. Dept. of Metallurgical Engineering, Troy, N. Y. Apr 1955. 7p table. Order from LC. Mi $1.80, ph $1.80. PB 120322

The possibility of producing magnesium-thorium alloy single crystals up to at least 4.0% thorium was demonstrated.

Scaling of titanium and titanium alloys, by H. J. Siegel, R. C. Duncan, Jr., and R. E. Swift. Kentucky. University. Dept. of Mining and Metallurgical Engineering. Nov 1955. 110p photos, graphs, tables. Order from OTS. $2.75. PB 121219

A preliminary study of the scaling characteristics in air of experimentally produced titanium and titanium-base alloys was conducted at temperatures of 1200°, 1400°, 1600°, and 1800°F (650°, 760°, 870°, 980°C) in the time range of approximately four to three hundred hours. A total of thirty-six titanium-base alloys were scaled at each of these temperatures. Scales formed on all of the alloys at 1600°F were studied using x-ray diffraction. Scaling propensity of titanium-base alloys relative to unalloyed titanium were evaluated on the basis of weight gain with time. Isothermal transitions were noted for many of the alloys but were not studied in detail. An investigation of gaseous penetration in the commercial materials RC-70, RC-130A, and RC-130B was made at 1600° and 1800°F. Project 7351, Task no. 73510. Covers period of work from Jan 1, 1954 to Jun 1, 1955 under Contract AF 18(600)-60. AF WADC TR 54-109, Part 2.

Strain energy release rates for fractures caused by wedge action, by A. A. Wells. U. S. Naval Research Laboratory. Mar 1956. 12p diagrs, graphs. Order from OTS. 50 cents. Also available from LC on microcard. $1.80. PB 111975

It is shown in this report that, in such a test, the strain energy release rates from the wedge force and static stress may be combined so as to give a minimum when the crack has a given length. The minimum values so obtained for the Standard Oil Development test results correspond reasonably well with minimum surface energy values determined by independent experiment for similar steels and temperatures. In addition, it is shown that the applied tensile stresses to maintain a given strain energy release rate are decreased by decreasing the specimen width and increasing the wedging force by amounts which bear comparison with the S. O. D. test results. Thus the suggestion is made that the Robertson and S. C. D. tests are controlled, at least below the transition temperature, by strain release rates. NRL R 4705.

Über die korrosion unter schutzfilmen. 3. mitteilung über die korrosion schutzfilmbedeckter metalle (On the corrosion under protective films. Third report on the corrosion of metals covered with a protective film), by J. K. Wirth. Translated by F. A. Raven. Nov 1955. 27p photos, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 120328

It was attempted in this study to determine the ohmic resistances of the boundary layers on the one hand, and those of the paint films per se on the other. Translated from Korrosion und metall-

schutz, vol. 16, no. 11, 1940, pp. 331-338. Previous report issued in Korrosion und metallschutz, vol. 16, 1940, pp. 69-76. NAVSHIPS T 596. STS 224.

METEOROLOGY AND CLIMATOLOGY

Application of information theory and discriminant function analysis to weather forecasting and forecast verification, by J. Leith Holloway, Jr. and Max A. Woodbury. Pennsylvania. University. Institute for Cooperative Research. Feb 1955. 90p diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 120150

An index of forecast skill, called the "information ratio", has been derived from information theory. This ratio is zero when the forecasts show no skill and is unity when the forecasts are perfect. The statistical distribution of this ratio is discussed. Technical report no. 1 of the Meteorological Statistics Project, Contract Nonr-551(07), NR 082-113.

Cloud physics research. Technical note no. 1: Measurement systems for atmospheric electricity observations, by Donald R. Fitzgerald. Chicago. University. Dept. of Meteorology. May 1955. 72p photos, diagrs, tables. Order from LC. Mi $4.50, ph $12.30. PB 120148

This report contains a description of the technical characteristics of several types of electrostatic field measuring systems developed by the Cloud Physics Project for use in the study of the relationship between cloud electricity and precipitation development. Systems suitable for ground and in-flight measurements of these relationships are described. Contract AF 33(038)-25913. Contract AF 19(604)-618.

Faraday effect in the earth's ionosphere with special reference to polarization measurements of solar radio emission, by Takeo Hatanaka. Cornell University. School of Electrical Engineering, Ithaca, N. Y. Aug 1955. 20p diagrs, graphs. Order from LC. Mi $2.40, ph $3.30. PB 120281

Scientific report no. 5 under Contract no. AF 19-(604)-73. Cornell University Research report EE 257.
1. Solar radiation - Polarization 2. Radio waves - Propagation - Ionosphere 3. Ionosphere - Electromagnetic effects 4. Contract AF 19(604)-73 5. AF CRC TN 55-886.

Frequency studies of the hourly mean values of the magnitude F of the earth's magnetic field at Agincourt during the period 1946-1951, by B. A. Griffith, J. A. Jacobs and B. Sachs. Toronto. University. Dept. of Physics. Aug 1955. 48p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120330

Hourly mean values of the magnitude F of the earth's magnetic field at Agincourt have been calculated from corresponding mean values of the horizontal and vertical components H and Z. The data used are those for the period 1946 to 1951, inclusive, a period which begins soon after a sun-spot minimum and extends past a sun-spot maximum. Trend lines for the hourly mean values of F have also been plotted and the number of large departures of F from these trend lines are summarised and discussed. Scientific report no. 1 under Contract no. AF 19(604)-761. AF CRC TN 55-868.

Izmerenie gorizontal'noĭ sostavliaiushcheĭ elektricheskogo poliâ v atmosfere (Measuring the horizontal component of the atmospheric-electric field), by I. M. Imîânitov. Translated by Michael M. Dane and David Kraus. Jun 1955. 25p photo, diagrs, graphs, tables. Order from LC. Mi $2.70, ph $4.80. PB 119623

This article discusses the discovery of a horizontal component of the atmospheric electric field near the ground. A method is given for separating the components of this field. Measurement results are presented that show an unexpectedly high value for the horizontal component of the field, which reaches several volts per centimeter and sometimes exceeds the value of the vertical component. From Izvestiia Akademii Nauk S.S.S.R., Ser. geograf. i geofiz., Vol. 13, no. 4, pp. 320-30, 1949. Contract AF 19(604)-1364.

Premiers résultats obtenus au cours du printemps 1953 (First results obtained during the spring of 1953), by L. Demon and others. Translated by Edith Kulstein. Jun 1955. 6p diagr. Order from LC. Mi $1.80, ph $1.80. PB 119622

From Journal des Recherches du C.N.R.S., Vol. 24, pp. 126-127, 1953.
1. Laboratory equipment - Sahara Desert, Algeria 2. Electrometers, Symmetrical field - Design - Algeria 3. Contract AF 19(604)-1364.

Progress report no. 12 for the period 1 Feb-30 Apr 1951 under Contract no. W19-122AC-9. Colorado. University. Dept. of Physics, Upper Air Laboratory, Boulder, Colo. Apr 1951. 38p photos, diagr. Order from LC. Mi $3, ph $6.30. PB 119894

The flight of the Uniaxial Pointing Control on Nov. 2, 1950 has been studied and analyzed. Data is meager due to failure of the telemetering commutator. Results indicated that the control worked as designed from start until blowoff. For reports no. 1, 10-11, 13 see PB 115169, 113279-113281.

State of the development and application of hydrocyclones, by F. J. Fontein. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 10p photos, diagrs, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119955

Translated from Chemie-Ingenieur-Technik, Vol. 27, no. 4 (Supplement), pp. 190-2, Apr 1955. Presented at a meeting of the V.D.I. Committee for dust technology, 23d Apr 1954 in Bad Kissingen.
1. Dust technology - Research - Holland 2. Cyclones, Development - Holland 3. AERE Lib/Trans 617.

"Sviaz' radiatsionnykh i elektricheskikh kharakteristik atmosfery v Tashkente" (Connection between the radiational and electrical characteristics of the atmosphere in Tashkent), by D. I. Kulagin. Translated by Michael M. Dane and David Kraus. Jun 1955. 15p tables. Order from LC. Mi $2.40, ph $3.30. PB 119621

From Izvestiia Akademii Nauk S.S.S.R., seriia geofizizicheskaia, Vol. 2, pp. 75-80, 1952.
1. Atmosphere - Electricity - Tashkent, Russia 2. Contract AF 19(604)-1364.

Temperature and humidity test, by J. H. McIvor and N. E. Beach. U. S. Picatinny Arsenal, Dover, N. J. Oct 1955. 12p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 120136

Aluminum caps, with various sizes of orifice, were assembled to booster cups. The samples were subjected to three different temperature cycles, varying from +160°F with 95% relative humidity to -65°F. Moisture entering a sample was absorbed by violet paper and measured by the change in weight of the paper. PA TR 1800.

Variation of the 27-day recurrence period for low-latitude aurorae, by A. B. Meinel, B. J. Negaard and J. W. Chamberlain. Chicago. University. Yerkes Observatory, Williams Bay, Wis. Jul 1955. 8p graphs. Order from LC. Mi $1.80, ph $1.80. PB 119526

An earlier statistical study of the recurrence periods of low-latitude aurorae has been extended in an attempt to ascertain any variations in the solar-rotation (27-day) recurrence period through the solar cycle. The data are divided according to minimum and maximum years and according to the first and second halves of the solar cycles. Some changes during the cycle are suggested by the data, but an insufficient number of observations are available to make conclusions definite. Contract AF 19(122)-480, Tech. report no. 14.

MINERALS AND MINERAL PRODUCTS

Luminescence of uranyl glasses and crystals, by A. N. Sevchenko. Translated by V. Beak. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 20p photos, diagrs, graphs, table. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119986

Translated from Izvestiya Akad. Nauk, S.S.S.R. ser fiz., vol. 13, no. 1, pp. 188-202, 1949.
1. Glass, Uranyl - Photoluminescence - Russia 2. Crystals, Uranyl - Photoluminescence - Russia 3. Uranyl salts - Luminescence - Russia 4. AERE Lib/Trans 549.

On geometrical methods of quantitative mineralogical analysis of rocks, by A. A. Galgolev. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 57p photo, drawings, diagrs, graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119967

Translated from Trudy Instituta Prikladnoi Mineralogii, no. 59, 1933.
1. Atomic power - Research - Russia 2. Rocks - Analysis - Russia 3. AERE Lib/Trans 567.

Refractory materials for use in high temperature areas of aircraft, by Norman R. Thielke. Pennsylvania State University, State College, Pa. Jul 1955. 97p photos, diagrs, graphs, tables. Order from OTS. $2.50. PB 121046

The fracture patterns of TiC-cermet stator blades which had been exposed to a simulated service test and the microstructures of these materials were investigated. The oxidation behavior of cermets was studied theoretically and experimentally. The ternary system TiC-TaC-NbC has been investigated, using sintering temperatures up to 2530°C. The sintering and shrinking behavior of oxide mixtures simulating the oxides which are being formed during the oxidation of carbide cermets has been studied in search for compositions which form a dense and adherent oxide film. An analysis of the applicability of thermal shock tests has been made. A static method to measure the two thermal stress resistance factors R and R' is described and measurements on porous and dense titania, steatite, cordierite and β-spodumene bodies are presented. Project no. 7350. Report of work during the period 16 Jun 1952 to 1 Jan 1955 under Contract AF 33-(616)-139. Earlier report issued as WADC TR 53-9, Parts 1-2. AF WADC TR 54-467.

ORDNANCE AND ACCESSORIES

Electron microscope examination of the surfaces of M-8 propellant for bacterial contamination, by Seymour M. Kaye. U. S. Picatinny Arsenal, Samuel Feltman Ammunition Laboratories, Dover, N. J. Sep 1955. 29p photos, table. Order from LC. Mi $2.70, ph $4.80. PB 119945

Experimental procedure, discussion, results and historical background are given. Electron micrographs attached. Ordnance project WD OAC 47001420-19-99105. PA TR 2210.

Feasibility of fluorography at 2 MeV for the inspection of melt-loaded ammunition, by D. T. O'Connor, D. Polansky and C. Woltz. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1953. 71p photos, diagr, graphs, tables. Order from LC. Mi $4.50, ph $12.30. PB 120782

Evidence is offered to support the contention that fluorescent screens are capable of a highly discriminating brightness-response at 2 MeV X-ray excitation, even though this energy is far above their peak response energy. The fact that lead filters are highly effective in removing scattered radiation to which such materials are more responsive makes it possible to achieve penetrameter sensitivities of the order of two percent with fluorography at 2 MeV. If this quality level is adequate, fluorography at higher energies combined with rapid automatic processing offers an economical approach to the problem of the inspection of melt-loaded ammunition. NAVORD 2863.

Flight test of the E74 (M116) fire bomb to determine the need for safety clips on arming wires (U), by R. B. Wheeler and D. Schneck. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Oct 1955. 14p photos, table. Order from LC. Mi $2.40, ph $3.30. PB 120325

This report describes flight tests with an F47, F80 and F86E aircraft to determine the need for the safety clip on the arming wire used with the M173 fuze of the fire bomb. Flights without protective nose and tail bomb fairings showed that only 1-in. maximum retraction of the arming wire from the fuze occurred at the highest test speed of 520 knots (600 m.p.h.), achieved with the F86E aircraft. No arming-wire retraction was noted with the F47 and F80 at speeds up to 500 m.p.h. Project 4-04-16-022-01 (4-04-16-006). CC CRL R 335.

Sampling procedures and tables for inspection by variables. U. S. Bureau of Ordnance. May 1952. 33p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 122092

This standard was prepared to meet a growing need for the use of standard sampling plans for inspection by variables in the field of ordnance inspection and evaluation, especially for the acceptance inspection of product procured. NAVORD OS TD 80.

PERSONNEL APTITUDE TESTING

Comparative factor analyses of three radio operator training criteria, by Gabriel Friedman, Walter E. Hempel, Jr. and Howard M. Detter. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Jan 1955. 30p tables. Order from LC. Mi $3, ph $6.30. PB 120306

This study was aimed at analyzing grades in the Radio Operator General Technical School. The findings add to a growing body of information describing a successful radio operator as judged by the school. These results strengthen evidence from previous research that the Airman Classification Battery should be augmented by an additional test which calls upon aural rather than visual abilities. AF PTRC TN 55-2.

Comparison of performance in USAF Officer Candidate School of candidates selected by two screening procedures, by Ernest C. Tupes. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Tex. Jul 1955. 37p graphs, tables. Order from LC. Mi $3, ph $6.30. PB 120243

The Officer Candidate School (OCS) selection procedures operative in 1951 left much to be desired from an administrative standpoint. Furthermore, a study conducted by the Human Resources Research Center (since integrated into the Air Force Personnel and Training Research Center) demonstrated that these screening procedures were not improving selection in terms of OCS grades or subsequent on-the-job efficiency ratings. The procedures were changed early in 1952, and this report compares the results of selection by the revised procedures with selection by those previously used. Its purpose is to determine to what extent the average OCS performance of candidates selected under the new procedures exceeded the average performance of candidates selected under the old. AF PTRC TN 55-16.

Fire control research. Princeton University, Princeton, N. J. NDRC Div 7. Order separate

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parts described below from LC, giving PB number of each part ordered.

Report no. 14 and 14a: Manual for use in the selection of stereoscopic range finder operators, by Henry A. Imus. Jun-Dec 1942. 66f diagrs. Mi $3.90, enl pr $12.30. PB 120794

This report presents a detailed manual of procedure for the selection of candidates to be trained as stereoscopic observers. The equipment and procedures described have been developed and used at Fort Monroe and Fort Eustace. In the practical application of procedures set forth in Report no. 14, certain changes were found to be advisable. These are in the supplementary report. Accompanied by supplement (Report no. 14a). OSRD 9346.

Report no. 15: Validation and standardization of tests used in the selection of stereoscopic rangefinder operators. Jul 1942. 68f graphs, tables. Mi $3.90, enl pr $12.30. PB 120797

Presents the findings of a study of tests which may be used for the selection of candidates for training as stereoscopic observers. It includes an analysis of some of the more important tests which did not show predictive value as well as those which were finally recommended for use by the Services. OSRD 9436.

Report no. 18: Training stereoscopic height finder observers. The relative effectiveness of the M1 height finder, the M2 trainer and the Eastman trainer. Jul 1942. 48f photos, diagrs, graphs, tables. Mi $3.30, enl pr $9.30. PB 120798

This report presents evidence that stereoscopic height finder observers can be trained effectively on instruments such as the M2 trainer or the Eastman trainer. OSRD 9432.

Human pilot, by R. G. E. Epple. Northrop Aircraft, Inc. Dept. of Mechanical Design. Servomechanisms Section. Aug 1954. 166p drawing, diagrs, graphs, tables. Order from OTS. $4.25. PB 121073

This volume is intended to: (1) provide engineers who are responsible for the synthesis of flight control systems for piloted aircraft with a quantitative description of the characteristics of a human pilot viewed as a sensor and as an actuator; and (2) to present the approximate transfer functions which have been recently developed to describe human pilots engaged in simple tasks, and to present methods for simulating on an analog computer a pilot in a routine flying situation. Selected bibliography is appended. NAVAER AE-61-4 III.

PHOTOGRAPHIC AND OPTICAL GOODS

Part A. Forward angle scattering camera for the determination of particulate concentration of aerosols, by Victor K. La Mer and P. K. Lee. Part B. Investigation of particle size by differential settling, by Joseph Benedict and Guy G. Goyer. Columbia University. Central Aerosol Laboratories. Feb 1951. 39f photos, diagr, graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 122096

A forward angle scattering camera was constructed to photograph a confined aerosol stream of about 0.1 mm or smaller in thickness. This is described in Part A. Part B describes a new method of calculating particle size distribution of aerosols from settling data. Includes theory, limitations of method, modifications of apparatus, and experimental results. Progress report no. 5 for the period Dec 1, 1950-Feb 28, 1951 under Contract no. AF 19-(122)-164. Photos will not reproduce.

Ob odnom sposobe pulcheniia kratkovremennykh impul'sov sveta (Method of obtaining light impulses of short duration), by S. M. Raiskii and E. Ia. Pumper. Translated by David Kraus. Aug 1955. 8p diagr, graphs. Order from LC. Mi $1.80, ph $1.80. PB 119620

This article describes a simple mechanical apparatus that acts as an optical shutter for obtaining periodic groups of light impulses of short duration. The duration of the individual impulse may be as short as 10^{-7} sec. The time between two successive impulses is of that same order of magnitude. From Zhurnal tekhnicheskoi fiziki, Vol. 20, no. 7, pp. 822-24, 1950. Translated Oct 1952, revised Aug 1955, under Contract AF 19-(604)-1364.

Orientation of fixed camera to cover maximum length of straight line trajectory, by W. J. Berger. U. S. Air Force. Air Research and Development Command. Missile Test Center, Patrick Air Force Base, Fla. Aug 1955. 9p diagr. Order from LC. Mi $1.80, ph $1.80. PB 120308

This report develops formulae for the azimuth, elevation and roll angle-values such that a given fixed camera adjusted to these values will cover on its film-plate a maximum length of a given straight line trajectory measured from some specified point on the trajectory and onward along it. RCA reduction technical report no. 23. AF MTC TN 55-42.

Prospects for the use of impulse multigrid electron-optic tubes to record tracks of ionising particles in luminescent media, by G. A. Askar'yan. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 4p. Available for loan from AEC Depository Libraries. Photocopies at a fee.
PB 119956

Translated from Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, Vol. 28, no. 5, pp. 626-627, 1955.
1. Tubes, Electron - Optical properties - Russia 2. Trajectories, Particle - Recording equipment - Russia 3. AERE Lib/Trans 588.

Some remarks on the Guinier-type X-ray focusing camera, by R. W. M. D'Eye. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1954. 16p photos, diagrs, table. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 63 cents plus mailing handling.
PB 120138

S. O. code no. 70-674-1-78.
1. X-rays - Diffraction - Analysis - Equipment - Gt. Brit. 2. X-rays - Cameras - Gt. Brit. 3. AERE C/R 1524.

PHYSICS

General

Asymptotic expansions, by A. Erdelyi. California Institute of Technology. Dept. of Mathematics, Pasadena, Calif. 1955. 112p diagrs. Order from LC. Mi $6, ph $18.30.
PB 120149

Chapter I of this report contains a brief introduction to the general theory of asymptotic expansions, and serves as the theoretical background for the main part of the report. In Chapter II, the most important methods for the asymptotic expansion of functions defined by definite integrals are developed. Double and multiple integrals are not included. The remaining two chapters are devoted to the asymptotic expansion of functions defined by ordinary linear and homogeneous differential equations of the second order. Technical report no. 3 under Contract no. Nonr-220(11).

Dynamic response in three dimensions of linear elastic structures to independent motions of multiple supports, by Ralph E. Blake and George J. O'Hara. U. S. Naval Research Laboratory. May 1956. 23p diagr. Order from OTS. 75 cents.
PB 121094

The equations of response of three-dimensional linear elastic structures, having rotational and translational inertia, to dynamic loading by foundation motion, are derived by using only the mathematical methods which are familiar to most engineering graduates. The differential equations describing the response of the structure are seen to be similar to that of a simple oscillator subjected to similar foundation motions. Duhamel's integral is applied to determine the response to arbitrary motions in all directions of the multiple foundations. The case of stady-state vibrations due to continuous harmonic foundation motions in arbitrary directions for all the foundations as well as one foundation is investigated, and the equations of response derived. The general equation for stress at any point is shown, and an example of its use is followed through. NRL R 4739.

Experimental measurement of thermal conductivities, specific heats, and densities of metallic, transparent and protective materials. Battelle Memorial Institute, Columbus, Ohio. Contract AF 33(038)-2996. Project no. 1367, Task no. 61299. Order separate parts described below from OTS, giving PB number of each part ordered.

Part 1, by C. F. Lucks, H. B. Thompson, A. R. Smith, F. P. Curry, H. W. Deem, G. F. Bing. Feb 1951. 136p drawings, graphs, tables (part fold). $3.50.
PB 121289

Measurements have been made of the thermal conductivities of ten metals in the temperature range from about -160°C to about 950°C. Equipment has been assembled for measuring thermal conductivities of transparent solids, and preliminary measurements were made on one glass. An ice calorimeter and associated equipment has been assembled for measuring specific heats at high and low temperatures. The calorimeter has been calibrated electrically. Densities of ten metals, six glasses, and one plastic have been measured at 0°C and 50°C. Thermal-expansion measurements were made on the ten metals from -190°C to 1000°C. and from this, the densities in the same temperature range were calculated. A literature survey of methods and apparatus was carried out, and an extensive bibliography of the literature on thermal conductivity, thermal expansion, specific heat, and density was compiled. Appendix I. Bibliography on the thermal conductivity, specific heat, coefficient of thermal expansion, and density of certain materials. - Appendix II. Methods of calculating density and mean linear coefficient of thermal expansion. AF TR 6145, Part I.

Part II, by C. F. Lucks, G. F. Bing, J. Matolich, H. W. Deem and H. B. Thompson. Jul 1952. 39p diagrs, graphs, tables. $1.
PB 121285

Measurements of the thermal conductivity of Plexiglas from -200° to 80°C. and Pyrex from 0° to 500°C. are reported. Specific-heat measurements from 0° to 850°C. have been made on K-Monel and Inconel. Density meas-

urements on seven transparent solids from -200°C. to their upper service temperature are reported. Room-temperature density measurements on three protective coatings have been made. AF TR 6145, Part II.

Part III, by C. F. Lucks, J. Matolich, J. A. Van Velzer. Mar 1954. 78p diagrs, graphs, tables. $2. PB 121290

Measurements of the thermal conductivities of white (clear) plate glas, Solex 2808X plate glass, and Solex "S" plate glass from 150 to 450°C, and of clear fused silica (quartz) and Vycor from 150 to 800°C, are reported. AF TR 6145, Part III.

Flow on non-Newtonian fluids, correlation for the laminar, transition and turbulent flow regions. Technical report no. 1 for the period Nov 1953-Aug 1954 under Contract no. DA 36-034-ORD-1495, by A. B. Metzner and J. C. Reed. Delaware. University, Newark, Del. 1954. 29p graphs (part fold.). Order from LC. Mi $2.70, ph $4.80. PB 119916

A clear physical understanding of the mechanics of non-Newtonian flow was felt to be a necessary pre-requisite to an orderly development of mixing and heat transfer theory. As a result of this fluid mechanics work, all available data on flow of non-Newtonians in pipes have been correlated on the conventional friction factor - Reynolds number plot for Newtonian fluids. This correlation, theoretically rigorous in the laminar flow region, has been tested with data on 16 different non-Newtonian materials covering the 2.1×10^5 range of Reynolds numbers from 6.0×10^{-5} to 1.3×10^5. Dept. of the Army Project no.: 599-01-004. ORD Project no.: N22-001. OOR Project no.: 1074.

Fundamental studies of the adhesion of ice to solids, by Philip E. Berghausen, Robert J. Good, Gerard Kraus, Boris Podolsky and Walter Soller. Cincinnati. University. Applied Science Research Laboratory, Cincinnati, Ohio. Feb 1955. 185p diagrs, graphs, tables. Order from OTS. $4.75. PB 121047

A theory was developed by which, for the first time, the energy of adhesion between ice and a solid can be calculated directly from experimental data on heats of immersion and the integral heat of adsorption of water on the solids. The same theory also makes possible, for the first time, the calculation of the surface energy of solids, interfacial tensions and energies, and contact angles from data on the surface tensions and energies of the pure separate phases. A test of this theory using literature data on interfacial tensions and contact angles showed very good agreement between theory and experiment. A theory was developed by which the distribution of surface energies over a solid surface could be calculated from experimental data. Project no. 1111. AF WADC TR 55-44. Contract AF 33(616)-231.

General solution for one-dimensional nonsteady flow of a perfect gas, by W. H. Heybey. U. S. Naval Ordnance Laboratory, White Oak, Md. Sep 1951. 13p diagr. Order from LC. Mi $2.40, ph $3.30. PB 120869

A new general solution for one-dimensional nonsteady flow of a perfect gas is given involving integrals instead of differential quotients used exclusively heretofore. It is applied to two initial value problems. The formulas thus obtained are more convenient than those employed before in determining any particular solution. NAVORD 2210.

Linear programming, by Raoul J. Freeman. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1955. 22p diagr. Order from LC. Mi $2.70, ph $4.80. PB 120237

The mathematical linear programming problem is described, and a "practical" explanation of the simplex method is provided. A numerical example is worked out to illustrate the technique. Other methods of solution are surveyed, and their relation to machine computation discussed. The practicability of putting such problems on Ordvac is taken up. A description of the transportation problem and a logical flow chart for its solution is presented. An extensive bibliography covering the literature of the field is appended. Dept. of the Army project no. 5B0306002. Ordnance research and development project no. TB3-0007. APG BRL R 955.

Monge-Ampere partial differential equation $rt-s^2+\lambda^2=0$, by M. H. Martin. U. S. Naval Ordnance Laboratory, White Oak, Md. May 1951. 25p. Order from LC. Mi $2.70, ph $4.80. PB 120870

1. Equations, Differential 2. Shock waves - Theory 3. NAVORD 2201.

Note on linear ordinary differential equations, by Stephen P. Diliberto. Institute for Advanced Study, Princeton, N. J. Jun 1955. 4p. Order from LC. Mi $1.80, ph $1.80. PB 119939

Project no. R-354-10-60.
1. Equations, Differential - Linear 2. AF OSR TN 55-171 3. Contract AF 18(600)-1109.

On the theory of a non steady radiation field I, by V. V. Sobolev. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 14p tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119300

Translated from Astronomicheskii Zhurnal, Vol. 29, no. 4, pp. 406-417, 1952.
1. Astrophysics - Theory - Russia 2. Cosmic radiation - Theory - Russia 3. AERE Lib/Trans 610.

On the variational principles of elasticity and plasticity, by K. Washizu. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory. Mar 1955. 152p diagrs. Order from LC. Mi $7.50, ph $24.30.
PB 119782

Discusses variational principles in the solution of problems in elasticity and plasticity, including minimum potential energy, curvilinear coordinates, thin shells, deformation, initial stresses or strains, flow, thermal stresses, eigenvalue problems, component structures. Contract N5 ori-07833, NR 064-259. MIT ASRL TR 25-18.

Optimal test length for maximum absolute prediction, by Paul Horst. Washington. University, Seattle, Wash. Feb 1955. 19p tables. Order from LC. Mi $2.40, ph $3.30. PB 119580

The report is divided into 3 parts: I. The problem, II. numerical example, and III mathematical derivation. Computation tables and formulas are given. Contract Nonr-477(08).

Perforated sheets as a porous material for distributed suction and injection, by Robert E. Dannenberg, Bruno J. Gambucci, and James A. Weiberg. U. S. National Advisory Committee for Aeronautics. Apr 1956. 26p photos, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.
PB 120408

Measurements were made of the resistance to air flow through a series of perforated metal sheets with open areas ranging from less than 1 percent up to 41 percent. The use of punch-perforated sheets as a porous material for boundary-layer-control applications by means of distributed suction is discussed. NACA TN 3669.

Shift and shape of spectral lines, by R. B. Breene, Jr. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Sep 1955. 366p diagrs, graphs, tables. Order from OTS. $7.
PB 121241

The present work aims to gather together, organize, and present all major theoretical work which has been done on this problem through the year 1953. AF CRC TR 55-214. AF GRD P 41.

Solid-state model for detonations, by Ransom B. Parlin and J. Calvin Giddings. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jan 1955. 22p graphs, table. Order from LC. Mi $2.70, ph $4.80.
PB 120146

Calculated and observed detonation velocities of picric acid, PETN, Tetryl, and RDX explosives. Contract N7 onr-45103, Proj no. NR 051-192. UU ISRP TR 16.

Some aspects of three-dimensional boundary layer flows, by R. Sedney. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1955. 20p diagrs. Order from LC. Mi $2.40, ph $3.30. PB 120234

The equations for laminar boundary layer flow over a general surface in three-dimensions are analyzed in a normal coordinate system. The invariance properties of these equations are found using the concept of subtensors. The boundary layer equations are not tensor equations but subtensor equations. Conditions for the Cartesian form of the equations are given and a criterion for no secondary flow is found in terms of the geodesics of the body surface. The displacement effect of the boundary layer is also discussed. Dept. of the Army project no. 5B03-03-001. Ordnance research and development project no. TB3-0108. APG BRL R 962.

Stability in the numerical solution of initial value problems in partial differential equations, by R. P. Eddy. U. S. Naval Ordnance Laboratory, White Oak, Md. Oct 1949. 20f diagrs, table. Order from LC. Mi $2.40, enl pr $4.80.
PB 120545

This memorandum uses a new approach to derive simple criteria for determining whether a given procedure is stable. Although the present theory is based upon the theory of difference equations with constant coefficients, the results may be applied, with caution, to equations with variable coefficients provided the latter are approximately constant in a sufficiently small region. NOL M 10232.

Structure of magnetohydrodynamic shocks, by W. Marshall. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jul 1955. 40p graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee.
PB 119973

1. Shock waves - Mathematical analysis - Gt. Brit. 2. Shock waves - Structure - Gt. Brit. 3. AERE T/R 1718.

Study of finite difference approximations to a fourth order parabolic differential equation, by S. D. Conte and W. C. Royster. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1955. 20p. Order from LC. Mi $2.40, ph $3.30. PB 120235

This report is divided into two parts. In Part I the problem of the vibrating rod hinged at both ends is considered. The differential equation is replaced by two finite difference equations, one explicit and one implicit. The explicit represen-

tation is shown to be stable for values of the mesh ratio $r = \Delta t / (\Delta x)^2 \leq \frac{1}{2}$ while the implicit representation is shown to be stable for all values of the mesh ratio. Convergence of the solution of the finite difference equations to the solution of the differential equation is established in both cases. In Part II a computational procedure is set up for solving the implicit finite difference problem given in Part I. The numerical procedure described is applicable to the problem of the vibrating rod under any combination of boundary conditions. Dept. of the Army project no. 5B0306002. Ordnance research and development project no. TB3-0007. APG BRL R 959.

Study of the impact of a sphere on a semi-infinite slab for use in drop-tower analysis, by Alfred A. Loeb. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Jul 1955. 45p diagrs, graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 119942

The object of this study was to develop a theoretical solution of the problems involved in the impact of a sphere on a horizontal surface, applicable to the description of events which occur in a drop tower impact to test the ability of ammunition and ammunition components to endure set-back forces, and to compare these theoretical findings with the results of actual drop tower tests, modifying them to agree with such test results. Ordnance project TA1-2707. Dept. of the Army project 505-01-003Z. Appendix A. Explanation of symbols. - Appendix B. Generalized impact theory. - Appendix C. Drop spring test. PA TR 2173.

Study of the numerical solution of partial differential equations, by George G. O'Brien, Morton A. Hyman, and Sidney Kaplan. U. S. Naval Ordnance Laboratory, White Oak, Md. Jan 1949. 31f graphs, tables. Order from LC. Mi $3, enl pr $7.80. PB 120544

1. Equations, Differential 2. Mathematical equations and solutions 3. NOL M 10433.

Tables of cumulative binomial probabilities. Change no. 2. U. S. Ordnance Corps. Apr 1956. 51p tables. Order from OTS. $1.50. PB 111389s

Pages 578-626, as added by this change, give cumulative binomial probabilities for sample sizes n=1(1)150 and changes of occurrence in a single trial, p = .001(.001).010, for ready reference in binomial form or for various applications where the order of accuracy indicated in the table is desired in preference to the Poisson approximation to the binomial. Supplement to PB 111389. See PB 111389 for subject entries. ORD P 20-1, Change no. 2.

Technique for the analysis of time-varying sampled-data systems, by Bernard Friedland. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. Sep 1955. 24p diagrs, graphs, table. Order from LC. Mi $2.70, ph $4.80. PB 120301

A method of analyzing time-varying sampled-data systems is developed in this paper. It is shown that the input-output relation for a component of such systems may be regarded as a matrix equation. The relations for combinations of elements are developed, from which the transmission matrix for an entire system can be found by the simple operations of matrix multiplication and solution of linear algebraic equations. A numerical example illustrating the technique is given. A method for improving the performance of a sampled-data feedback system by means of a time-varying amplifier is given as a further illustration of the technique. A numerical example is given. Technical report T-10/B under Contract AF 18(600)-677. CU-16-55-AF-677-EE. Project no. R-357-50-3. AF OSR TN 56-4. CUN ERL TR T-10/B.

Theoretical aspects of limit control, by Nicholas J. Rose. Stevens Institute of Technology. Experimental Towing Tank, Hoboken, N. J. Nov 1953. 67f diagrs, graphs. Order from LC. Mi $3.90, enl pr $12.30. PB 120803

This study is concerned with a minimum problem associated with a linear differential equation containing a discontinuous forcing term. The problem arises physically in the design of an automatic control system for optimum performance. E.T.T. project EA 1403. Contract Nonr-26302. S.I.T. ETT 459.

Theory of plastic plates, by W. Prager. Brown University. Division of Applied Mathematics, Providence, R. I. Jan 1955. 24p diagrs, graphs, tables. Order from OTS. 75 cents. PB 111943

While the bending of beams has been studied extensively, little has been done on plasticity of thin plates until the last few years. The present report is a convenient introduction to the study of the work presented in greater detail in a number of recent papers and reports, some of which are not readily accessible. The problems discussed in this paper concern circular plates under rotationally symmetric conditions of loading and support. GDAM A11-120/22. GDAM TR 120. Contract N7 onr-35801, T. O. I, NR 041-406.

Über die instabilität von methoden zur integration gewöhnlicher differentialgleichungen (On the instability of methods for the integration of ordinary differential equations), by Heinz Rutishauser. Translated by Mary L. Mahler. Apr 1956. 15p tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120259

The author gives some examples and a criterion for stability of integration methods. This criterion is

then applied to some well-known integration formulas. Translated from Zeitschrift für Angewandte Mathematik und Physik, vol. 3, 1952, p. 65-74. NACA TM 1403.

Nuclear

Atomic energy, a jump towards a richer life. Translated by J. Rundo. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119288

Translated from Politikens Ugeblad for Danske i Udlandet no. 26, 26.6.55 to 2.7.55.
1. Atomic power - Research - Denmark 2. AERE Lib/Trans 601.

Determination of equivalent and molecular weight by potentiometric microtitration in non-aqueous solvents, by Hans Brockmann and Ernst Meyer. Translated by F. Hudswell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 14p drawing, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119309

Translated from Chemische Berichte, Vol. 86, no. 12, pp. 1514-1522, 1953.
1. Atomic power - Research - Germany 2. Molecular weights - Determination - Germany 3. Equivalent weights - Determination - Germany 4. AERE Lib/Trans 528.

Diffusion coefficients in copper under fast neutron irradiation, by W. M. Lomer. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Dec 1954. 15p graphs, table. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 45 cents plus mailing handling. PB 120129

S. O. code no. 91-3-1-81.
1. Atomic power - Research - Gt. Brit. 2. Copper - Diffusion - Gt. Brit. 3. AERE T/R 1540.

Diffusion of noble-gas fission products in uranium, by K. E. Zimen and P. Schmeling. Translated by F. Hudswell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p graphs, table. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119987

Translated from Zeitschrift für Elektrochemie, vol. 85, no. 8, pp. 599-601, 1954.
1. Atomic power - Research - Germany 2. Xenon - Diffusion - Germany 3. Uranium - Fission products - Germany 4. AERE Lib/Trans 584.

Final report covering the period 1 Mar 1946-31 Mar 1955 under Contract N6 ori-48, T. O. 1. Indiana. University. Dept. of Physics, Bloomington, Ind. Mar 1955. 30p. Order from LC. Mi $2.70, ph $4.80. PB 119918

The task order contemplates: a) the study of energy levels revealed by decay of naturally and artificially radioactive nuclei; b) the study of energy levels revealed by instantaneous reactions induced by cyclotron bombardment; c) the design, development, construction, and operation of nuclear spectrometers and other instruments pertinent to such studies; and d) theoretical considerations of nuclear structure. Reports resulting from this contract and published in various periodicals are listed, with tables of contents. Contract N6 ori-48, T. O. 1.

Fine structure of the paramagnetic resonance spectrum of the Cr^{+++} ion in chromium corundum, by A. A. Manenkov and A. M. Prokhorov. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 3p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119966

Translated from Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki, Vol. 28, no. 6, p. 762, 1955.
1. Atomic power - Research - Russia 2. Resonance, Paramagnetic - Russia 3. Chromium-corundum alloys - Crystal structure - Russia 4. AERE Lib/Trans 625.

Formation of π^0 mesons at hydrogen and deuterium by neutrons of energy 400 MeV, by B. M. Pontekorvo and G. I. Selivanov. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 4p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119286

Translated from Doklady Akademii Nauk S.S.S.R., Vol. 102, no. 3, pp. 495-7, 1955.
1. Atomic power - Research - Russia 2. Mesotrons - Formation - Russia 3. AERE Lib/Trans 599.

Formation of π^0 mesons by neutrons, by B. M. Pontekorvo and G. I. Selivanov. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 7p diagr, graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119954

Translated from Doklady Akademii Nauk S.S.S.R., Vol. 102, no. 2, pp. 253-6, 1955.
1. Atomic power - Research - Russia 2. Mesotrons - Formation - Russia 3. AERE Lib/Trans 583.

Magnetic fields in turbulent plasmas, by P. W. Schilling and W. Lochte-Holtgreven. Translated by R. J. Richardson. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 13p photos, drawing, diagrs, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119958

Translated from Zeitschrift für Naturforschung, Vol. 9a, part 6, pp. 520-526, 1954.
1. Atomic power - Research - Germany 2. Plasma, Electron - Magnetic fields - Germany 3. AERE Lib/Trans 533.

On spontaneous fission of thorium, by A. V. Podgurskaya, V. I. Kalashnikova, G. A. Stolyarov, E. D. Vorob'ev, and G. N. Flerov. Translated by V. Beak. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119304

Translated from Zhurnal Eksperimentalnoi i Teoreticheskoi Fiziki, Vol. 28, no. 4, pp. 503-505, 1955.
1. Atomic power - Research - Russia 2. Thorium - Fission, Spontaneous - Russia 3. AERE Lib/Trans 569.

One-group perturbation theory for a cylindrical reacting core, by J. Codd. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 11p. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 36 cents. PB 119985

Date of manuscript 23 Jun 1954. S. O. code no. 91-3-2-30.
1. Atomic power - Research - Gt. Brit. 2. Reactors, Neutron - Flux distribution - Gt. Brit. 3. Perturbation - Theory - Gt. Brit. 4. AERE RP/M 45.

Second isotope of lutetium and the magnetic moment and quadrupole moment of the nucleus of Lu^{175}_{71}, by H. Gollnow. Translated by F. Hudswell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 12p graphs, tables. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119305

Translated from Zeitschrift für Physik, Vol. 103, pp. 443-453, 1936.
1. Atomic power - Research - Germany 2. Isotopes - Nuclear properties - Germany 3. Lutetium - Isotopes - Germany 4. AERE Lib/Trans 570.

Stochastic method of accelerating particles, by E. L. Burshtein, V. I. Veksler and A. A. Kolomenskii. Translated by J. B. Sykes. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Oct 1955. 4p. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119302

Translated from Some Problems in the Theory of Cyclical Accelerators, U.S.S.R., Academy of Sciences, Moscow, 1955, pp. 3-6.
1. Atomic power - Research - Russia 2. Accelerators, Cyclical - Theory - Russia 3. Particles - Acceleration - Theory - Russia 4. AERE Lib/Trans 623.

Study of diffusion in the interior and along the boundaries of metal grains by the method of autoradiography, by S. Z. Bokshtein, S. T. Kishkin, L. M. Moroz, and T. I. Gudkova. Translated by V. Beak. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1955. 5p photos, graphs. Available for loan from AEC Depository Libraries. Photocopies at a fee. PB 119992

Translated from Doklady Akademii Nauk U.S.S.R., vol. 102, no. 1, pp. 73-75, 1955.
1. Atomic power - Research - Russia 2. Diffusion, Grain boundary - Russia 3. Autoradiography - Russia 4. AERE Lib/Trans 627.

Theory of the scattering of fast charged particles, by Gert Moliere, translated by F. Hudswell. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Request loan from AEC depository libraries (Photocopies at a fee), giving AERE series number for each part requested, or PB number for photocopies from LC.

I. Single scattering by the shielded Coulomb field. 1955. 23p diagr, graphs, table. PB 119959

Translated from Zeitschrift für Naturforschung, Vol. 2A, no. 3, pp. 133-145, 1947.
1. Atomic power - Research - Germany 2. Particles, Charged - Scattering - Theory - Germany 3. Coulomb functions - Germany 4. AERE Lib/Trans 594.

II. Repeated and multiple scattering. 1955. 34p graphs, tables. PB 119991

Translated from Zeitschrift für Naturforschung, vol. 3a, no. 2, pp. 78-97, 1948.
1. Atomic power - Research - Germany 2. Particles, Charged - Scattering - Theory - Germany 3. AERE Lib/Trans 626.

PHYSIOLOGY

Space requirements of the seated operator. Geometrical, kinematic, and mechanical aspects of the body with special reference to the limbs, by Wilfred Taylor Dempster. Michigan. University.

Engineering Research Institute, Ann Arbor, Mich. Jul 1955. 271p photos, drawings, diagrs, graphs, tables. Order from OTS. $3.50. PB 121053

The structure of the limb joints and the range and type of their motions were studied on cadaver material, with supplementary work on living subjects, in order to clarify geometric, kinematic and engineering aspects of the limb mechanism. Plans for the construction of manikin joints which showed normal ranges of limb movement were developed from this information. Specifications were also worked out for drafting board manikins which show correct limb ranges for seated postures. Subjects comparable to the model physique of Air Force flying personnel and highly selected small samples of muscular, thin, and rotund builds supplied information on the range of possible hand and foot movements which was consistent with the seated posture. Maximum dimensions of the work space for seated individuals were determined; a study of the kinematic factors involved permitted an evaluation of the potential utility of different regions within reach. Project no. 7214. AF WADC TR 55-159. Contract AF 18(600)-43.

PSYCHOLOGY

Experiments on leadership in small groups, by Richard Snyder, John R. P. French, Jr., and Arthur J. Hoehn. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Training Aids Research Laboratory, Chanute Air Force Base, Ill. Jan 1955. 52p diagrs, tables. Order from LC. Mi $3.60, ph $9.30. PB 120307

Two laboratory-type experiments were conducted. One of them, the group judgment experiment, concerned the influence of NCOs on airman judgments or opinions; the other, the card-sorting experiment, dealt with NCO influence on airman productivity. Thirty-six groups were studied, each group consisting of an NCO and three airmen serving under him. AF PTRC TN 55-1.

Reduction of sex differences in problem solving by improvement of attitude through group discussion, by Gloria L. Carey. Stanford University. Dept. of Psychology, Stanford, Calif. Mar 1955. 51p tables. Order from LC. Mi $3.60, ph $9.30. PB 120030

The main experiment was designed to answer questions as to whether an attempt to change attitude will be followed by a change in performance, and whether women will respond more favorably than men to an attempt to improve their attitudes. Two forms of an attitude scale were constructed by the Likert procedure. Technical reports and journal articles available from the program of research on thinking are listed. Technical report no. 9 under Contract N6 onr-25125, NR 150-149.

Study of conditions affecting cooperation. Annual technical report no. 3 for the period Feb 16, 1954-Feb 15, 1955 under Contract no. Nonr 285-(10), by Morton Deutsch. New York University. Research Center for Human Relations. Mar 1955. 36p diagr. Order from LC. Mi $3, ph $6.30. PB 119924

The studies, in general, fall into two phases: Phase I studies dealt with a variety of factors which are related to the initiation of cooperation; Phase II studies are more specifically concerned with the relationship between trust and cooperation. For report no. 2 see PB 116346. See also PB 119157 (this may be report no. 1).

RUBBER AND RUBBER PRODUCTS

Evaluation of high temperature hydraulic seals, by Edward A. Webster. Douglas Aircraft Co., Inc., Santa Monica, Calif. Jan 1955. 107p photos, drawings (1 fold), graphs, tables (1 fold). Order from LC. Mi $5.70, ph $16.80. PB 120264

The investigation included determinations of temperature limitations of approved AN6227 O-rings and AN6246 leather back-up rings, comparative qualification tests of all currently available experimental high temperature O-ring materials, evaluations of various vendor and contractor-furnished experimental seal configurations designed for both standard and non-standard packing glands, and tests of back-up materials and configurations suitable for high temperature use. Additional comparative tests were also conducted on certain approved AN6227 and experimental high temperature materials to establish relative endurance characteristics at various temperatures. Project task no. 1371-13495. AF WADC TR 55-120. Contract AF 33(616)-236.

Ozone-cracking of synthetic and natural rubber sheet materials, by A. Baker and A. J. Woods. Gt. Brit. Royal Aircraft Establishment, Farnborough, England. Apr 1949. 10p photos, diagrs. Order from LC. Mi $1.80, ph $1.80. PB 120155

In a study of ozone-cracking of synthetic and natural rubber sheet materials, samples of neoprene GN, perbunan, hycar OR, and natural rubber were exposed to air when ozone concentration was of the order of 100 times that normally present in the atmospheres. It was found that the effect of plasticizer in promoting the cracking of stressed synthetic rubbers by ozone is significant, though not as great as the effect caused by the variations in the chemical nature of the rubbers. Neoprene

GN was more ozone resistant than the other rubbers tested. The extent of cracking depends on the time of exposure to ozone, as well as on its concentration. A proposed specification test method for assessing ozone resistance of rubbers is described. RAE TN Chem 1093.

Reinforcement of silicone rubber with carbon black, by Aldo J. deFrancesco. Connecticut Hard Rubber Co., New Haven, Conn. Feb 1956. 33p tables. Order from OTS. $1. PB 121231

The silicone polymer, Linde W-96, when filled with various carbon blacks, was successfully cured to form a firm, well-reinforced rubber. Not all carbon blacks, however, are satisfactory. In general, an optimum loading of most acetylene and furnace blacks can be used. Channel blacks severely retarded the cure, and efforts were made to prevent this effect. Project no. 7340, Task no. 73405. Covers work from 1 Mar to 1 Jul 1955 under Contract AF 33(616)-2542. AF WADC TR 55-439.

STRUCTURAL ENGINEERING

Accuracy of the substitute-stringer approach for determining the bending frequencies of multistringer box beams, by William W. Davenport. U. S. National Advisory Committee for Aeronautics. Apr 1956. 28p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120409

The accuracy of the substitute-stringer approach for including the effects of shear lag in the calculation of the transverse modes and frequencies of multistringer box beams is investigated. Box beams, the covers of which consist of normal-stress-carrying stringers on sheets which carry not only shear but also normal stress, are analyzed exactly. Frequencies of beams with various numbers of stringers, obtained by means of this exact analysis, serve to determine the possible accuracy of the frequencies obtained by the substitute-stringer approach. NACA TN 3636.

Permanent buckling of sheet-stringer panels at elevated temperatures, by Robert A. Needham. California. University. Dept. of Engineering, Los Angeles, Calif. Jul 1953. 37p graphs, table. Order from LC. Mi $3, ph $6.30. PB 120272

A method of predicting permanent buckling stresses of sheet-stringer panels at elevated temperatures is presented. A relation between the stiffener strain and the maximum combined strain at the center line of an axially loaded sheet-stringer panel is obtained. A method of obtaining elevated temperature stress-strain diagrams, based on the Ramberg-Osgood approximation, is also presented. It is assumed here that the shape of the knee of the stress-strain diagram is not affected by temperature increases. AF WADC TR 53-209. Contract AF 33(616)-293.

TEXTILES AND TEXTILE PRODUCTS

Aerodynamic heating of parachute ribbons, by Louis C. Block. Lowell Technological Institute Research Foundation, Lowell, Mass. Nov 1955. 59p photos, drawings, graphs, tables. Order from OTS. $1.50. PB 121150

A theoretical evaluation of the expected temperature rise of these ribbons in high velocity flight was carried out. Wind tunnel tests were subsequently performed on the basic ribbon and ribbons of modified design. The results showed that the experimental values of the heat transfer coefficient agreed very well with the theoretical values. Changes in ribbon design and ribbon material did not effect an improvement to the heat transfer characteristics of the basic sample. Project no. 7320. Covers work conducted from Mar 1952 to Mar 1954 under Contract AF 18(600)-136. AF WADC TR 54-572.

Development of wool-synthetic blended fabrics for summer flight garments, by George O. Langlais and Samuel L. Fuller. Lowell Technological Institute Research Foundation, Lowell, Mass. Jan 1956. 76p diagrs, graphs, tables. Order from OTS. $2. PB 121153

A survey of worsted manufacturers was conducted to obtain commercially available blend fabrics that approximated the basic requirements. The results of tests performed on the fabrics obtained were considered in subsequent design and manufacture. Identically constructed fabrics composed of blends of nylon, dacron, orlon, and dynel (each blended at 15%, 30%, and 60%) with wool and an all-wool control were produced; these were tested and compared with respect to fabric properties. Particular emphasis on the flame-resistance characteristics, specifically centered on the degree of melting and "dripping" after ignition, indicated of major consequence in the establishment of this program, led to the selection of the final fabric, a 70% wool-30% dynel fabric. Project no. 7320, Task no. 73202. Covers work conducted from Sep 1954 to Mar 1955 under Contract AF 33(600)-25892. AF WADC TR 55-83.

Effect of fabric structure on the frictional fusion of parachute materials, by Vasilis Lavrakas. Lowell Technological Institute Research Foundation, Lowell, Mass. Aug 1955. 19p photo, diagr, tables. Order from OTS. 50 cents. PB 121142

The effect of fabric structure, yarn twist, calendering, and fabric weight on the resistance to fusion of parachute cloth has been studied. A belt friction apparatus, used in lubrication investigations, has also been utilized in this study. The parameters of fabric structure, yarn twist, calendering, and fabric weight have been found to be significant in the resistance of parachute cloth to friction. Project no. 7320, Task no. 73201. Covers work conducted from Mar 1954 to Mar 1955 under Contract AF 18(600)-136. AF WADC TR 54-570.

Effect of surface finishes on friction and fusion of parachute cloth and line, by Vasilis Lavrakas and Adolph Katz. Lowell Technological Institute Research Foundation, Lowell, Mass. Contract AF 18(600)-136. Project no. 7320, Task no. 73201. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I. Dec 1955. 149p diagrs, photos, graphs, tables. $3.75. PB 121186

An attempt to find lubricating agents which would minimize or prevent the fusion of nylon parachute materials caused by frictional heat was the main objective of this program. A friction apparatus, based on the belt friction principle, was developed to evaluate lubricating materials. Many lubricants were examined and ten were classed as highly effective in preventing fusion. In addition, nylon parachute line coated with these best lubricants was further subjected to breaking strength, fungus resistance, and aging tests. No one lubricant was determined to be superior in all respects. Covers work conducted from Mar 1952 to Mar 1955. AF WADC TR 54-323, Part 1.

Part II. Oct 1955. 53p photos, diagrs, graphs. $1.50. PB 121254

Effect of speed on fusion and friction was investigated. High molecular weight fatty acids, alcohols, and monoesters were investigated. Molecular weight was found to be an important factor in the phenomenon of fusion and lubrication. Anionic, cationic, and nonionic lubricants were also studied. Covers work conducted from Jan 1952 to Dec 1954. AF WADC TR 54-323, Part 2.

Effects of gamma radiation on textile materials, by Joyce McGrath and R. H. Johnson. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Feb 1956. 33p photo, diagr, graphs, tables. Order from OTS. $1. PB 121206

The primary purpose of this investigation was to obtain data on the effect that exposure to high energy gamma radiation, for specific periods of time, would have on various parachute textile materials, also to determine if the use of parachute marking ink would increase or speed up the degredation of the materials. Project no. 7320, Covers work from Dec 1954 to Dec 1955. AF WADC TR 56-15.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Engineering study of air conditioning load requirements for aircraft compartments, by W. L. Torgeson, H. C. Johnson, and N. B. Wright, Jr. Research, Inc. Jun 1955. 177p drawings, diagrs, graphs, tables. Order from OTS. $4.50. PB 121139

This report is concerned with the development and presentation of methods for determining the thermal air conditioning requirements of aircraft compartments. The methods of analysis are given in a simplified form suitable for routine calculations, with graphical presentation of much of the information needed for computation of heating or cooling loads. Important design factors are discussed in detail. A procedure for estimating transient heating effects in high speed flight is included. Project no. 6146. AF WADC TR 55-254. Contract AF 33(616)-2261.

Measurement and analysis of wing and tail buffeting loads on a fighter airplane, by Wilber B. Huston and T. H. Skopinski. U. S. National Advisory Committee for Aeronautics. 1955. 29p photo, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 30 cents. PB 120123

Supersedes TN 3080 (PB 114129).
1. Airplanes, Fighter - Aerodynamics 2. Airplanes, Fighter - Loads - Measurement 3. Tail surfaces - Loads 4. Loads, Structural - Dynamic tests 5. Wings - Loading 6. NACA 1219 7. NACA TN 3080 Revised.

Study of the prediction of the position of a flying aircraft, by Eugene F. Grant. U. S. Air Materiel Command. Cambridge Field Station. Special Studies Laboratory. Mar 1949. 25f diagr, graph. Order from LC. Mi $2.70, enl pr $6.30. PB 120789

This report considers the prediction of the future rectangular coordinate position from the present and past information of the coordinate position. The theory of prediction and filtering of the single stationary time series developed by Norbert

Wiener is used for this development. However, only the present and past of the x-coordinate is used in predicting the future x-coordinate and similarly for the y- and z-coordinate. AF CRL E 5042.

Instruments

Evaluation of the TACAN system, by Richard C. Borden, Thomas S. Wonnel, Robert B. Flint, Samuel L. Kades and John R. Hoffman. U. S. Civil Aeronautics Administration. Technical Development Center, Indianapolis, Ind. May 1956. 47p photo, diagrs, graphs, tables. Order from OTS. $1.25. PB 121229

TACAN is a military short-range system of tactical air navigation, proposed as a replacement for VOR/DME. This evaluation revealed that both systems supply identical information, have similar siting errors, and that TACAN is not suitable for civilian use, is impractical for use in small aircraft, and that the propagation characteristics of its frequency band are not reliable for that service. CAA TDR 261.

Engines and Propellers

Design charts for axial-flow compressors having constant rotor work distribution over the blade span, by Robert E. Hunter. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aeronautical Research Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1953. 32p fold graphs. Order from LC. Mi $3, ph $6.30. PB 120297

This technical report attempts to provide a means of shortening the compressor design procedure through the use of charts. To facilitate a more rapid procedure, the charts are restructed in application to constant rotor work axial-flow compressors. The design charts give the relationships between the mean radius velocity triangle and compressor performance and dimensions. Ranges are established for the variables to include all normal design problems and also to rule out almost immediately all impractical solutions. AF WADC TR 53-152.

Some effects of guide-vane turning and stators on the rotating stall characteristics of a high hub-tip ratio single-stage compressor, by Eleanor L. Costilow and Merle C. Huppert. U. S. National Advisory Committee for Aeronautics. Apr 1956. 52p photos, drawing, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120411

1. Compressors, Axial - Flow 2. Compressors - Stalling - Research 3. NACA TN 3711.

Aerodynamics

Aerodynamic heating and heat transfer for airfoils at Mach numbers of 2.74 through 5.7, by A. E. Abramson, W. L. Torgeson and J. A. Zdrazil. Research, Inc. Apr 1955. 156p photos, drawings, diagrs, graphs, tables. Order from OTS. $4. PB 121045

This report gives the results of a theoretical study and experimental determination of recovery factors and heat transfer coefficients for three basic airfoils over a Mach number range from 2.74 to 5.7. The three airfoils considered were the double wedge, biconvex, and modified ellipse. The heat transfer coefficients were determined for a constant surface temperature. Experimental recovery factors and heat transfer coefficients are presented in this report for each airfoil over the range of conditions given above. The application of the results to a design problem is illustrated by a sample calculation. AF WADC TR 55-252. Contract AF 33(616)-391. Project no. 1367.

Analysis of a spin and recovery from time histories of attitudes and velocities as determined for a dynamic model of a contemporary fighter airplane in the free-spinning tunnel, by Stanley H. Scher. U. S. National Advisory Committee for Aeronautics. Apr 1956. 54p photos, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120248

1. Airplanes - Spinning - Recovery 2. Airplanes - Spinning - Wind tunnel tests 3. NACA TN 3611.

Analysis of estimated and experimental transonic downwash characteristics as affected by plan form and thickness for wing and wing-fuselage configurations, by Joseph Weil, George S. Campbell and Margaret S. Diederich. U. S. National Advisory Committee for Aeronautics. Apr 1956. 92p photos, drawing, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120407

Supersedes RM L52I22.
1. Mach number - Effect 2. Wings - Downwash 3. NACA TN 3628.

Analysis of the ultimate strength and optimum proportions of multiweb wing structures, by B. Walter Rosen. U. S. National Advisory Committee for Aeronautics. Mar 1956. 34p drawings, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120112

Originally a thesis submitted to Virginia Polytechnic Institute.
1. Beams, Structural - Bending 2. Webs - Stresses 3. Wings - Design 4. Wings - Stability 5. NACA TN 3633.

Annual report, 40th, 1954. Administrative report including Technical reports no. 1158 to 1209. U. S. National Advisory Committee for Aeronautics. 1956. 1216p photos, drawings, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $8.50. PB 122118

1. Aeronautical research 2. Aeronautics - Yearbooks 3. NACA 1158-1209.

Annual report, 41st, 1955. Administrative report without technical reports. U. S. National Advisory Committee for Aeronautics. 1955. 74p. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 50 cents. PB 119914

1. Aeronautics - Yearbooks 2. Aeronautical research.

Calculations of the rate of thermal dissociation of air behind normal shock waves at Mach numbers of 10, 12, and 14, by George P. Wood. U. S. National Advisory Committee for Aeronautics. Apr 1956. 40p diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120250

1. Mach number - Effect 2. Flow, Supersonic - Theory 3. Air - Thermal dissociation 4. NACA TN 3634.

Determination of lateral-stability derivatives and transfer-function coefficients from frequency-response data for lateral motions, by James J. Donegan, Samuel W. Robinson, Jr., and Ordway B. Gates, Jr. U. S. National Advisory Committee for Aeronautics. 1955. 19p graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 120127

Supersedes NACA TN 3083 (PB 114130).
1. Stability, Lateral - Theory 2. Equations of motion 3. NACA 1225 4. NACA TN 3083 Revised.

Effect of ground interference on the aerodynamic and flow characteristics of a 42° sweptback wing at Reynolds numbers up to 6.8×10^6, by G. Chester Furlong and Thomas V. Bollech. U. S. National Advisory Committee for Aeronautics. 1955. 62p photos, drawings, diagrs, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 45 cents. PB 120122

Supersedes NACA RM L8G22 and TN 2487 (PB 105281).
1. Wings, Sweptback - Aerodynamics 2. Wings, Ground effect 3. NACA TN 487 Revised 4. NACA 1218.

Investigation of a multiple-source schlieren system for application to a perforated wall wind tunnel, by M. Pindzola and G. R. Mozer. U. S. Air Force, Air Research and Development Command, Arnold Engineering Development Center, Tullahoma, Tenn. Apr 1956. 25p photos, diagrs, tables. Order from OTS. 75 cents. PB 111910

Visibility equations are derived showing the influence of geometrical parameters on the schlieren photograph background pattern for first one and then two tunnel walls. A uniformly illuminated background pattern is shown to be easily attained with a single perforated wall, but not with two identically perforated walls. A method for obtaining a uniformly illuminated background pattern for the two-wall case by relocating the holes in one perforated tunnel wall is discussed. The use of an external source plate is shown to increase system sensitivity at no sacrifice in background pattern. The multiple-source schlieren system is also shown to be useful with transparent walls where the conventional system is unsatisfactory. AF AEDC-TR-56-1.

Method for the design of sweptback wings warped to produce specified flight characteristics at supersonic speeds, by Warren A. Tucker. U. S. National Advisory Committee for Aeronautics. 1955. 19p diagrs, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 120128

1. Wings, Sweptback - Design 2. Wings, Sweptback - Theory 3. Flow, Supersonic - Theory 4. Mach number - Effect 5. NACA 1226.

NOL hypersonic tunnel no. 4, results VII: Experimental investigation of turbulent boundary layers in hypersonic flow, by R. Kenneth Lobb, Eva M. Winkler and Jerome Persh. U. S. Naval Ordnance Laboratory, White Oak, Md. Mar 1955. 48p graphs, tables. Order from LC. Mi $3.30, ph $7.80. PB 120871

Naturally turbulent boundary layers on the wall of a wedge-type water-cooled nozzle in the NOL 12 x 12 cm hypersonic tunnel no. 4 have been investigated at Mach numbers of 5.0 to 8.2 with and without steady state heat transfer to the surface. The Reynolds number based on boundary layer momentum thickness was varied from 5,000 to 13,000. Measurements of pitot and static pressures, total and wall temperatures, and rates of heat transfer made it possible to compute velocity profiles, temperature profiles, and boundary layer parameters without resorting to any assumptions. NAVORD 3880.

Prediction of wing loads due to gusts including aeroelastic effects. Midwest Research Institute, Kansas City, Mo. Contract W-33-038-ac-14868. Order separate parts described below from LC, giving PB number of each part ordered.

Part 1: Formulation of the method, by H. Goland, Y. L. Luke and E. A. Kann. Jul 1947. 98p graphs, tables. Mi $5.40, ph $15.30. PB 120352

A method is formulated for predicting the wing load encountered by high performance aircraft when flying through gusts. Particular attention is given to the effect of aeroelastic characteristics of the wing on the gust loads, including the effects of the wing flutter mode. An analytical procedure is established, which can be used during the design stages to determine the airworthiness of a particular design for flight during gust weather. The mechanism of the response of an aircraft due to flight through gusts is explored in detail, with particular attention centered on the coupling effects between the various degrees of freedom. AF TR 5706.

Part II: Design procedure, by H. Goland and V. L. Luke. Jan 1949. 58p graphs, tables. Mi $3.60, ph $9.30. PB 120351

Conclusions of Part I are summarized and the procedure for carrying out practical gust load analysis is described. To illustrate the procedure, the case of an aircraft with a critical bending-torsion flutter mode is studied in detail. Sample calculations are given. AF TR 5751.

Preliminary study of some factors which affect the stall-flutter characteristics of thin wings, by A. Gerald Rainey. U. S. National Advisory Committee for Aeronautics. Mar 1956. 33p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120107

1. Wings - Aspect ratio 2. Wings - Stalling - Research 3. Wings - Flutter 4. Mach number - Effect 5. Reynolds number - Effect 6. NACA TN 3622.

Results of a flight investigation to determine the zero-lift drag characteristics of a 60° delta wing with NACA 65-006 airfoil section and various double-wedge sections at Mach numbers from 0.7 to 1.6, by Clement J. Welsh. U. S. National Advisory Committee for Aeronautics. Apr 1956. 13p photo, drawing, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120405

Supersedes RM L50F01.
1. Wings, Triangular - Drag 2. Mach number - Effect 3. NACA TN 3650.

Some effects of fuselage flexibility on longitudinal stability and control, by Bernard B. Klawans and Harold I. Johnson. U. S. National Advisory Committee for Aeronautics. Apr 1956. 42p diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120246

1. Stability, Longitudinal - Effect of fuselage
2. NACA TN 3543.

Theoretical prediction of pressure distributions on nonlifting airfoils at high subsonic speeds, by John R. Spreiter and Alberta Alksne. U. S. National Advisory Committee for Aeronautics. 1955. 45p photos, diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 40 cents. PB 120121

Supersedes NACA TN 3096 (PB 113615).
1. Wing theory 2. Flow, Transonic - Theory 3. Airfoils, Circular-arc - Nonlifting - Pressure distribution 4. Velocity, Sonic - Theory 5. Flow, Mixed - Theory 6. NACA 1217 7. NACA TN 3096 Revised.

Theoretical study of the aerodynamics of slender cruciform-wing arrangements and their wakes, by John R. Spreiter and Alvin H. Sacks. U. S. National Advisory Committee for Aeronautics. Mar 1956. 68p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 119852

1. Wings, Cruciform - Aerodynamics 2. NACA TN 3528.

Theoretical study of the tunnel-boundary lift interference due to slotted walls in the presence of the trailing-vortex system of a lifting model, by Clarence W. Matthews. U. S. National Advisory Committee for Aeronautics. 1955. 21p diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 120124

Supersedes NACA RM L53A26.
1. Wind tunnels - Interference 2. NACA 1221.

Wind-tunnel investigation of effects of fuselage cross-sectional shape, fuselage bend, and vertical-tail size on directional characteristics of non-overlap-type helicopter fuselage models without rotors, by James L. Williams. U. S. National Advisory Committee for Aeronautics. Mar 1956. 39p photos, drawings, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 120114

1. Helicopters - Stability - Effect of fuselage
2. Helicopters - Stability - Effect of tail 3. Fuselages - Shape - Effects 4. Helicopters - Wind tunnel tests 4. NACA TN 3645.

Investigation of turbulence beneath a destroyer, by E. B. Stephenson and W. F. Curtis. U. S. Naval Research Laboratory. Dec 1937. 17p drawing, graphs, table. Order from LC. Mi $2.40, ph $3.30. PB 120384

A pitot tube device designed to be attached in place of the projector in an underwater sound installation was used to measure the depth and intensity of the turbulences beneath the sound wells on the U. S. S. SEMMES. NRL S-1413.

Military standard: Mechanical vibrations of shipboard equipment. U. S. Bureau of Ships. Dec 1954. 15p graphs, tables. Order from LC. Mi $2.40, ph $3.30. PB 120074

Supersedes MIL-T-17113 (Ships) (in part) 25 Jul 1952.
1. Ships - Machinery - Vibration - Specifications 2. MIL STD 167 (Ships).

Oceanographic vessels in the United States. U. S. Office of Naval Research. Geophysics Branch. Apr 1953. 179f photos. Order from LC. Mi $8.10, enl pr $28.80. PB 120802

The report consists of photographs and a tabulation of the various characteristics and equipment of the ships employed in oceanographic research.

Production of pressure waves in water by nonexplosive means, by George Mackas, Joseph F. Vogl and Robert F. Mead. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 84p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.80, ph $13.80. PB 120807

The object is to design and construct a laboratory machine to produce the same shock waves and bubble pulses that depth charges produce in the ocean. The machine is to be used for countermine testing of small underwater equipment and ordnance components. An experimental model of the machine is described. The preliminary design of a larger machine, accommodating test specimens up to 12 inches diameter is described. NAVORD 2479.

Report on low visibility camouflage of submarines: Tests at sea, of Jun and Jul 1937, by E. O. Hulburt and Charles Bittinger. U. S. Naval Research Laboratory. Nov 1937. 15p photos. Order from LC. Mi $2.40, ph $3.30. PB 120382

Photos will not reproduce.
1. Submarines - Camouflage 2. NRL H-1409.

MISCELLANEOUS

Administration of medical and pharmaceutical patents, by Archie M. Palmer. National Research Council. Mar 1955. 72p. Order from Office of Patent Policy Survey, National Academy of Sciences - National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. $2. PB 120345

Interpretive analysis of the policies, practices, procedures and experiences of medical schools and colleges of pharmacy in the United States and Canada in administering medical and pharmaceutical patents; verbatim statements of formalized patent policies; descriptions of generally accepted practices. NRC 375.

Report of NRL progress. U. S. Naval Research Laboratory. Jun 1956. 48p. Order from OTS. $1.25. PB 121280

For earlier reports see PB 111994-111995, 121029, 121095. Contents: Articles: Detector of radioactive airborne particles for the Nautilus, by J. I. Hoover, C. M. Gordon, C. F. Dohne, and R. C. Waddel. - Utilization of tactical information in air defense: Preliminary study, by D. F. Wilson. - Scattering and attenuation of microwave radiation through rain, by F. T. Haddock. - Scientific program: Problem notes: Astronomy and astrophysics: A radio frequency search for interstellar and atmospheric OH....Second prototype Navy Aerobee-Hi firing....Atmospheric radioactivity studies planned for the IGY....Sea trials of drifting buoy-type automatic weather stations. - Chemistry: Thin films of Teflon as lubricants and preservative coatings for metals....Electrolytic generation of oxygen without the accompanying generation of hydrogen....Empirical relationship between vibration and electro-negativity of the substituent atoms or radicals for a variety of compounds. - Electricity: Magnetic arbitrary waveform generator. - Mechanics: Onset of fast crack propagation in high-strength steel and aluminum alloys....A study of the birefringence of hot-stretched polymethel methacrylate....Evaluation of medium-weight and lightweight high-impact shock machines. - Metallurgy and ceramics: The determination of hydrogen in steel....Effects of various atmospheres on the creep-rupture properties of several classes of high-temperature alloys....Effect of geometry on the properties of 195-T6 and 356-T6 aluminum alloy castings....The influence of low-melting metals on the second stage graphitization of malleable irons....Barium titanate raw material purity. - Nuclear and atomic physics: Techniques for using fissionable deposits in neutron measurements....Status of the NRL nuclear research reactor. - Radio: Low-noise 215-Mc to 225-Mc converter....Amplification of plasma waves by an electron beam....Electronic components and materials studies--the optical absorption spectra of natural and synthetic quartz crystals. - Solid-state physics: An abstract model for a ferromagnet.... The ferromagnetic saturation and remanence of Beta—uranium hydride at low temperatures. - Sound: "Digiter" prints automatically the acoustic level of a sonar signal in decibels. - 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

Study of atmospheric contamination in the Melt Plant building, by F. E. Adley, W. E. Gill, and R. H. Scott. Hanford Works, Richland, Washington. Apr 1952. Decl. Dec 1955. Contract W-31-109-eng-52. 94p. Order from OTS. 50 cents. HW-23352(Rev.)

Agricultural research program. Semi-annual progress report for July 1, 1955 to December 31, 1955. Univ. of Tenn., Knoxville, Tenn. May 1956. 129p. Order from OTS. 65 cents. ORO-150

Chemistry and Chemical Engineering

Electrolytic reduction of uranyl and ferric sulfate solutions, by Wilfred Freyberger. Mineral Engineering Lab. Massachusetts Inst. of Tech., Watertown, Mass. May 1950. Decl. Dec 1955. Contract W-7405-eng-85. 11p. Order from OTS. 20 cents. AECD-4101

Electrolytic precipitation of uranium from Rand leach solutions, by Galen W. Clevenger. Mineral Engineering Lab. Massachusetts Inst. of Tech., Watertown, Mass. Feb 1951. Decl. Dec 1955. Contracts W-7405-eng-85, AT-1-30-gen-211, AT(49-1)-533. 20p. Order from OTS. 20 cents. AECD-4105

Alpha counting for the assay of uranium in ion exchange effluents, by Emilia M. Rubino. Mineral Engineering Lab. Massachusetts Inst. of Tech., Watertown, Mass. Feb 1951. Decl. Dec 1955. Contracts W-7405-eng-85, AT-30-1-gen-211. 17p. Order from OTS. 20 cents. AECD-4106

Removal of uranium from Rand leach liquors with anion exchange resins. Part V. Further studies on process X solutions, by Norman N. Schiff. Mineral Engineering Lab. Massachusetts Inst. of Tech., Watertown, Mass. Mar 1951. Decl. Dec 1955. Contract AT-30-1-gen-211. 10p. Order from OTS. 15 cents. AECD-4108

Systematic ion exchange studies, by George W. Lower. Mineral Engineering Lab. Massachusetts Inst. of Tech., Watertown, Mass. Feb 1951. Decl. Dec 1955. Contracts W-7405-eng-85, AT-1-30-gen-211, and AT(49-1)-533. 24p. Order from OTS. 25 cents. AECD-4113

Corrosion studies pertinent to bromine trifluoride processes, by J. G. Schnizlein, R. K. Steunenberg, and R. C. Vogel. Argonne National Laboratory. Apr 1956. Contract W-31-109-eng-38. 27p. Order from OTS. 35 cents. ANL-5557

Chemical process to recover uranium from phosphate rock, by E. F. Stephan, L. T. Hendrix, and Iver Igelsrud. Battelle Memorial Inst., Columbus, Ohio. Jan 1948. Decl. Mar 1956. Contract W-38-094-eng-27. 22p. Order from OTS. 20 cents. BMI-JDS-100

Recovery of uranium from shales, by A. E. Bearse, J. Chocholak, R. F. Devine, S. J. Kiehl, Jr., and D. D. Rabb. Battelle Memorial Inst., Columbus, Ohio. Jan 1948. Decl. Mar 1956. Contract AT-30-1-gen-202. 25p. Order from OTS. 25 cents. BMI-JDS-101

Chemical process to recover uranium from phosphate rock, by Iver Igelsrud, E. F. Stephan, John Chocholak, C. M. Schwartz, and A. E. Austin. Battelle Memorial Inst., Columbus, Ohio. Jun 1948. Decl. Mar 1956. Contract W-38-094-eng-27. 29p. Order from OTS. 25 cents. BMI-JDS-126

Organic precipitants and complexing agents for uranium, by E. J. Kahler, G. W. Kinzer, G. A. Lutz, R. H. Poirier, and A. E. Bearse. Battelle Memorial Inst., Columbus, Ohio. Jun 1948. Decl. Mar 1956. Contract AT-30-1-gen-202. 32p. Order from OTS. 25 cents. BMI-JDS-127

Recovery of uranium from shales, by A. E. Bearse, R. F. Devine, R. A. Ewing, J. F. Foster, and S. J. Kiehl, Jr. Battelle Memorial Inst., Columbus, Ohio. Jun 1948. Decl. Mar 1956. Contract

AT-30-1-gen-202. 72p. Order from OTS. 45 cents. BMI-JDS-130

Vanadium in steelmaking, present and future. Survey report, by Hugo E. Johnson. Battelle Memorial Inst., Columbus, Ohio. Aug 1948. Contract AT-30-1-gen-258. 57p. Order from OTS. 40 cents. BMI-JDS-136

Organic precipitants and complexing agents for uranium, by A. E. Bearse, E. J. Kahler, G. W. Kinzer, G. A. Lutz, and R. H. Poirier. Battelle Memorial Inst., Columbus, Ohio. Oct 1948. Decl. Mar 1956. Contract AT-30-1-gen-202. 27p. Order from OTS. 25 cents. BMI-JDS-146

Recovery of uranium from shales, by A. E. Bearse, R. A. Ewing, S. Calvert, C. G. Cichocki, R. F. Devine, S. J. Kiehl, Jr., F. W. Miles, and R. Q. Wilson. Battelle Memorial Inst., Columbus, Ohio. Dec 1948. Decl. Mar 1956. Contract AT-30-1-gen-202. 68p. Order from OTS. 40 cents. BMI-JDS-156

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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

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INDEXES TO USGRR

This issue contains the index to Volume 25 of *U. S. Government Research Reports.*

Volume 25, No. 1 (Jan 20, 1956) contains the index to Volume 24; the index to Volume 23 is in Volume 24, No. 1 (July 15, 1955).

Indexes previous to Volume 23 were published separately. These are available from the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., at $1 a copy, except for Volume 5 and Volume 8 which are $2.

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