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In this issue:

Radiation Sterilization of Foods

A survey and bibliography of the scientific literature in the field of ionizing radiation, a process which promises to revolutionize food preservation. In four volumes. Compiled by the Quartermaster Food and Container Institute.

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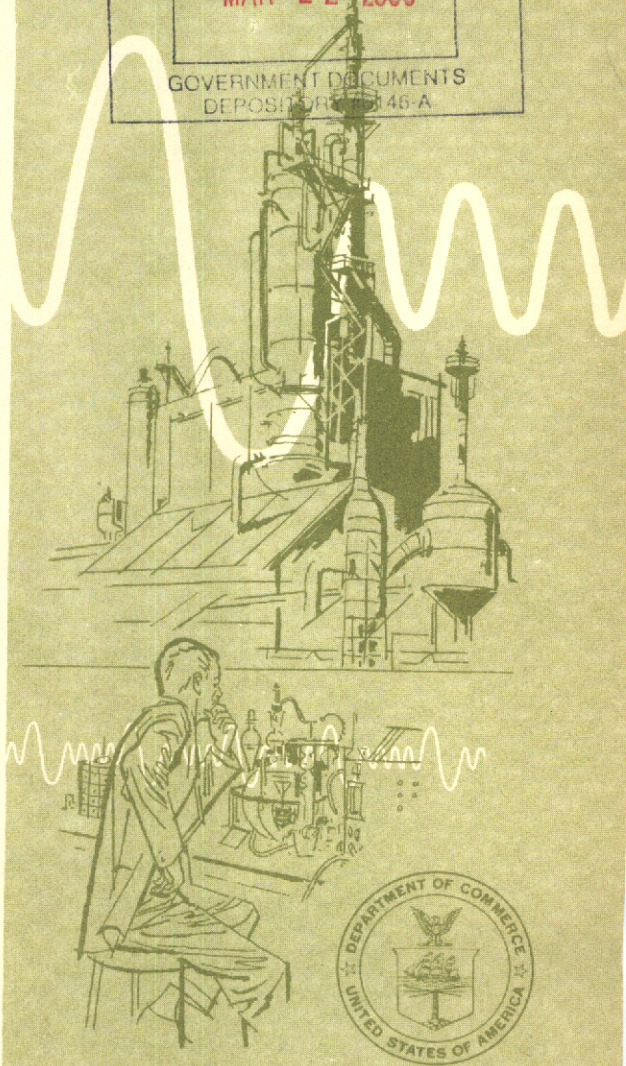

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U. S. DEPARTMENT OF COMMERCE

OFFICE OF TECHNICAL SERVICES

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CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Action of some strong acids on secondary phenylpentanes, by Robert L. Burwell, Jr. and Alfred D. Shields. Northwestern University, Evanston, Ill. Jul 1954. 24p diagrs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117472

Contract N7 onr 54006, Project NR 055-199.
1. Pentane - Reaction products 2. Pentane, 2-Phenyl - Reactions 3. Pentane, 3-Phenyl - Reactions.

Cyclic polyolefins. XXXIII: Compounds derived from cyclooctate traenylmethyl alcohol. Isomerization of cyclooctatetetraenylacetonitrile, by Arthur C. Cope, Ronald M. Pike and Donald F. Rugen. Massachusetts Institute of Technology. Dept. of Chemistry, Cambridge, Mass. Jul 1954. 12p graphs. Order from LC. Mi $2.00, ph $2.75. PB 117572

Contract N5ori-07822, Project NR-356-096. Technical report 21. Prepared for publication in the Journal of the American Chemical Society.
1. Cyclooctatetraene - Derivatives 2. Olefins, Cyclic - Preparation.

Dielectric properties of alcohols and glycols, by Robert H. Cole. Brown University. Metcalf Research Laboratory, Providence, R. I. Jun 1954. 5p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $1.50, ph $1.50. PB 117400

Rate of hydration of methylenecyclobutane and the effect of structure on thermodynamic properties for

the hydration of small ring olefins, by Peter Riesz and Robert W. Taft, Jr. Pennsylvania State University. Dept. of Chemistry, State College, Pa. Jun 1954. 19p tables. Order from LC. Mi $2.00, ph $2.75. PB 117398

Contract Nonr 656(03), Project NR 055-295.
1. Cyclobutane, Methylene - Hydration 2. Olefins - Hydration 3. Cyclobutanol, 1-Methyl - Hydration 4. Propane, 2-Methyl - Equilibrium diagrams 5. Cyclopentene, 1 Methyl - Hydration.

Plastics and Plasticizers

Development of heat-resistant foamed-in-place dielectric core materials for sandwich radomes, by Phillip J. Campagna, Harold M. Preston, and Norman E. Wahl. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Mar 1954. 208p photos, graphs, tables. Order from OTS. $5.50. PB 111692

Radar housings for high speed aircraft, missiles and other equipment have elevated the temperature requirements for sandwich constructions. Considerable success has been achieved in obtaining adhesives and glass-reinforced laminate skins that maintain a large proportion of their mechanical strengths at 500°F for short periods of time. The next logical step was the development of a heat resistant core material. This final report summarizes the work and accomplishments of this program. The report is divided into two parts; the first outlines the target objectives of the study and presents the results obtained; the second describes in detail the materials investigated and the data obtained. Contract no. AF-33(038)-11816, Task 41554. AAF WADC TR 54-249.

Development of a heat-resistant foamed-in-place low-density silicone resin core material, by Donald E. Weyer, James R. Russell, and Kenneth R. Hoffman. Dow Corning Corp. Midland, Mich. Supplement. Jan 1955. 115p photos, graphs, tables. Order from OTS. $3.00. PB 111555s

The most promising method of producing foamed-in-place sandwich structures from silicone resins consists of expanding a dry powdered resin containing blowing agent, catalyst and inert filler. Core density can be conveniently controlled by adjustments in the expansion temperature, and by small modifications in formulating the powder. The expansible powder produces a stable, uniform multipore foam with a pore structure predominately spherical and unicellular. None of the materials or by-products are toxic. The foams have low moisture absorption along with excellent electrical properties. They are nonflammable and very resistant to an open flame. Thermal life of the core was over 1000 hours at 600°F with no appreciable weight loss or dimensional change. Weight loss of the core after 72 hours at 700°F was less than 6 percent. Contract no. AF 33(600)-6320. Supplement to PB 111555. AAF WADC TR 53-146 Suppl. 1.

Investigation of the dynamic mechanical properties of polymethyl methacrylate, by Bryce Maxwell. Princeton University. Plastics Laboratory. Feb 1955. 35p diagrs, graphs. Order from OTS. $1.00. PB 111642

Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152B.
1. Plastics, Methacrylic - Mechanical properties 2. Plastics, Methacrylic - Tensile tests 3. SIG Contract DA 36-039-sc-42633, Final report 4. PU PL TR 36A.

Study on magnetic ceramics, by George Economos. Massachusetts Institute of Technology. Laboratory for Insulation Research. May 1954. 61p photos, drawing, diagrs, graphs, tables. Order from OTS. $1.75. PB 111625

Magnetite, manganese ferrite, and magnesium ferrite together with thirteen compositions within the system Fe_2O_3-MgO-MnO were investigated. A carbonate decomposition method of obtaining a well-dispersed oxide mix of high reactivity was used. The ferrites were also prepared and fired in various controlled atmospheres. Magnesium ferrite and one complex composition (approximate mole percent: 30 Fe_2O_3: 35 MgO: 35 MnO) with a rectangular hysteresis loop characteristic were investigated in detail under a variety of firing conditions. Changes in the magnetic properties of the complex ferrites in the center of the system Fe_2O_3-MgO-MnO could be correlated to the amount and types of ions contributing magnetic moments. X-ray and microstructure studies aided in the interpretation of the experimental data. O.N.R. Contracts N5ori-07801, N5ori-07858 and AF 19(604)-458. MIT LIR TR 78.

Inorganic Chemicals

Crystal structure of barium peroxide, by S. C. Abrahams and J. Kalnajs. Massachusetts Institute of Technology. Laboratory for Insulation Research. Jul 1954. 15p diagr, graph, tables. Order from LC. Mi $2.00, ph $2.75. PB 117470

The lattice constants of barium peroxide have been remeasured, and at 25.0°C, the tetragonal unit cell has $a = 5.384 \pm 0.010$ and $c = 6.841 \pm 0.005$A. The crystal structure has been redetermined, using a complete least-squares method, as well as triple Fourier series, based upon powder-derived intensities, measured with a Geiger counter. Contract N5ori-07801. MIT LIR TR 81.

Examination of the 1948 liquid helium vapor pressure-temperature scale, by J. R. Clement, J. K. Logan, and J. Gaffney. U. S. Naval Research Laboratory. May 1955. 24p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117720

Measurements using a carbon resistance thermometer show that errors probably exist in the 1948 liquid helium vapor pressure-temperature scale. Various authors have proposed corrections to the 1948 temperature scale. Applying these corrections significantly smooths the resistance thermometer data. Comparison of the 1948 temperature scale

with calculated temperature scales shows significant structure in the 1948 scale itself. NRL R 4542.

Quarterly periodic status report under Contract N5 ori-07819, NR 092-008, by R. L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories. Jun 1954. 16p diagrs, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117376

Covers stability of hydrogen peroxide, conductivity of its solutions, effect of pH, and surface-to-volume ratio on decomposition rate, effect of radiation on stability; partial oxidation of propane, heterogeneous vapor phase decomposition, and cyclical barium peroxide processes. DIC 6552.

Solid state properties and catalytic activity, 12th periodic status report, Apr 1, 1954-Jun 30, 1954, under Contract no. N6onr-27018, NR 051-265, by Hugh Taylor. Princeton University. Dept. of Chemistry, Princeton, N. J. Jun 1954. 5p. Order from LC. Mi $1.50, ph $1.50. PB 117473

For 9th-11th reports see PB 114084, 115107, 116327.
1. Catalysts, Iron 2. Catalysts, Manganese oxide 3. Hydrogen - Reactions 4. Vanadium oxides - Electrical properties.

ELECTRICAL MACHINERY

Communication Equipment

Interference probabilities, by Bobby Buchanan. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Communications Laboratory, Cambridge, Mass. Nov 1954. 12p diagrs. Order from LC. Mi $2.00, ph $2.75. PB 117717

A method is developed for computing (1) the probability of at least one message being received from any one transmitter without interference, and (2) the probability of at least one message being received without interference from all transmitters for a communication system consisting of n transmitters and one receiver in which each transmitter sends a random message during a given time T. AAF CRC TN 55-100.

Long-term predictions of maximum usable frequencies for sky wave communications, by Luther C. Kelley. U. S. Signal Corps. Radio Propagation Agency, Fort Monmouth, N. J. Revised. Mar 1955. 96p diagrs, maps, graphs, tables. Order from LC. Mi $4.50, ph $12.75. PB 101579r

Revision of PB 101579.
1. Radio waves - Propagation - Predictions 2. SIG RPU TR 8 Revised.

Supplementary notes on evaluation theory of communication systems. Quarterly report (Fourth), December 15, 1954 to March 15, 1955, by Frank J. Bloom. New York University. College of Engineering. Research Division. Mar 1955. 27p graph. Order from LC. Mi $2.25, ph $4.00. PB 117506

Contract no. AF 19(604)-1049.
1. Communication systems - Evaluation - Theory
2. AAF CRC TN 55-353.

Electronics

Analysis and interpretation of impedance measurements on ferrocyanide-ferricyanide electrolytic cells, by A. Edward Remick. Wayne University. Dept. of Chemistry, Detroit, Mich. Jun 1954. 26p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117408

Technical report no. 2 under Contract Nonr-604-(00), Project no. NR-051-288.
1. Electrolytic cells - Impedance - Measurements
2. Grahame's theory (Impedance).

Analysis of a side-outlet tee for impedance measurements, by A. M. Serang. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Jul 1954. 71p drawings, diagrs, graphs, tables. Order from LC. Mi $3.75, ph $10.25. PB 117504

Report 29 under Contract N7onr-29529. Appendices A-C. - Details of theory. - D. Crystal and barretter calibration. - E. Description and calibration of loads.
1. Impedance - Measurement - Equipment
2. Bridges, Impedance - Design 3. Wave guides - Theory 4. UC IER Series 60, Issue 117.

Analysis of some models of beam modulation and tube noise by the Liouville theorem, by Gedalia Held. Washington. University. Dept. of Electrical Engineering, Seattle, Wash. Jan 1955. 26p. Order from LC. Mi $2.25, ph $4.00. PB 117624

Work was started at California. University. Electronics Research Laboratory under Contract AF 33(616)-495. Technical report no. 20.
1. Vacuum tubes, Diode - Noise - Mathematical analysis 2. Electron beams - Mathematical analysis 3. Liouville theorem 4. Electrons - Velocity distribution - Theory 5. Mathematical equations and solutions.

Antennas for radio astronomy, by Roy C. Spencer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Apr 1955. 50p drawings, diagrs, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117589

Optical and Fourier techniques of analysis are particularly well suited for predicting the gain, beam-

width or beam shape, and side lobes of the antenna, starting from a knowledge of the aperture illumination; these are reviewed. More recently, applications of information theory to the optical scanning problem, and by analogy to the antenna scanning problem, have focused attention on the aperture as a spatial frequency filter. Paper presented by title at the Symposium on Astronomical Optics, April 18-23, 1955 at the University of Manchester, Manchester, England. AAF CRC TR 55-101.

Autocorrelation of F2 critical frequency deviations, by H. Poeverlein. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Propagation Laboratory, Cambridge, Mass. Aug 1954. 13p graphs. Order from LC. Mi $2.00, ph $2.75. PB 117552

1. Autocorrelation 2. Waves, Electromagnetic - Backscattering 3. Waves, Electromagnetic - Reflection - Ionosphere 4. Ionosphere - F-layer 5. AAF CRC TN 54-104.

Corner reflector standard gain antennas for 800 to 1600 megacycles, by James J. Epis. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jul 1954. 83p photos, drawings, diagrs, graphs. Order from LC. Mi $4.00, ph $11.50. PB 117505

Contract N7onr-29529, Report no. 31.
1. Antennas - Gain - Measurement 2. Antennas - Reflectors - Design 3. Antennas - Tests 4. UC IER Series 60, Issue 118.

Development of type 6AN5WA. Report no. 3 under Contract NOBsr-57576, by Douglas S. Monroe and Francis T. Gowen. Raytheon Manufacturing Co., Newton, Mass. Jan 1953. 8p. Order from LC. Mi $1.50, ph $1.50. PB 117694

1. 6AN5WA (Vacuum tube) 2. Vacuum tubes - Design.

Effect of low frequency radio waves on biological materials. Final report under Contract no. Nonr-669, NR 119-204, Oct 1, 1952 to Jun 30, 1954, by Nathan Ginsburg and Philip Cholet. Syracuse University. Institute of Industrial Research. Dept. of Physics, Syracuse, N. Y. Jul 1954. 56p graphs (1 fold), tables. Order from OTS. $1.50. PB 111656

This report investigates the effects of low frequency radio waves on viable seeds of Zea maize, as a function of frequency, intensity and exposure length. Two separate experimental approaches were followed. The first consisted of irradiation of dry seeds at various frequencies, varying field strengths, with various times of exposure, moisture content and temperature. The second experimental approach was measurement of dielectric constant, dissipation factor, and equivalent parallel resistance of the grain, with varying conditions of temperature and moisture content.

Exact treatment of antenna current wave reflection at the end of a tube-shaped cylindrical antenna, by Erik Hallen. California Institute of Technology. Electrical Engineering Dept., Pasadena, Calif. Mar 1955. 42p graphs. Order from LC. Mi $2.75, ph $6.50. PB 117501

Technical report no. 5 under Contract no. AF 18(600)-1113.
1. Antennas, Cylindrical - Current distribution
2. Antennas, Cylindrical - Mathematical analysis
3. Hallen's integral equation.

Grid-modulated traveling wave tube for low-pass amplification, by John T. Mendel. Stanford University. Electronics Research Laboratory, Stanford, Calif. Jul 1952. 107f diagrs, graphs. Order from LC. Mi $4.75, enl pr $15.25. PB 116534

Contract N6onr-251, Consolidated task no. 7 (NR-078-360).
1. Amplifiers, Low frequency 2. Frequency modulation - Research 3. Tubes, Traveling wave 4. SU ERL TR 47.

Hyperbolic amplifier (hydrodynamic attenuation equalizer), by F. E. Snodgrass and W. W. Lund. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 17p diagrs, graphs, table. Order from LC. Mi $2.00, ph $2.75. PB 117388

The hyperbolic amplifier (Hydrodynamic Attenuation Equalizer) discussed in this paper is the result of an attempt to find a device that could compensate for hydrodynamic attenuation by introducing frequency selective amplification. Contract N7 onr-295(28). UC IER Series 3, Issue 365.

Industrial preparedness study for silicon power rectifiers, by D. Bakalar, H. G. Rudenberg, D. Navon, R. Hall, and L. Huff. Transitron Electronic Corp., Melrose, Mass. Contract no. DA-36-039-sc-46638. Order separate parts described from LC., giving PB number of each part ordered.

Quarterly progress report for period Jul 1, 1954 - Oct 1, 1954. Nov 1954. 49p photos, graphs. Mi $2.75, ph $6.50. PB 117641

Electrical test equipment has been designed and constructed and is now in operation. Improvement has been made in the junction forming technique. The hermetic seal design of the silicon power rectifier is being developed. Extensive development in mounting the silicon junction to the base pin has resulted in superior silicon ohmic base contacts. The present contacts are mechanically stable at elevated temperatures with negligible contact resistance. SIG Contract DA-36-030-sc-46638.

Quarterly progress report for period Oct 1, 1954 - Jan 1, 1955. Jan 1955. 45p photos, drawings, diagr, graphs. Mi $2.75, ph $6.50. PB 117642

The hermetic seal design of the silicon power rectifier capable of operating reliably between -55°C and +100°C has been perfected. Improvement has been in the silicon doping techniques. This has resulted in greater control of silicon single crystal resistivity. Initial life test and cycling data has been obtained. Extensive temperature measurements have been obtained on the power rectifier. Additional test equipment has been designed and constructed. SIG Contract DA-36-039-sc-46638.

Introduction to the use of the scattering matrix in network theory, by Herbert J. Carlin. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Jun 1954. 61p drawings, diagrs. Order from LC. Mi $3.25, ph $9.00. PB 117438

The general algebraic properties of scattering parameters are discussed with respect to their application to lumped, linear, reciprocal networks. A basic definition is given for the reflection factor of a two terminal network and this is then extended to n-terminal pair networks where the relevant descriptive tool is the scattering matrix. The normalization of the scattering matrix is presented and power transfer through n-ports, and the properties of maximum output and biconjugate networks are shown to be simply described in terms of this normalized scattering matrix. Contract Nonr-839(05), Project NR-075-216. PIB R 366-54. PIB 300.

Inverse scattering problem, by Irvin Kay. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Feb 1955. 32p. Order from LC. Mi $2.50, ph $5.25. PB 117711

Contract no. AF 19(122)-42.
1. Waves, Electromagnetic - Scattering - Theory
2. Waves, Electromagnetic - Reflection - Theory
3. Equations, Differential 4. Mathematical equations and solutions.

Luneburg lens of continuously varying dielectric constant, by Russell W. Corkum, A. S. Gutman, Ralph E. Hiatt. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Oct 1954. 22p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117546

Compression of a polystyrene foam dielectric produces a material whose dielectric constant may be varied continuously in any prescribed manner, or held to a definite value, between limits. The practicability of this simple method is demonstrated by its successful application in the construction of a two-dimensional microwave Luneburg lens. Results obtained with a spherical Luneburg lens built from layers of polystyrene foam disks of variable dielectric constant are not satisfactory. Such a lens does not have the desired spherical symmetry in an optical sense because of internal reflections on the stratified layers, although with on-axis illumination it performs satisfactorily. AAF CRC TR 54-103.

New methods of driving-point and transfer-function synthesis, by Richard Harris Pantell. Stanford University. Electronics Research Laboratory, Stanford, Calif. Jul 1954. 108p diagrs. Order from LC. Mi $4.75, ph $14.00. PB 117507

This paper deals 1) with several methods for accomplishing driving-point impedance synthesis; 2) with new methods for separation of the impedance function into two positive-real functions; 3) with a method for accomplishing non-ladder realizations of driving-point impedance functions; and 4) with transfer-function synthesis. Contract N6onr 251(07), Task 7 NR 073-360. SU ERL TR 76.

Noise phenomena in the region of the potential minimum, by J. R. Whinnery. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Microwave Tube Group, Berkeley, Calif. Feb 1955. 35p diagrs, graphs. Order from LC. Mi $2.50, ph $5.25. PB 117502

Contract no. AF 33(616)-495. Appendix - A. Sign Convention. - B. Initial velocity of perturbed charges leaving minimum. - C. Relation between convection current and total current. - D. Alternative schedule for computing terms in power series solution. - E. Order of magnitude of "Frequency" of overcompensation effect.
1. Amplifiers - Noise - Measurements 2. Amplifiers, Traveling wave - Theory 3. Tubes, Traveling wave - Noise - Measurements 4. Tubes, Traveling wave - Theory 5. Liouville theorem 6. UC IER Series 60, Issue 132.

Nonlinear elements and filter networks, by Harold E. Ellithorn. University of Notre Dame. Aeronautical Research Laboratory, Notre Dame, Ind. Oct 1953. 115p photos, diagrs, graphs, tables. Order from OTS. $2.75. PB 111673

The use of non-linear resistors as terminating elements for linear prototype filters and the performance of lattice reactive element networks using non-linear inductance is reported. Non-linear inductors are studied by magnetization curve, equivalent circuit, and experimental means. Non-linear capacitors of barium titanate dielectric are studied for effective capacitance and instantaneous capacitance as functions of temperature, voltage, frequency, and rate of change of applied voltage. Four terminal linear networks are analyzed by, and experimentally obtained by, phase plane for attenuation and phase shift. Attempts to predict circuit performance using non-linear inductor values as obtained from phase plane analyses are made. Contract no. AF-33(038)-12646, Project no. 4155, Task no. 70514. AAF WADC TR 53-390.

On the radiative correction to high - energy electron scattering, by Hiroshi Suura. Stanford University. Dept. of Physics, Stanford, Calif. Mar 1955. 25p diagrs. Order from LC. Mi $2.25, ph $4.00. PB 117535

The one-photon radiative correction to the high-energy electron scattering by a nuclear field is analyzed to all orders of Born approximation for

the nuclear potential. The leading term of the fractional decrease of the elastic scattering cross-section is shown to be exactly the same as that given by the first Born approximation. A detailed analysis of the effect of the long Coulomb tail on the infrared divergence is made. Contract AF 18(600)-545. Report no. 545-12. SU DP TR 12.

Probe signal study of the Hull-magnetron diode, by John A. Bradshaw. Harvard University. Cruft Laboratory. Jul 1954. 87p drawings, diagrs, graphs. Order from LC. Mi $4.00, ph $11.50. PB 117508

The Hull magnetron diode is a vacuum tube essentially consisting of two concentric metal cylinders. In the diode used to obtain the results herein reported, the inner cylinder was a nickel sleeve 1/4" in diameter and it carried an oxide coating 10 cm long. The outer cylinder was a heavy copper anode. The sleeve could be heated above 1200°K and a steady voltage could be applied between it and the anode. Anode and sleeve were also sections integrated in a coaxial transmission line between a high-frequency oscillator and a detector. Changes of phase as well as of amplitude of the transmitted signal were observed over wide ranges of probe frequency, anode voltage, magnetic field and cathode temperature and were correlated with other effects. The second half of this report outlines these changes and related effects. Contract N5ori-76, Task order no. 1, NR 071-012. HU C L TR 185.

Quarterly progress report, 1 Jan - 31 Mar 1955, by J. D. Axtell, Jr. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Apr 1955. 39p diagrs. Order from LC. Mi $2.50, ph $5.25. PB 117511

Contract N7-onr-29529, and Boeing Aircraft Company research grant.
1. Wave guides - Theory 2. Electronics - Research 3. Waves, Electromagnetic - Scattering 4. Waves, Electromagnetic - Diffraction 5. Amplifiers, Feedback - Design 6. UC IER, Ser. no. 60, Issue no. 8.

Radiation from electric and magnetic dipoles in the presence of a conducting circular disk, by Carson Flammer. Stanford Research Institute, Stanford, Calif. Feb 1955. 54p diagr. Order from LC. Mi $3.00, ph $7.75. PB 117713

This report presents the vector wave function solutions of the diffraction of the radiation from electric and magnetic dipoles by a perfectly conducting circular disk and concomitantly, by virtue of the rigorous form of Babinet's principle, by a perfectly conducting plane screen perforated by a circular aperture. Contract AF 19(604)-1296. Appendix A: Vector wave functions. - Appendix B. Dyadic Green's functions. SRI TR 49. SRI Proj 1197. AAF CRC TN 55-185.

Scattering by a slot of arbitrary length in a multimode waveguide, by D. G. Angelakos and G. Held. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jun 1954. 33p diagrs. Order from LC. Mi $2.50, ph $5.25. PB 117528

Report no. 28 under contract N7-onr-29529.
1. Waveguides, Multimode 2. Electrons - Scattering 3. Atomic power - Research 4. Slots, Waveguide - Design 5. UC IER ser. 60, Issue no. 115.

Scattering by a slot radiator in a multimode waveguide, by Gedaliahu Held. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Jun 1954. 86p diagrs, table. Order from LC. Mi $4.00, ph $11.50. PB 117529

Report no. 27 under contract N7-onr-29529.
1. Waveguides, Multimode 2. Electrons - Scattering 3. Slots, Waveguide - Design 4. UC IER ser. no. 60, Issue no. 114.

Studies on alternating current electrolytic cells, by A. Edward Remick, Herbert W. McCormick and William K. Snead. Wayne University. Dept. of Chemistry, Detroit, Mich. Jun 1954. 15p. Order from LC. Mi $2.00, ph $2.75. PB 117409

Final report under Contract Nonr-604(00), Project no. NR-051-288. Contents: Part I. Effects of concentration on polarization capacity and polarization resistance in ferrocyanide-ferricyanide cells with platinum electrodes, by A. Edward Remick and Herbert W. McCormick. Part II. Determination of thermodynamic reduction potentials by an alternating current technique, by William K. Snead and A. Edward Remick.

Symposium on the Application of Transistors to Military Electronics Equipment, Yale University, 1953. Proceedings. Nov 1953. 503p photos, drawings, diagrs, graphs, tables. Order from OTS. $5.00. PB 111680

MON-500-53. Sponsored by Committee on Electronics (R & D) Office of the Secretary of Defense. Contents: Use of passive components in transistor circuits, by Vincent J. Kublin. - Effect of transistor on power sources, by Grenville B. Ellis. - Applications considerations for transistors, by R. M. Cohen. - Transistor circuit design for all-transistor a.c. servo amplifiers, by Jacob Tellerman. - D. C. transistor amplifier, by John F. Sheehan. - Transistor magnetic amplifier for tank fire control, by James Jensen. - Transistor pre-amplifier for a magnetic servo amplifier, by Marcel B. Zucchino. - Transistor servo amplifier for an airborne armament control system, by Alfred L. Reich. - Application of transistors to temperature-indicating circuits, by Morris Goldman and John MacPhee. - Thyratron-type transistor circuits, by Thomas A. Prugh and J. Walter Keller. - Transistor shift registers, by R. H. Baker, I. L. Lebow, R. E. McMahon. - Transistor blocking oscillator counter, by Parker Painter, Jr. - Transistor decade counter, by Richard E. Kimes. - Application of junction transistors to switching circuits, by R. L. Crosby and J. R. Kelsey. - Transistor phono-amplifier, by

N. W. Feldman and W. W. Hall. - Transformerless headphone amplifier, by Sidney Reed, Jr. - Negative impedance telephone repeater for field use, by R. LaRosa and H. A. Vasques. - Temperature-stabilized missile amplifier, by James B. Angell and William C. Altemus. - Analysis and design of junction transistor audio oscillator circuits, by J. B. Cakes. - Transistor pulse amplifier using external regeneration, by J. H. Vogelsong. - High-speed nonsaturating flip-flops, by A. William Carlson. - Design and performance of a transistor pulse amplifier, by Joseph Mandelkorn. - Transistor test equipment for digital applications, by Rudolph Bradbury. - Principles of transistor application and system design, by Emerick Toth and William N. Keller. - Temperature-stabilized transistor oscillator for telemetering applications, by Emery A. White. - Design of a transistorized FM signal generator, by Julius J. Hupert and Ted Szubski. - Transistorized crystal video receiver amplifier, by F. Cooper, Jr. and J. R. Little. - Transistors applied to aspect determination of a free-falling body, by T. R. Paulson. - Use of transistors in radiac instruments, by Robert R. Smyth. - Effect of shock on transistor characteristics, by Walter H. Manning. - Nonlinear communications/systems: Some aspects of clipped speech, by R. K. Saxe and R. E. Lacy. - Electrometer trigger circuit using a junction transistor as a D.C. power amplifier at the microampere level, by H. S. Bright and H. A. Zagorites.

Theory of the electromagnetic field about an antenna, according to the gap model, by John P. Vinti. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1954. 35p diagrs. Order from LC. Mi $2.50, ph $5.25. PB 117548

The Albert-Synge gap theory of antennas is completed by detailed investigation of the electromagnetic field about an antenna, with specific applications to the far zone fields about various antennas of revolution. For thin antennas the results are conventional. For thick antennas a new term arises which is proportional to the applied voltage, and the term arising from the current is somewhat changed. Dept. of the Army project no. 503-06-011. ORD project no. TB 3-0538. APG BRL R 914.

Vacuum fluctuation noise and dissipation, by J. Weber. Maryland. University. Glenn L. Martin College of Engineering and Aeronautical Sciences, College Park, Md. Jul 1954. 13p diagrs. Order from LC. Mi $2.00, ph $2.75. PB 117443

An electron beam interacting with the fields in an enclosed region is considered. The induced noise due to the vacuum fluctuations and the thermal fluctuations is calculated in terms of the dissipation function and electron transit time. Contract N-onr-879-(00).

Variable intensity peaking circuit, by Morris Halio. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Dec 1954. 17p photos, graph, table. Order from LC. Mi $2.00, ph $2.75. PB 117643

A circuit is described which is used to measure the velocity of film or paper in a drum camera. This circuit causes a lamp to emit pulses of light at accurately controlled intervals, thus producing timing lines on the recording medium. The frequency range of this equipment is 20 to 20,000 cycles per second. Dept. of the Army project no. 503-06-005. ORD project no. TB 3-0122. APG BRL M 859.

Generators, Motors, Transmission

Contributo allo studio delle cause che producono le correnti nei sopporti e delle relative protezioni (Contribution to the study of the causes which produce currents in bearings and relative protections), by Roberto Keller. Translated by F. Rizzo. Feb 1955. 11p drawings, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117399

The causes which may produce voltages and therefore currents in the shaft are enumerated. The results of some experimental observations on high power machines in operation are presented and a simple system of protection is outlined. Translated from Associazione Elettrotecnica Italiana. Rendiconti delle Riunioni annuali, 53, 1952, vol. 40, fasc. 2, paper 112. NAVSHIPS T 582.

Research and development of various configurations of core materials for optimum transformer design. Final report, Apr 1951 to Sep 1952, under Contract no. W36-039-sc-38255, by C. F. Salt, W. T. Sackett, Jr., and R. C. McMaster. Battelle Memorial Institute, Columbus, Ohio. Nov 1952. 332p photos, diagrs, graphs, tables (part fold). Order from LC. Mi $9.25, ph $42.75. PB 117510

The magnitudes and causes of variability in magnetic-material properties were considered first. Extensive test data under combined a-c and d-c excitation were obtained on selected representative samples. These data make up the major portion of this report. Experimental measuring techniques included a modified Hay bridge, and conventional ASTM core-loss and permeability testing equipment. Deterioration factors, i.e., the effect of core fabrication on material properties, are given for various core configurations. A simplified analysis was then made which showed the relative merit of various configurations for oriented silicon steel cores. Dept. of the Army project no. 3-26-00-600. Signal Corps project no. 32-2006-3. For 1st-3d, 5th-12th quarterly reports see PB 101752, 104640, 101753, 108990-108997, 107671-107672. Summarizes the 9th-13th quarterly reports, covering the extension of the contract. The 8th quarterly report (PB 108993-108995) summarizes previous work on the contract. SIG Contract W36-039-sc-38255, Final report.

FOOD AND KINDRED PRODUCTS

Ionizing radiations, their production, effects, and utilization (with special reference to food and

packaging technology). U. S. Quartermaster Food and Container Institute. Library Branch, Chicago, Ill. Order separate parts described below from OTS, giving PB number of each part ordered.

Part I. (A-K). May 1954. 266p. $6.75. PB 111635

Part II. (L-Z). May 1954. 320p. $8.00. PB 111636

Part III. Subject index. Jun 1954. 281p. $7.25. PB 111637

1. Food - Radiosterilization - Bibliography 2. Radiation, Ionizing - Biological effects - Bibliography 3. QMC TL BS 4.

Review of the literature in selected fields, compiled by the Radiation Sterilization Project. Feb 1955. 77p tables. $2.00. PB 111634

Contents: Effects of ionizing radiation upon proteins, by Charles M. Ise and Sidney W. Fox. - Effect of ionizing radiation on lipids, by James F. Mead. - Non-photolytic irradiation of carbohydrates, by W. W. Binkley and M. L. Wolfrom. - Summary of studies on the irradiation of meats, by B. S. Schweigert, D. M. Doty and C. F. Niven, Jr. - Effect of ionizing radiation upon the vitamins, by James F. Mead. - Effect of ionizing radiations on enzymes, by Joseph Glenn.

FUELS AND LUBRICANTS

Experiments with a rotating-cylinder viscometer at high shear rates, by J. A. Cole, R. E. Petersen and H. W. Emmons. Harvard University. Jun 1955. 31p diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117646

Two straight mineral oils and a polymer-containing oil have been tested in a rotating-cylinder viscometer at high shear rates (maximum 0.25 million reciprocal seconds) and the accompanying heat effects have been investigated. The torque measurements are of low accuracy, but the temperature measurements indicate the presence of temporary viscosity decrease at high shear rates for this oil. NACA TN 3382.

Formation and combustion of smoke in laminar flames, by Rose L. Schalla, Thomas P. Clark and Glen E. McDonald. U. S. National Advisory Committee for Aeronautics. 1954. 23p photos, drawings, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $.25. PB 117464

The nature and formation of smoke and its combustion were investigated. Factors affecting smoke formation were studied in both diffusion flames and premixed Bunsen flames. The variables investigated were (1) fuel type, (2) extenal air-flow rate, (3) oxygen-enrichment of external air, (4) substitution of argon for nitrogen in external oxidant, (5) fuel temperature or primary mixture temperature, and (6) pressure. The ability of a flame to burn smoke admitted from an exterior source was also studied. A critical survey was made of the literature pertaining to the mechanism of smoke formation. NACA 1186.

Smörjoljors statiska bärighet (Static bearing power of lubricating oil), by Emil Edler. Translated and edited by F. A. Raven. Apr 1955. 13p diagrs, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117566

Translated from Teknisk Tidskrift, vol. 83, 1 Dec 1953, p. 945-947.
1. Bearings, Friction - Lubrication - Sweden 2. Lubricating oils - Tests - Sweden 3. Lubricating oils - Viscosity - Sweden 4. NAVSHIPS T 578 5. STS 207.

Tensile test for rocket propellants extruded in the 2.75-inch internal-burning grain form, by F. J. Worcester and W. H. Gough. U. S. Naval Power Factory. Research and Development Dept., Indian Head, Md. Apr 1955. 17p photo, drawings, diagr. Order from LC. Mi $2.00, ph $2.75. PB 117440

A tensile test has been developed for propellant extruded in the Mk 31 grain form. This report describes the operations by which dumbbell-shaped test specimens can be obtained from thin machined slabs. The test procedure, adapted from other methods in current usage, is described in detail. NPF MR 97.

INSTRUMENTS

Apparatus for presentation and continuous measurement of error in a two-dimensional compensatory tracking task, by James C. McGuire. Washington University. Dept. of Psychology. Biomechanics Laboratory, St. Louis, Mo. Dec 1954. 31p photos, diagrs, graphs. Order from OTS. $1.00. PB 111672

An electronic compensatory-tracking apparatus which utilizes a two-dimensional target locus is described, together with its computing and recording circuits. The apparatus was designed to provide a standard task of variable difficulty for use in the study of attention. Contract no. AF 33(616)-135, Project no. 7186. AAF WADC TR 54-335.

Boundary layer radioactive tracer technique. Part 1: Instrumentation, by Frances M. Richardson, James K. Ferrell, and Kenneth O. Beatty, Jr. North Carolina State College. Dept. of Engineering Research, Raleigh, N. C. Aug 1954. 107p photos, drawings, diagrs, graphs, tables. Order from OTS. $2.75. PB 111677

A new technique for the measurement of velocity profiles in flowing fluids based on displacement of

a radioactive or dye solution from the tube has been shown to be applicable to measurements on liquids in laminar flow in round tubes, and has been used successfully for velocity measurements to within 0.002 inch of the wall of a one-half inch diameter tube. Use of dyes as tracers was made possible by adaptation of a spectrophotometer for continuous recording. The results are presented of eight sets of velocity profile measurements made using radioactive sodium carbonate solution. The present limiting factor is shown to be molecular diffusion of the tracer element, and further reduction of this appears readily possible. Contract no. AF 33(616)-31, Project no. 1363. AAF WADC TR 54-100, Part 1.

Computer components fellowship no. 347. Quarterly report no. 5, second series, Oct 1, 1954 to Dec 31, 1954. Mellon Institute of Industrial Research, Pittsburgh, Pa. Dec 1954. 85p photos, diagrs, graphs, tables. Order from LC. Mi $4.00, ph $11.50. PB 117590

Contract no. CLN AF 19(604)-943. For Quarterly reports no. 1-4, second series, see PB 114377, 114976, 115560, 117013. Contents: I. Some notes on the work of the Computer Components Fellowship, by F. A. Schwertz. - II. Dielectric films on germanium, by A. Milch and C. H. T. Wilkins. - III. Conductive transparent films on glass, by Robert Freund. - IV. New concept of circuit fabrication, by F. A. Schwertz. - V. Heterogeneous reactions in a D. C. glow discharge, by A. Milch and Robert Freund. - VI. R-C circuits at 200°C, by J. J. Mazenko, A. Milch, F. A. Schwertz. - VII. Printed circuitry via xerography, by Martin N. Haller. - VIII. D. C. electroluminescence, by Robert Freund and F. A. Schwertz. - IX. Voltage-dependence of electroluminescent brightness, by F. A. Schwertz and J. J. Mazenko. - X. Bit storage via electro-optical feedback, by A. Milch. - XI. Hyperbolic law for cathodoluminescent efficiency, by A. Milch. AAF CRC TN 55-190.

Electric analog response spectrum analyzer for earthquake excitation studies, by T. K. Caughey and D. E. Hudson. California Institute of Technology. Earthquake Research Laboratory, Pasadena, Calif. Jul 1954. 36p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117442

The design of a response spectrum analyzer for earthquake excitation studies is described. Electric analog techniques are used, with a series inductance, capacitance, and resistance circuit forming a direct analog to the mechanical structure. The circuit arrangement permits a determination of system response for a sequence of periods at constant damping. Provision is made for obtaining zero damping in the circuit. An arbitrary function generator of the variable width film - photoelectric cell type is described. 6th technical report under Contract N6onr-244, Task order 25, Project NR 081-095.

Final report on Contract no. DA-36-034-ord-1330. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N. J. Dec 1954. 178p photos, drawings, maps, diagrs, graphs, tables. Order from LC. Mi $6.75, ph $22.75. PB 117640

This report describes the operation of and engineering improvements on the electronic computer during the period from 1 July 1953 to 30 June 1954. The engineering discussion is restricted to those features of the present machine which were added during this period. A full technical description of the machine prior to this period is given in the final reports on Contract No. W-36-034-ORD-7481, (PB 108896-108898) Contract No. DA-36-034-ORD-19, (PB 114760), and Contract No. DA-36-034-ORD-1023. Project TB 3-0007.

Guam wave recorder installation: I, by F. E. Snodgrass. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 48p photos, drawings, diagrs, map, tables. Order from LC. Mi $2.75, ph $6.50. PB 117553

In order to study the relationships among microseisms, typhoons and the resulting waves, a series of three wave recorders were installed around Guam, M. I., to operate in conjunction with the microseismic station of the Naval Research Laboratory. The installation was made during the summer of 1952 and the equipment operated until Typhoon Hester on 31 December 1952. Presented in this report are the details of the equipment, the sea installation, the telemetering circuits and the recording stations. Also presented in an Appendix are the analyses of the wave records for the period of operation. Contract N7onr-295(28). UC IER Series 3, Issue 353.

High-speed computing machine calculation of supersonic axisymmetric flow, by Martha W. Clark. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1954. 33p diagrs, graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117644

This report presents the mathematical basis for machine calculation of supersonic axisymmetric flows of air. It describes the numerical method giving information on operating procedures and flow charts with special emphasis on an available ORDVAC routine, and it offers some remarks about future computations. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M 830.

Improved method of dynamic strain gage calibration, by Morris Halio. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1954. 27p photos, diagrs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117447

A strain calibrator is described which eliminates the electrical noise usually present in calibrators using ordinary switches when used in series type strain circuits employing high voltages. By performing the switching operations with mercury contact relays arcing is avoided, resulting in a very

clean oscillograph trace. This circuit supplies six equal steps for four separate ranges: 1/4, 1/2, 1 and 2 ohm intervals. An electronic switch controls the relays. This circuit has proven to be superior to previously used circuits with respect to quality of calibration record, reliability of performance and ease of maintenance. Dept. of the Army project no. 503-06-005. ORD project no. TB 3-0122E. APG BRL M 836.

Investigation of the nature of the forces of adhesion, by L. Reed Brantley, Kenneth N. Bills, Jr., and Reginald Stabler. Occidental College. Dept. of Chemistry, Los Angeles, Calif. Jun 1953. 20p photos, graphs, tables. Order from LC. Mi $2.00, ph $2.75. PB 117420

Improvements in procedure and instrumentation have made it possible to increase the precision of the Adherometer. That this instrument can be made to reproduce its readings is demonstrated. The successful application of statistical design to investigations of "hesion" with the Adherometer with a saving of time and an increase in reliability has been demonstrated. The Adherometer has also been used to investigate the effect of temperature on "hesion." The adhesion was found to decrease with an elevation in temperature. Technical report under Contract N 9-86701, Project NR 330 015.

Light scattering studies in aerosols with a new counter-photometer, by Chester T. O'Konski and George J. Doyle. California. University. Dept. of Chemistry and Chemical Engineering, Berkeley, Calif. Jun 1954. 50p diagr, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117397

A versatile light scattering instrument of high sensitivity is described. It employs a right-angle collecting system. It can be used (a) to determine the distribution of particle sizes in aerosols, by counting and classifying individual particles, and (b) to record the light scattering intensities from aerosols and gases. Procedures have been developed for calibration of the counter with the uniform polyvinyltoluene and polystyrene latex preparations. Technical report no. 1 under Contract no. Onr-222-12, Project no. NR 051-302.

New method for extracting square root on desk calculators, by George E. Reynolds. U. S. Air Force. Air Research and Development Command. Cambridge Research Center, Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Jan 1955. 34p photos, graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117708

A new and practical method is presented for the extraction of square roots on each of three common brands of desk calculators. Brief tables are provided as auxiliaries to a straightforward procedure for calculating these roots to five, six, seven, eight, and nine, significant figures. The theory upon which the method and tables are based is explained in detail. AAF CRC TR 54-120.

Numerical analysis. Progress report no. 9, Jan 1, 1954 - Jun 30, 1954, under Contract N6ori-07130, NR-044-001, by J. P. Nash. Illinois. University. Digital Computer Laboratory, Urbana, Ill. Jul 1955. 8p. Order from LC. Mi $1.50, ph $1.50. PB 117575

Contains Program library index, July 1, 1954.
1. Computers, Digital 2. Illiac (Computer).

Operation manual, shore wave recorder, Mark IX, model 5, by F. E. Snodgrass. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 79p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.75, ph $10.25. PB 117389

The Mark IX, Model 5 shore wave recorder is the last of a series of wave recorders developed by the Wave Research Laboratory. It is the one in most general use at the present time. Details are presented on the design and manufacture of the underwater pressure head, the power supply and the bridge unit. Details of actual installation and maintenance of the complete units are also given, as is information on the analysis of the wave records. Contract N7 onr-295(28). UC IER Series 3, Issue 364.

Preliminary test results using the Mink (AN/GPA-29) as a single intercept GCI computer, by Robert M. Sullivan. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Feb 1955. 36p photos, diagrs, graphs. Order from LC. Mi $2.50, ph $5.25. PB 117503

This report is concerned with tests performed at the Verona Test Site of RADC for approximately six weeks, 26 May to 1 July, 1954, to determine if the Tracker Position Indicator AN/GPA-29(Mink) has possible utility for ground-controlled intercepts (GCI). Actual data were gathered by photographic techniques from simulated aircraft tracks. AAF RADC TN 55-1.

Radio interference measurements and modifications on Fischer model "ANM" X-ray unit, U. S. Stock no. 6-124-885, by James H. Ray. Electro-Se[illegible]ch, Philadelphia, Pa. Jun 1954. 22p diagrs, graphs. Order from LC. Mi $2.25, ph $4.00. PB 117540

A description of the radio interference tests performed on an X-ray unit, is given. The modifications which were made to reduce this interference are discussed, and those which are considered to be most adaptable to production techniques are recommended. Technical report no. 158. Contract NObsr-63199.

Solution of some eigenvalue problems on the EDVAC, by Richard C. Di Prima. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jan 1955. 24p diagr, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117657

This report is concerned with the determination of the eigenvalues and eigenfunctions of linear boundary value problems on a high speed digital computer. In particular, only linear ordinary differential equations are considered. The method is applied to a second, fourth, and sixth order differential equation with satisfactory results. Dept. of the Army project no. 503-06-002. ORD Project no. TB 3-0007. APG BRL R 924.

Tip clearance flows in axial flow compressors and pumps, by Dean A. Rains. California Institute of Technology. Hydrodynamics and Mechanical Engineering Laboratories, Pasadena, Calif. Jun 1954. 102p photos, drawings, diagrs, graphs. Order from LC. Mi $4.75, ph $14.00. PB 117536

Flow in the clearance at the rotor blade tips of axial flow compressors and pumps was studied experimentally and theoreticslly with particular attention to losses. It is shown that losses due to blade tip clearances can be evaluated in a simple manner for high efficiency turbomachines. A vortex sheet formed by the clearance flow was found to roll up into a vortex of such strength that cavitation in axial flow pumps begins in the vortex rather than on the blade surface. Report no. 5 under contracts N6 ori-102, Task order IV, and Nord 9612. CIT HL 5.

Ventilation air filters: 0-5 micron dust arrestance, by Ernest N. Hellberg and William R. Nehlsen. U. S. Naval Civil Engineering Research and Evaluation Laboratory, Port Hueneme, Calif. Feb 1955. 36p photos, drawings, diagrs, graphs, table. Order from LC. Mi $2.50, ph $5.25. PB 117626

Results of 0-5 micron dust arrestance tests completed under Phase I of the investigation of ventilation air filters are given. Table I gives a complete list of the filters tested, along with the arrestance and resistance values at airflows of 800 to 3000 cfm. No general conclusions as to the best type of filter or filters can be given at this time because of the lack of the loading-characteristic data and of BW correlation that remain to be completed under Phase II of the investigation. NCEREL M-099.

MACHINERY

Comparison of performance of experimental and conventional cage designs and materials for 75-millimeter-bore cylindrical roller bearings at high speeds, by William J. Anderson, E. Fred Macks and Zolton N. Nemeth. U. S. National Advisory Committee for Aeronautics. 1954. 17p drawings, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $.20. PB 117462

Studies are reported of four experimental bearings with outer-race-riding cages and inner-race-guided rollers operated at lower temperatures and to higher DN values (product of bearing bore in mm and shaft speed in rpm) than conventional inner- and outer-race-riding cage-type bearings. Cage slip and, consequently, wear were found higher with nodular iron than with bronze at high speeds. NACA 1177.

Evaporator. I. G. Farbenindustrie, Ludwigshafen, Germany. Feb 1939. 20p drawing only (Legends in German). Order from LC. Mi $2.00, ph $2.75. PB 79300s

Listed in BIOS Final report 1331, p. 10 (PB 79300).
1. Formaldehyde - Production - Germany 2. Evaporators - Design - Germany 3. BIOS FR 1331 LD 4. Micro BIOS DOCS 2348/951/99628/7 5. Micro BIOS FD 2562/46.

Final scrubber. I. G. Farbenindustrie A. G., Ludwigshafen, Germany. Jan 1940. 12p drawing only (Legends in German). Order from LC. Mi $2.00, ph $2.75. PB 79300s2

Listed in BIOS Final report 1331, p. 10 (PB 79300).
1. Formaldehyde - Production - Germany 2. Scrubbers - Design - Germany 3. BIOS FR 1331 LD 4. Micro BIOS DOCS 2348/937/101016/13 5. Micro BIOS FD 2562/46.

Gleitlagerberechnunger (Calculations of sliding bearings), by H. Sassenfeld and A. Walther. Translated and edited by F. A. Raven. Apr 1955. 51p diagrs, tables. Order from LC. Mi $3.00, ph $7.75. PB 117514

The pressure distribution and the bearing power for the 360^{0} bearing with inclined shaft and of the 180^{0} bearing with a parallel proceeding, i.e. non-inclined shaft, are calculated. The solution of the large linear systems of equations produced was carried out with the modernized Gauss logarithm. In the last part the results are reported in the form of tables and curve diagrams designed for engineering practice. The values obtained agree well with those found by other investigators for partial areas studied. Translated from VDI-Forschungsheft 441; Supplement to "Forschung auf dem gebiete des ingenieurwesens," issue B, vol. 20, 1954, p. 1-19. NAVSHIPS T 577. STS 206.

O raschete dinamicheski nagroozennogo podchaipnika skolzeniya (On the calculation of a dynamically loaded friction bearing), by E. M. Gutyar, translated by I. C. Lecompte; edited by F. A. Raven. Apr 1955. 21p. Order from LC. Mi $2.00, ph $2.75. PB 117515

Translated from the Reports of the Academy of Sciences, USSR (Department of Technical Sciences), Nov 5, May 1953, p. 762-766.
1. Bearings, Friction - Loads - Calculations - Russia 2. Bearings, Friction - Theory - Russia 3. NAVSHIPS T 580 4. STS 209.

MEDICAL RESEARCH AND PRACTICE

Effect of inhalation of low oxygen concentration (10.5% O_2 in N_2) over a period of 33 minutes on

respiration, pulse rate, arterial oxygen saturation (oximeter) and oxygen uptake, by Karl-Ernst Schaefer and H. J. Alvis. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Aug 1951. 35p graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117700

This work is part of a study to determine oxygen consumption and carbon dioxide excretion at different partial pressure of oxygen, undertaken to better the understanding of oxygen toxicity. Results provide an answer to the long-discussed question as to (1) whether oxygen consumption is decreased at low partial pressures, and if so, (2) whether the decrease is commensurate with the decrease of partial pressure. Data revealed two distinct patterns of response to low oxygen: a high ventilation response in sedentary workers and a low ventilation response in "skin divers". NAV MRL 175. NMRI Proj NM 002 015.03. 02.

Quarterly progress report, Oct-Dec 1954, by R. H. Bolt and R. D. Fay. Massachusetts Institute of Technology. Acoustics Laboratory. Dec 1954. 34p photo, diagrs, graphs. Order from LC. Mi $2.50, ph $5.25. PB 117331

1. Acoustic research 2. Analyzers, Electronic - Design 3. Computers, Digital - Components - Design 4. AAF CRC TN 55-173.

METALS AND METAL PRODUCTS

Analysis of ear formation in deep-drawn cups, by Arthur J. McEvily, Jr. U. S. National Advisory Committee for Aeronautics. May 1955. 7p drawings. Order from National Advisory Committee for Aeronautics, 1512 H" St., N. W., Washington 25, D. C. PB 117604

A review of the literature on deep drawing and on anisotropy of metals indicates that no direct correlation has been established between the number and location of the ears on deep-drawn cups and the preferred crystallographic orientation of the blank material. In the present paper, a method for predicting earing behavior is proposed which is based on the plastic properties of single crystals and a knowledge of the preferred orientation of the blank material. The proposed method of prediction is in satisfactory agreement with reported experimental results. NACA TN 3439.

Cemented borides (Physical properties), summary progress report from May 1, 1953 to July 31, 1954, by Frank W. Geaser, Michael G. Ford, David Moskowitz, William Ivanick, Norman Grossman and others. American Electro Metal Corporation, Yonkers, N. Y. Jul 1954. 27p diagrs, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117522

A new high temperature material, designated as Borolite IV has been developed, using chromium, molybdenum, and boron, which appears superior to most of the new cermets in terms of heat resistance, resistance to oxidation, and stress to rupture strength. Work is in progress to improve its resistance to impact. Contract N6-ONR-256.

Determination of the molecular weights of molecules at high temperatures. III: Evidence for polyatomic silver vapor molecules, by Alan W. Searcy and Robert D. Freeman. Purdue University. Dept. of Chemistry, Lafayette, Ind. Jul 1954. 11p graph, tables. Order from LC. Mi $2.00, ph $2.75. PB 117475

Report no. 12 under Contract no. N7onr-394/12, Project no. NR-032-331: Preparation and properties of refractory compounds of silicon and germanium.
1. Silver - Vapor pressure - Measurement 2. Silver - Molecular weight 3. Silver - Heat of sublimation 4. Vapor pressure - Measuring equipment.

Effect of oxygen content of furnace atmosphere on adherence of vitreous coatings to iron, by A. G. Eubanks and D. G. Moore. U. S. National Bureau of Standards. May 1955. 17p photos, drawing, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117393

A series of vitreous coatings of the same basic composition, but with cobalt-oxide contents varying from 0 to 6.4 percent by weight, was fired on ingot iron in atmospheres consisting of various oxygen-nitrogen mixtures. The effect of the oxygen content of the atmosphere on adherence was determined by subjecting each specimen to the American Society for Testing Materials adherence test, and the effect on interface roughness was estimated from examination of metallographic sections. NACA TN 3297.

Elastic constants of copper alloys, by John R. Neighbours and Charles S. Smith. Case Institute of Technology. Dept. of Physics, Cleveland, Ohio. Jul 1954. 18p tables. Order from LC. Mi $2.00, ph $2.75. PB 117520

The elastic constants of single crystals of dilute solutions of Al, Si, Zn, Ga and Ge in Cu have been determined by the ultrasonic pulse method. Alloying causes a decrease in all the fundamental constants, C_{44}, $(C_{11}-C_{12})/2$ and $C_{11}+2C_{12})/3$, the relative decrease in $(C_{11}-C_{12})/2$ being the greatest. The changes in shear constants C_{44} and $(C_{11}-C_{12})/2$ have been interpreted in terms of the known electrostatic and ionic contributions to these constants for copper. The large decrease in $(C_{11}-C_{12})/2$ is attributed to the change in ion-ion interactions upon alloying. The electrostatic shear stiffness of an alloy is found to be nearly equal to the electrostatic term for copper times the square of the electron atom ratio. Contract N6onr 273, T. O. 3, NR 019 201. ONR TR 13.

Handbook of Big Delta, Alaska, environment, by Fernand de Percin, Sigmund Falkowski, and Rex C. Miller. U. S. Army. Quartermaster Research

and Development Command. Environmental Protection Division, Quartermaster Research and Development Center, Natick, Mass. Apr 1955. 61p photos, maps, diagrs, graphs, tables. Order from LC. Mi $3.25, ph $9.00. PB 117632

The Big Delta test area, located in the subarctic Tanana River Valley of central Alaska, experiences long, cold winters, and short, relatively warm summers. Cold-dry weather prevails during winter; cold-wet conditions occur at intervals during spring and fall, when daily temperatures vary above and below freezing and free moisture is present on the ground surface. The most significant climate factors for subarctic testing are low temperatures, snow and strong winds. QMC EP TR 5.

Hydrogen overvoltage and electrode material, a theoretical analysis, by Paul Ruetschi and Paul Delahay. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Jun 1954. 20p graphs, tables. Order from LC. Mi $2.00, ph $2.75. PB 117328

It is shown on a theoretical basis that the overvoltage for hydrogen evolution on various metals and for otherwise identical conditions of electrolysis is essentially a linear function of the heat of adsorption of atomic hydrogen on the electrode. Calculated heats of adsorption are listed for 25 metals. It is also shown that there is no correlation between hydrogen overvoltage for various metals and the electronic work function of these metals.

Investigation of brazing of aluminum alloy parts, by J. G. Ballingall. U. S. Naval Air Material Center. Aeronautical Materials Laboratory, Naval Air Experimental Station, Philadelphia, Pa. May 1950. 15p photos, tables. Order from LC. Mi $2.00, ph $2.75. PB 117716

This report presents the results of (a) a study to secure information from the literature on the subject of brazing of aluminum alloys, (b) tests to determine the applicability of the process to aircraft construction and repair, and (c) a determination of the tests necessary for specification requirements to control and evaluate the quality of brazed joints. Dates of test: Jun 1946-Aug 1949. NAM AML 25685.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Seventh quarterly progress report, Jan 1 to Mar 31, 1955, under Contract AF 19(604)-867, by John Koenig. Brush Laboratories Co., Cleveland, Ohio. Mar 1955. 18p drawing, graph. Order from LC. Mi $2.00, ph $2.75. PB 117723

During the contract period covered by this report, search of literature and study was carried out dealing with equilibrium conditions, stability fields and phase boundaries in the system iron - oxygen - hydrogen. From the theoretical analysis certain conclusions have been made. For 1st-5th reports see PB 112795, 114024, 114569, 115923, 116516. AAF CRC TN 55-361.

Investigations of the oxidation of chromium and nickel-chromium steels, by H. G. Yearian. Purdue University. Dept. of Physics, Lafayette, Ind. Jun 1954. 96p photos, diagrs, graphs, tables. Order from LC. Mi $4.50, ph $12.75. PB 117422

The structure of the oxide scale formed on commercial chromium steels containing 5 to 26 percent Cr when oxidized in air or oxygen at temperatures from 700°C to 1160°C for times up to 100 hours, have been determined by X-ray diffraction methods, assisted in some instances by chemical analysis. Two distinct types of scale are observed; A type scale occurs when the rate of metal loss is less than approximately 10 mg/cm^2/day and B type when the attack rate is in the excessive range. For exposures near the critical conditions an initial A type scale transforms to B type during oxidation. Summary technical report under Contract N7 onr-39419.

Iron ore production at Kirkenes, Norway, by Trevor Lloyd. Dartmouth College. Dept. of Geography, Hanover, N. H. Jun 1954. 46p photos, maps, diagrs, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117407

The geography of the seaport of Kirkenes, and its Sydvaranger Taconite iron ore workings, located in Norwegian Lapland are described and illustrated.

Lattice constants of the alkali borohydrides and the low-temperature phase of sodium borohydride, by S. C. Abrahams and J. Kalnajs. Massachusetts Institute of Technology. Laboratory for Insulation Research. Jul 1954. 10p diagrs, tables. Order from LC. Mi $1.50, ph $1.50. PB 117469

The lattice constants of sodium, potassium, rubidium and cesium borohydrides have been measured at 25.0° C as 6.1635 ±0.0005, 6.7272 ±0.0005, 7.029 ±0.001 and 7.419 ±0.001A, respectively. All four crystals are face-centered cubic and have the sodium chloride structure. Below the transition point (-83°C) sodium borohydride becomes tetragonal with lattice constants of a =4.354±0.005 and c = 5.907 ±0.005A at -195°C. OWR Contracts N5 ori-07801 and N5 ori-07858. MIT LIR TR 80.

Liquid metal heat transfer fluid (Problem no. 526) Final report on Navy Contract no. N8onr-644 (NR-013-312), by J. L. Everhart and E. L. Van Nuis. American Smelting and Refining Co., Research Dept., Barber, N. J. Jul 1950. 14p tables. Order from OTS. $.50. PB 111662

This report summarizes the results obtained during an investigation of low-melting alloys containing bismuth, indium, lead, tin and thallium. Properties studied include freezing points, density, and expansion. The corrosion of structural materials by several of these liquid alloys was investigated also. A bibliography, which supplements that issued previously, is included. Report no. N-5.

Magneto-X-ray study of magnetite at 78°K, by S. C. Abrahams and B. A. Calhoun. Massachusetts Institute of Technology. Laboratory for Insulation Research. Jul 1954. 11p photos, diagrs, graph. Order from LC. Mi $2.00, ph $2.75. PB 117471

The X-ray diffraction pattern produced by a small single crystal of magnetite after cooling through the transition at 119°K, has been examined. It is demonstrated by using orientated magnetic fields during the cooling process that up to six different domain orientations are presented in the crystal at 78°K. This number of domain orientations can be produced only if the symmetry of the low-temperature phase of magnetite is orthorhombic, or lower. ONR Contracts N5ori-07801, N5ori 07858. MIT LIR TR 82.

Overcoming rheotropic embrittlement by torsional prestrain, by J. Rozalsky. Case Institute of Technology. Department of Metallurgical Engineering. Metals Research Laboratory, Cleveland, Ohio. Jun 1954. 72p photos, diagrs, graphs, table. Order from LC. Mi $3.75, ph $10.25. PB 117418

A correlation was made of the effects of tensile and torsional prestrain upon the tensile fracture properties of annealed copper, spheroidized SAE 1020 steel and quenched and tempered SAE 1340 steel at various test temperatures. Evidence of rheotropic behavior was found at subtransition test temperatures for each of the two steels for both tensile and torsional prestrain. Technical report no. 29 under Contract N6-onr-273/I, Project NR-031-049. Appendix gives details of material and procedure.

Preliminary investigation of properties of high-temperature brazed joints processed in vacuum or in molten salt, by C. A. Gyorgak and A. C. Francisco. U. S. National Advisory Committee for Aeronautics. May 1955. 29p photos, drawing, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117394

An investigation was conducted to determine the effect of the variables temperature, time at temperature, and nickel addition to the braze alloy on the shear strength of high-temperature-alloy brazed joints processed in vacuum or in molten salt. Both brazing methods produced shear strengths greater than those of joints processed in dry hydrogen. Vacuum brazing was superior to salt-bath brazing, average shear strengths being on the order of 63,000 and 48,000 psi, respectively. NACA TN 3450.

Reaction between BaO and C and BaO and Si, by Michael Hoch, Anthony J. Lamantia and Herrick L. Johnston. Ohio State University. Dept. of Chemistry. Cryogenic Laboratory, Columbus, Ohio. Jun 1954. 15p diagrs, graphs, tables. Order from LC. Mi $2.00, ph $2.75. PB 117372

Contract no. N6 ori-17, T. O. IV, NR 358 039.
1. Cathodes, Oxide - Equilibrium pressures 2. Barium oxide - Reactions 3. Barium oxide - Thermionic emission 4. Barium silicate - Thermal properties 5. Barium carbonate - Thermal properties 6. OSURF Proj 280, Report no. 14.

Research on boron polymers: Literature survey, by William L. Ruigh and Charles E. Erickson. Rutgers University, New Brunswick, N. J. Mar 1955. 58p. Order from OTS. $1.50. PB 111689

The role of boron compounds in the technology of silicone and other synthetic rubbers is important. The patent literature does not satisfactorily reveal the chemical functions played by boron compounds. Research has been initiated on the preparation of polymeric boronamides derived from stabilized boronic acids and bifunctional isocyanates. Contract no. AF 33(616)-2057, Project no. 7340. AAF WADC TR 55-26, Part 1.

Research on the electronic configuration in the ferromagnetic materials, by Emerson M. Pugh. Carnegie Institute of Technology. Dept. of Physics, Pittsburgh, Pa. Jul 1954. 36p graphs. Order from LC. Mi $2.50, ph $5.25. PB 117478

The ordinary Hall constants for Co, Ni, Cu and their binary alloys, measured at different temperatures, can be understood on the basis of a simple four band model. The four bands consist of the two halves of the 4s band with spin parallel and antiparallel to the magnetic field and two sub-bands of the 3d shell also having spins parallel and antiparallel. Final report on Contract Nonr-260(00). Includes Band models for explaining data from Hall effect, magnetization, and resistivity measurements on magnetic elements and their binary alloys.

Soft X-ray absorption of evaporated thin films of tellurium, by M. Parker Givens and Brian O'Brien. Rochester. University. Rochester, N. Y. Jul 1954. 11p graphs. Order from LC. Mi $2.00, ph $2.75. PB 117521

The linear absorption coefficient of tellurium has been measured in the wavelength region 100A to 400A. A double peak was observed at about 300A; this is due to transitions from the N_{IV} and N_V levels to the conduction band. A broad peak at shorter wavelengths was also observed. Technical report under Contract N6onr-24109 NR-017-202.

Studies in the behavior of certain non-ferrous metals at low temperature. Final report, vol. I, under Contract no. DA 36-039-sc-15393, by Alfred Bornemann and Theodore Gela. Stevens Institute of Technology. Peirce Memorial Laboratory for Metallurgy, Hoboken, N. J. Dec 1953. 157p photos, graphs, tables. Order from OTS. $4.00. PB 111657

Study of low temperature engineering properties of beryllium copper, Invar or Nilvar, molybdenum, tungsten, and tantalum. Bibliography included. Signal Corps project 2005-M08-Metals. SIG Contract DA-36-039-sc-15393, Final report, vol. I.

Study in non-ferrous and ferrous alloys at low temperatures, by Milton Margolis and Alfred Bornemann. Stevens Institute for Technology. Peirce Memorial Laboratory for Metallurgy,

Hoboken, N. J. Contract W36-039-sc-38135. Order parts described below from LC, giving PB number of each part ordered.

First quarterly report for period 1 Sep 1948 to 30 Nov 1948. Dec 1948. 93p graphs, fold tables. Mi $4.50, ph $12.75. PB 117704

This report consists of two parts. The first part is a survey of data pertaining to room temperature and low-temperature engineering properties of beryllium bronze, phosphor bronze, magnesium-manganese alloy, magnesium-low aluminum alloy, lead-tin solders and silver-solder (Easy Flo, 50% silver). Tables showing the kind of tests for which data is available in the literature have been compiled for the above metals as well as for wrought nickel and monel. The second part contains a summary of the various known conditions under which the low temperature transformation of tin or tin-alloys will or will not occur. The kinds of tests which will be performed to discover the effect of other conditions upon the rate of the allotropic transformation of tin are described. SIG Contract W36-039-sc-38135, Quarterly report no. 1.

Second quarterly report for period 1 Dec 1948 to 28 Feb 1949. Mar 1949. 57p photos, drawings (part fold), diagrs, table. Mi $3.00, ph $7.75. PB 117705

This report period has been devoted to constructing equipment for the low temperature testing program and in gathering together materials to be used in the tests. Effort has been concentrated on laying the groundwork for the study of solders. The cryostats are almost completed. Their design and a description of the problems encountered in their construction are included in this report. Preliminary work has also been done on the adaptation of the Sonntag Type SF2 Flexure Fatigue Testing machines for low temperature tests. The ultra high frequency generator has been constructed and is described. Recent information appearing in the literature on problems related to this project have been abstracted and critically appraised. SIG Contract W36-039-sc-38135, Quarterly report no. 2.

Third quarterly report for period 1 Mar 1949 to 31 May 1949. Jun 1949. 33p photos, drawing, graphs. Mi $2.50, ph $5.25. PB 117706

During the present report period all the material necessary for carrying out tests on tin-lead solders was received. Difficulties arising in the operation of the cryostats are described and the remedies applied discussed. Room-temperature fatigue tests and impact tests at various temperatures were made on pure tin specimens, the impact tests being made within twenty-four hours after casting and after storage at minus 100°F for seven weeks. Additional information is given on the effect of storage at a low temperature on pure tin and a tin-lead alloy. Dept. of the Army project 3-93-00-500. Signal Corps project 2005. SIG Contract W36-039-sc-38135, Quarterly report no. 3.

Thermionic emission from surfaces with adsorbed active centers, by George A. Haas. U. S. Naval Research Laboratory. Mar 1955. 24p drawings, diagrs, graphs. Order from LC. Mi $2.25, ph $4.00. PB 117509

A theoretical study has been made of the physical meaning of the thermionic emission constant A and the work function ϕ as obtained from a nonhomogeneous surface. A method is given for calculating such quantities as the fraction of a monolayer on the surface (ν) and the fraction of the total area covered by the active centers (θ). Applying these results to a surface of thorium on tungsten gives good agreement in the variation of the number of active atoms on the surface with time of activation for two independent empirical methods of calculating ν. The temperature dependence of the work function is also obtained and is plotted for various states of activation. NRL R 4508.

Thermodynamic properties of titanium halides in molten salt systems. Technical report no. 1: Development of the experimental method, by P. Herasymenko and B. L. Dunicz. New York University. College of Engineering. Research Division. Jul 1954. 34p photos, drawings, table. Order from LC. Mi $2.50, ph $5.25. PB 117523

A method for the measurement of the partial vapor pressure of inorganic salts over their melts has been developed. The vapor over the melt is collected in a small pipette of known volume, condensed on the inner walls of the pipette by rapid cooling, and the amount and kind of the condensate determined by quantitative microanalysis. The design of the apparatus is described. The method was checked with substances of known vapor pressure and was found to give satisfactory results with an accuracy of +0.2 mm Hg in the range from 400 to 900°C. Contract no. Nonr-285(13). Appendix I: Estimation of the partial vapor pressure of titanium tetrachloride. - Appendix II: Design of the modified apparatus for the determination of partial vapor pressures.

METEOROLOGY AND CLIMATOLOGY

Abhängigkeit der korrelation zwischen sonnenfleckenzahlen und erdmagnetischen aktivitätszahlen von der tätigkeitsphase innerhalb der 11-jährigen periode (Dependency of the correlation between the sunspot numbers and the geomagnetic activity measures upon the activity phase within the 11-year period), by W. Brunner. Translated by Edith Kulstein. Mar 1955. 8p graph, tables. Order from LC. Mi $1.50, ph $1.50. PB 117401

A statistical study of the correlation between magnetic activity and sunspot maximum periods for the years 1835 to 1931. Translated from Astronomische Mitteilungen, vol. 13, p. 131-136, 1939, under Contract no. AF 19(604)-1364 with American Meteorological Society.

Correlation of meteorological parameters with cosmic ray data, by Mario Iona. Denver. University. Dept. of Physics, Denver, Colo. Jul 1954. 68p drawing, diagr, graphs, tables. Order from LC. Mi $3.25, ph $9.00. PB 117709

The effect of temperature changes of the atmosphere on the cosmic ray intensity is expected to depend on the momentum of the radiation under observation and on the atmospheric depth at which the temperature changes occur. It was, therefore, attempted to isolate these factors by using for the correlation measurements radiation of well defined energy and to compare the measurements at different altitudes. Contract AF 19(122)-54. AAF CRC TR 54-251.

Far infrared transmissivities and their application to computing radiative fluxes in the atmosphere, by Walter M. Elsasser. Utah. University. Dept. of Physics, Salt Lake City, Utah. Sep 1954. 26p. Order from LC. Mi $2.25, ph $4.00. PB 117725

Work under this project covers: 1) A study of mathematical transfer formalism, in particular the pressure effect on the line width in so far as it affects transmission over thick layers. Radiative equilibrium of a non-gray layer has been investigated for the first time. 2) Transmission experiments on carbon dioxide and ozone have been used to obtain curves of mean transmissivity and generalized absorption coefficients on a logarithmic scale. 3) Extensive absorption measurements on water vapor covering the region from 5 to 25 microns were made which should be basic for future construction of water vapor charts. Final report under Contract no. AF 19(122)-392: Stratospheric radiation.

Final report under Contract no. AF 19(604)-309, by Sverre Petterssen. Chicago. University. Dept. of Meteorology. 1955. 44p table. Order from LC. Mi $2.75, ph $6.50. PB 117343

A review of the literature on weather forecasting techniques has been made and the conclusion is reached that progress is most likely to result from applications of the vorticity theorem to the large and medium-scale motion and weather systems, and, also, by further development of techniques for statistical treatment of synoptic data. Experiments have been made to determine whether it is possible to compute the distributions of vertical motions and divergence in cyclones and anticyclones. AAF CRC TR 55-252.

Investigation of cyclone development, storm no. 4, by Lynn L. Means. Chicago. University. Dept. of Meteorology. Oct 1954. 39p diagrs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117342

The development of a storm which occurred in the United States during the period December 13-15, 1951 is investigated. An attempt is made to ascertain to what extent this development could be accounted for by the terms in the vorticity equation which derive from the vorticity advection and the thermal advection. It is found that the computed patterns agree well with those observed, although the numerical values are considerably exaggerated. Computed values of vertical velocity and divergence are compared with the observed patterns of clear sky, and precipitation, and, on the whole, good agreement is found. The use of vorticity charts and thermal advection charts in routine forecasting is discussed briefly. Contract no. AF 19(604)-309. Technical report no. 8. Appendix I: Equations and symbols. - References to the literature. AAF CRC TN 55-274.

Measurement of polydispersity in aerosols; Status of differential settling apparatus, by Victor K. LaMer and Mary Louise Young. Columbia University. Central Aerosol Laboratories, New York, N. Y. Nov 1950. 11p drawings, tables. Order from LC. Mi $2.00, ph $2.75. PB 117366

Progress report no. 4 under Contract AF 19(122)-164, covering period from Sep 1 to Nov 1, 1950. 1. Generators, Aerosol 2. Aerosols - Dispersion 3. Aerosols - Particle size - Measuring equipment - Design 4. Aerosols - Settling chambers - Design.

Meteorological aspects of pressure pattern flight. U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Dec 1954. 69p diagrs, graphs, tables. Order from LC. Mi $3.25, ph $9.00. PB 117583

1. Flight path - Calculation 2. Airplanes - Flight paths - Meteorological aspects 3. AAF AWS M 345-1 Revised.

Project Mint Julep: Investigation of construction and maintenance of airdromes on ice, fiscal years 1953 and 1954. Part IV: The report of Arctic Construction and Frost Effects Laboratory for 1953. U. S. Army. Corps of Engineers. New England Division. Arctic Construction and Frost Effects Laboratory, Boston, Mass. Jun 1954. 155p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $6.25, ph $20.25. PB 117534

This report presents the tests conducted, results of tests, conclusions based on tests and recommendations for further investigations. It is concluded that runways for wheeled aircraft can be constructed and maintained on ice surfaces near the firn line for ten to eleven months of the year in the present state of knowledge of snow and ice mechanics. In areas of substantial snow cover above the firn line snow compaction procedures are necessary for construction of runways. Project carried out in 1953 by the American Geographical Society under contract with the Arctic, Desert, Tropic Information Center, Research Studies Institute, Air University, U. S. Air Force.

Radar-synoptic investigation of the rainstorms of November 23 and 25, 1953, in the Boston area, by Roland J. Boucher, Pauls H. Putnins, John P. Webber, Raymond Wexler and Charles F. Brooks. Harvard University. Blue Hill Meteorological Observatory, Milton, Mass. Mar 1955. 70p photos, maps, diagrs. Order from LC. Mi $3.25, ph $9.00. PB 117519

Two similar heavy rainstorms are investigated by means of radar and detailed synoptic analyses. Significant features of the small scale pattern of precipitation as revealed by the radar are related to the larger scale features of the synoptic pattern. Two squall lines, one discovered by radar, appear dynamically related to jet streams. Meteorological radar studies, no. 1. Contract no. AF 19(604)-950. HU BHMO MRS 1.

Research on objective weather forecasting, by H. Flohn and collaborators. Germany. Reichsamt für Wetterdienst. Aug 1954. 188p maps, diagrs, tables. Order from LC. Mi $7.00, ph $24.00. PB 117337

Final report under Contract AF 61(514)-434. Contents: Part A. Characteristic processes in numerical forecasting. - Part B. Some numerical tendency computations from a multiple-parametric model. - Part C. Relation between the fields of wind and pressure and their dependence on geographic latitude. - Part D. On the influence of disturbances on a non-homogeneous basic current. - Part E. On the behaviour of truncation errors in solution of the two dimensional and non divergent vorticity equation. AAF CRC TR 55-259.

Singularities in the sequence of European Grosswetter types, by Reid A. Bryson, James F. Lahey, Peter M. Kulin and William P. Lowry. Wisconsin. University. Dept. of Meteorology, Madison, Wis. May 1955. 19p diagrs, graph, tables. Order from LC. Mi $2.00, ph $2.75. PB 117638

To investigate singularities in large scale weather patterns, the daily weather types in the "Katal[illegible]er Grosswetterlagen Europas" were considered. The potential importance of determining preferred weather sequences following key dates for weather transitions, and key dates for occurrence of anticyclonic or cyclonic weather regimes are reviewed. Contract AF 19(604)-992. Scientific report no. 2. AAF CRC TN 55-299.

Stress-strain relations in snow under uniaxial compression, by Joseph K. Landauer. U. S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Feb 1955. 10p graphs, table. Order from LC. Mi $1.50, ph $1.50. PB 117584

This paper contains a summary of work done during the past year on the uniaxial compression of snow. Two types of tests were performed; experiments at constant specific velocity and tests at constant load. The visco-plastic behavior of snow is correlated with density, temperature, stress, and snow type. Project 22.1-7. Appendix: Deformation of snow under certain idealized conditions. SIPRE RP 12.

Structural features of the planetary nebulae, by Lawrence H. Aller. Michigan. University. Ann Arbor, Mich. Jul 1954. 12p tables (1 fold). Order from LC. Mi $2.00, ph $2.75. PB 117524

Final report under Contract no. Nonr-809(00), Project no. NR-046-723.
1. Spectra - Emission - Analysis 2. Nebulae, Planetary - Isophotal contours - Measurements 3. Nebulae, Planetary - Spectrographic analysis - Methods.

Studies of the intensity of light scattered by water fogs and ice aerosols, by William C. Thuman, Gilbert A. St. John, and Ilia G. Poppoff. Stanford Research Institute, Stanford, Calif. Mar 1955. 51p photos, drawings, diagrs, graphs. Order from LC. Mi $3.00, ph $7.75. PB 117404

Ice fogs in Alaska were investigated and an instrument developed which would record the ratio of the intensity of light scattered at horizontal angles between 15 and 165 degrees to the intensity of light scattered at 90 degrees. Tests were conducted on supercooled water fogs and true ice fogs. The results indicated that the ice fog in situ was indeed particulate ice. Other relationships relating temperature and time to particulate sizes were investigated. Contract AF 19(122)-634, Scientific report V. Report no. 18. SRI Proj CU-473, Report no. 18.

Study of certain problems in the field of absorption of microwave energy in the atmosphere. Quarterly progress report VII, period Jan 1, 1955 to Mar 31, 1955, under Contract no. AF 19(604)-831, by Edwin K. Gora. Providence College, Providence, R. I. Apr 1955. 11p. Order from LC. Mi $2.00, ph $2.75. PB 117639

For 1st-4th reports see PB 112611, 113557, 115001, 115056.
1. Atmosphere, Upper - Ozone - Microwave absorption 2. Radio waves - Absorption - Theory 3. AAF CRC TN 55-357.

Surface of least divergence and the level of least divergence, by Holbrook Landers. Florida State University. Dept. of Meteorology. Nov 1954. 64p diagr, maps, graphs, tables. Order from LC. Mi $3.25, ph $9.00. PB 117448

A three-dimensional picture of the horizontal velocity divergence is constructed at seven times at twelve hour intervals using observed winds as a basis for divergence computations. Principle conclusions are 1.) that the surface of least divergence and its time changes do not correlate well with the synoptic map and its changes but that vertical velocities computed on this surface correlate very well with the precipitation pattern, 2.) that various kinds and degrees of smoothing do not appreciably change the order of magnitude of the divergence, 3.) that interesting diurnal variations in divergence intensity occur when the times 0300 GCT and 1500 GCT are compared. Contract AF 19(122)-466. Scientific report no. 7. AAF CRC TN 54-293.

Synoptic climatology of the Arizona summer monsoon, by Reid A. Bryson and William P. Lowry.

Wisconsin. University. Dept. of Meteorology, Madison, Wis. Apr 1955. 44p diagrs, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117637

Contract AF 19(604)-992. Scientific report no. 1.
1. Climate - Arizona 2. Meteorology - Arizona 3. AAF CRC TN 55-291.

Techniques of cosmic ray timing experiments, by G. W. Keuffel. Princeton University. Palmer Physical Laboratory, and U. S. Naval Ordnance Laboratory. Jun 1954. 42p diagrs. Order from LC. Mi $2.75, ph $6.50. PB 117543

This report describes in detail the fast timing techniques which have been developed during the past few years in the Princeton cosmic ray group, and applied to the study of meson decay. Experiments of this sort yield detailed information on the time relationships in cosmic ray events and only rough information on the space relationships. Thus they complement the cloud chamber and the photographic emulsion, which yield detailed space information but only rough time information. Contract N6onr-270-II. Appendix: A simple and compact hodoscope. PU PPL TR 15.

Turbulent transfer of momentum in the lowest layers of the atmosphere, by E. L. Deacon. Australia. Commonwealth Scientific and Industrial Research Organization. Division of Meteorological Physics. 1955. 36p graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117596

Technical paper no. 4.
1. Atmosphere - Turbulence - Dynamics - Australia 2. Momentum - Transference - Australia.

Wiresonde observations during the winter of 1953-54 at Eielson Air Force Base, Alaska, by Gordon B. Bell, Jr. and Elmer Robinson. Stanford Research Institute, Stanford, Calif. Sep 1954. 29p photos, diagrs, graphs, table. Order from LC. Mi $2.25, ph $4.00. PB 117547

Contract no. AF 19(122)-634, Scientific report no. VI. For 1952-53 report see PB 114712.
1. Fog, Ice - Measurement - Alaska 2. Atmosphere - Temperature - Measurement - Alaska 3. Wiresondes - Design 4. SRI Proj CU-423, Report no. 19.

MINERALS AND MINERAL PRODUCTS

Stability relations of silicate-carbonates at elevated temperatures and pressures. Third progress report (first annual report) for period Sep 15, 1953 to Jun 30, 1954 under Contract no. Nonr-656, Task order 6, Project no. NR 081-204, by R. I. Harker and O. F. Tuttle. Pennsylvania State College. Mineral Industries Experiment Station, State College, Pa. Jun 1954. 53p drawings, diagrs, graphs, tables. Order from LC. Mi $3.00, ph $7.75. PB 117406

1. Pumps, Carbon dioxide - Design 2. Tremolite - Decomposition 3. Wollastonite - Decomposition 4. Magnesite - Decomposition 5. Dolomite - Decomposition 6. Calcite - Decomposition 7. Calcium compounds - Stability.

PACKING AND PACKAGING

Sorption of water vapor by cellulosic cushioning materials, by Howard M. Weiner. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Feb 1955. 11p photo, tables. Order from OTS. $.50. PB 111661

Seven cushioning materials were tested at 100F and 95% relative humidity to determine how much water vapor would be sorbed, both in the presence of silica gel dessicant and when the dessicant was not used. Dept. of the Army project 591-07-001. Ordnance project TB 4-672. PATR 2141.

PERSONNEL APTITUDE TESTING

Analysis of peer ratings: II. Their validity as predictors of military aptitude and other measures in the Naval Officer Candidate School, by T. R. Vallance. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1954. 14p tables. Order from LC. Mi $2.00, ph $2.75. PB 117429

This report investigates (1) The relationship between three peer rating questionnaires and military aptitude marks assigned by members of the school staff. (2) The difference between the three peer rating questionnaires as indicators of the military aptitude marks to be given by staff officers. (3) How peer ratings are related to other measures of success at OCS. Officer Personnel Research Program. Contract Nonr 890(01). NAVPERS TB 54-10.

Development and validation of a battery to predict peer ratings of Navy officer candidates, by Albert S. Glickman. American Institute for Research, Inc., Pittsburgh, Pa. Jul 1954. 19p tables. Order from LC. Mi $2.00, ph $2.75. PB 117610

Officer personnel research program, Contract Nonr 890(01).
1. Personnel, Naval - Ability tests 2. Personnel, Naval - Psychological records 3. Tests, Officer qualification 4. NAVPERS TB 54-13.

Development and validation of an experimental battery to select officer candidates for the Navy, by Albert S. Glickmann and T. R. Vallance. American Institute for Research, Inc., Pittsburgh, Pa. Jul 1954. 21p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117609

Officer personnel research program, Contract Nonr 890(01).

1. Personnel, Naval - Ability tests 2. Personnel, Naval - Selection 3. Tests, Officer qualification 4. NAVPERS TB 54-12.

Development of aircrew job element aptitude tests, by Mahlon V. Taylor, Jr., and Richard O. Peterson. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 35p tables. Order from LC. Mi $2.50, ph $5.25. PB 117490

This research bulletin reports the third phase of a program of analysis designed to improve classification of airmen into aircrew specialties. The first phase of the program was concerned with the development of a job analysis procedure based on the critical incident technique. In the second phase 19 job elements involving ability factors and 5 involving attitudes and temperament were isolated. These were reduced to 16 which could be tested by paper-and-pencil instruments. This bulletin reports the further refinement of these elements and the development of aptitude tests to identify the individuals possessing them. Contract no. AF 18(600)-15, American Institute for Research. Project no. 7701, Task no. 77025. Technical appendixes listed but not included. AAF PTRC TR 54-88.

Development of a preliminary life experience inventory for the study of fighter interceptor pilot combat effectiveness, by E. Paul Torrance. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Dec 1954. 52p tables. Order from LC. Mi $3.00, ph $7.75. PB 117491

This research bulletin describes the development of the life experience inventory, Form F-86, a biographical inventory intended to identify potential fighter pilots. Twelve trait scales were developed, plus two general scales to differentiate fighter interceptor pilots from multiengine pilots and aces from nonaces. Relationships between the ace scale and previously hypothesized characteristics were found to be significant in the expected directions. Altogether, scores from 103 jet interceptor pilots and 138 multiengine pilots were involved. Project no. 7680, Task no. 76803. AAF PTRC TR 54-89.

Learning measures as predictors of success in torpedoman's mates school, by Roger B. Allison, Jr. Educational Testing Service, Inc., Princeton, N. J. Jun 1954. 29p diagrs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117439

The purpose of this study was to develop a measure of learning ability that would predict success in Navy schools teaching mechanical-motor skills. When combined with scores from the Navy Basic Test Battery, the learning measure was also expected to increase the predictive effectiveness obtainable from the basic battery alone. The results of the study showed that the learning measure could be used by itself to predict success in the school about as effectively as was possible with many of the tests from the basic battery. A second method for assessing learning ability was developed around a paper-and-pencil alternate for the assembly test. Contract Nonr-694(00), Project NR 151-113.

Method for man-machine task analysis, by Robert B. Miller. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1953. 66p tables. Order from LC. Mi $3.25, ph $9.00. PB 117702

This report describes a systematic procedure for making a task analysis of the operator's job in any man-machine system. The quality and quantity standards defined for the man-machine system are analysed into constituent variables or functions. The operator is treated as part of the system's linkages from input to output functions. The method, although of general applicability, is specifically designed for use by trained specialists in planning for training and training equipment. Contract no. AF 33(038)-22638. AAF WADC TR 53-137.

Naval knowledge test: Construction and validation, by Albert S. Glickman. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1954. 19p graph, tables. Order from LC. Mi $2.00, ph $2.75. PB 117433

It appears that a form of the Naval Knowledge Test of about 70 items, requiring about 25 minutes administration time, can be prepared which will consistently contribute a substantial increment of predictive efficiency to the screening of civilian applicants for the Navys' Officer Candidate School, beyond that obtainable through the use of the Officer Qualification Test as a single selection instrument. Officer Personnel Research Program, Contract Nonr 890(01). Appendix includes a table showing Naval knowledge item correlations with Officer qualification test. NAVPERS TB 54-7.

Prediction of disenrollment from Officer Candidate School from background variables, by Albert S. Glickman. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1954. 11p tables. Order from LC. Mi $2.00, ph $2.75. PB 117432

This study was undertaken in order to find out whether age, university or college attended, major subject, and dependency status could be used as reliable indicators of the probability of graduating. Officer Personnel Research Program, Contract Nonr 890(01). NAVPERS TB 54-8.

Proficiency of Q-24 radar mechanics. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Order parts described below from LC, giving PB number of each part ordered.

V: Level of trouble-shooting performance observed, by Norman A. Crowder. Dec 1954. 42p diagrs, graphs, tables. Mi $2.75, ph $6.50. PB 117496

The following main points are covered: The AN/APQ-24 system and the line mechanics job, the design of the performance trouble-shooting test, administration of the test, tabulating categories, results and a discussion on the representativeness of the results and implications for training. Project no. 7709, Task no. 77151. For Parts 1-4, 6 see PB 115922, 116124, 116158-116159, 117493. AAF PTRC TR 54-102.

VI: Analysis of intercorrelations of measures, by Norman A. Crowder, Edward J. Morrison, and Robert G. Demaree. Dec 1954. 74p photos, drawings, diagrs, graphs, tables. Mi $3.75, ph $10.25. PB 117493

This report includes the results of two methods of analysis of the intercorrelations. The first is a multiple-regression analysis of selected sets of variables against particular single variables. The second is a factor analysis of all of the variables. Project no. 7709, Task no. 77151. For parts 1-5 see PB 115922, 116124, 116158, 116159, 117496. AAF PTRC TR 54-127.

Reading interests of airmen during basic training, by George R. Kalre, Levarl M. Gustafson, and James E. Mabry. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Technical Training Research Laboratory, Chanute Air Force Base, Ill. Nov 1953. 12p. Order from LC. Mi $2.00, ph $2.75. PB 117349

This bulletin presents the results of an administration of a reading interest check list to 398 Sampson Air Force Base basic airmen. The check list contains 117 statements designed to cover the range of nonfiction reading interests. Contract no. AF 33(038)-25726, Project no. 507-011-0001. AAF HRRC RB 53-44.

Selection and classification tests for women, a review of the literature, by Barbara Wand and William G. Mollenkopf. Educational Testing Service, Inc., Princeton, N. J. Jun 1954. 67p tables. Order from LC. Mi $3.25, ph $9.00. PB 117431

The purpose of this review of the literature was to examine the appropriateness of using with women the same selection and classification procedures that are used with men in situations in which both men and women are selected for the same jobs. Particular attention was paid to reports of the selection of women for jobs similar to billets in the U. S. Navy. The findings tend to support the assumption that tests developed and used for the selection of men must be carefully examined prior to their use in selecting women for the same jobs. Contract no. Nonr-694(00). NAVPERS TB 54-11.

PHOTOGRAPHIC AND OPTICAL GOODS

Application of sound motion pictures for recording billet analysis information, by Charles J. McIntyre and Edward P. McCoy. Pennsylvania State University, State College, Pa. Mar 1954. 17p photos. Order from LC. Mi $2.00, ph $2.75. PB 117530

Contract N6onr-269, T. O. VII. Project 20-E-4b. Instructional film research program.
1. Motion pictures, Educational 2. Motion pictures, Educational - Preparation 3. SDC TR 269-7-41.

Kerr cell as an ultra-high-frequency optical shutter. 1. Theoretical analysis, by G. L. Clark, D. F. Holshouser and H. M. von Foerster. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory. Electron Tube Research Section. Mar 1955. 133p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $5.75, ph $17.75. PB 117437

In the literature there is little or no information of a general nature on the design and operation of Kerr cells. This analysis is an attempt to provide the necessary engineering knowledge for the design and operation of Kerr cells operating under a wide range of conditions. While this analysis should be particularly useful in the design of Kerr cell systems for producing very short or very frequent pulses of light, it covers, as special cases, low frequency and electrostatic operation. Technical note no. 1-1 under Contract no. AF 18(600)-1018, Project no. R-115-032.

Photography at the AN/CPS-9 weather radar at Montreal airport, by M. P. Langleben and Walter Hitschfeld. McGill University. MacDonald Physics Laboratory. "Stormy Weather" Research Group, Montreal, Canada. Jan 1955. 14p photos, diagrs. Order from LC. Mi $2.00, ph $2.75. PB 117656

This note reports the installation of the CPS-9 weather radar at Montreal Airport and surveys briefly the methods adopted for photographing the scopes. It was found advantageous to photograph remote displays, thus giving the radar operator complete freedom to manipulate the controls at the main console. MW T-1. AAF CRC TN 55-298.

PHYSICS

General

Analysis of fully developed turbulent heat transfer and flow in an annulus with various eccentricities, by Robert G. Deissler and Maynard F. Taylor. U. S. National Advisory Committee for Aeronautics. May 1955. 42p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117457

A previous analysis for turbulent heat transfer and flow in tubes was generalized and applied to an annulus with various eccentricities. Velocity distributions, wall shear-stress distributions, and friction factors, as well as wall heat-transfer distributions,

wall temperature distributions, and average heat-transfer coefficients, were calculated for an annulus having a radius ratio of 3.5 at various eccentricities. NACA TN 3451.

Application of the invariance principle to the student hypothesis, by Paul L. Meyer. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1954. 31p diagrs. Order from LC. Mi $2.50, ph $5.25. PB 117611

Contract N6onr-251, Task order III (NR-042-993).
1. Random functions 2. Statistical theory 3. Mathematical equations and solutions 4. SU AMSL TR 24.

Biased estimate of the process average, by Aloise Askin and Donald Guthrie. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1954. 15p tables. Order from LC. Mi $2.00, ph $2.75. PB 117607

The purpose of this report is to investigate existing estimates of the process average and to propose more sensitive criteria for tightened and reduced inspection under the double sampling plans of MIL-STD-105A, (Sampling Procedures and Tables for Inspection by Attributes). Contract N6onr-25126 (NR-042-002). SU AMSL TR 14.

Couette flow between two parallel plates as a function of the Knudsen number, by C. S. Wang Chang and G. E. Uhlenbeck. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jun 1954. 24p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117545

Contract no. N6onr-23222.
1. Couette flow 2. Knudsen number 3. Gas flow - Theory 4. Mathematical equations and solutions 5. MU ERI Proj M 1999.

Distribution of the average-range for subgroups of five, by George J. Resnikoff. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1954. 18p tables. Order from LC. Mi $2.00, ph $2.75. PB 117608

Contract N6onr-25126 (NR-042-002).
1. Random distribution - Theory 2. Sampling (Statistics) 3. Tables, Mathematical 4. SU AMSL TR 15.

Electrical clean-up of gases. Quarterly report, Jan 1955-Mar 1955, on Contract no. AF 18(600)-1049, by R. S. Buritz and L. J. Varnerin, Jr. Westinghouse Electric Corporation. Westinghouse Research Laboratories, East Pittsburgh, Pa. Apr 1955. 9p drawing, graphs, table. Order from LC. Mi $1.50, ph $1.50. PB 117718

This report includes a comprehensive discussion of pumping experiments in which the collecting surface is metal. These experiments were concerned primarily with the pumping of argon into molybdenum. Molybdenum was chosen because it can be outgassed thoroughly and is used widely in tubes. The tube in which experiments were conducted is a cylindrical triode with an axial filament, a surrounding grid to accelerate electrons, and a coaxial molybdenum ion collector. In all the experiments, the grid was maintained +150 volts relative to the cathode. Research report 71 F 191-R4. For other reports on this contract see PB 116569-116571.

Equations of a simple flame solved by successive approximations to the solution of an integral equation, by G. Klein. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Jun 1954. 27p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117421

The problem of an idealized flame whose underlying chemical reaction is unimolecular, reversible, and of the first order, is reconsidered here (kinetic energy of the gas stream being neglected). Its solution is made to depend on the solution of an integral equation which contains an unknown parameter whose eigenvalue has to be determined. This equation is solved by a method of successive approximations. Contract N7onr-28511. WIS-ONR-8.

Exact re-statement of the equations of motion of a rigid projectile for use with modern computing machinery, by Serge J. Zaroodny. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Sep 1954. 14p. Order from LC. Mi $2.00, ph $2.75. PB 117549

Because of the inherent complexity of the motion of a rigid body (a system of twelve first-order differential equations), all past ballistic treatments adopted idealizing simplifications (such as the symmetry, the linearity and the neglect of certain linkages between the equations). All inadequacies of the existing theories seem to be due to such distorting simplifications. The present trend from the analytical treatments to the reliance upon the modern computing machinery calls for a reassessment of the problem. Dept. of the Army project no. 503-03-001. ORD project no. TB 3-0108. APG BRL M 856.

Experimental study of flow between centrifugal pump shrouds, by H. N. Tyson, Jr. California Institute of Technology. Hydrodynamics Laboratory, Pasadena, Calif. Jul 1954. 28p photos, drawings, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117613

An experimental investigation of flow between the shrouds of an impeller has shown that gross flow separation can occur for "well designed" shapes. Rotation of the shrouds inhibits separation and if the flow coefficient is sufficiently low it will be completely prevented. Contract N6onr-244, Task order II, NR-062-010. Report no. E-196. CIT HL E-19.6.

Generalized simple wave, by D. Naylor. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jun 1954. 93p diagrs,

graphs. Order from LC. Mi $4.50, ph $12.75. PB 117542

Contract N7onr-35801, Task order 1, NR-041-032.
1. Prandtl - Meyer theory (Aerodynamics) 2. Equations of motion 3. Flow, Compressible - Theory 4. GDAM A11-111.

I: Light scattering of spherical colloidal particles, by Wilfried Heller and William J. Pangonis. II: The determination of particle size and refractive index near the turbidity maximum in monodisperse suspensions of spherical particles, by Wilfried Heller. Wayne University. Dept. of Chemistry, Detroit, Mich. Jun 1954. 12p tables. Order from LC. Mi $2.00, ph $2.75. PB 117419

Technical report no. 5 under Contract Nonr-736(000), Project nr. 330-027.
1. Particles - Shape 2. Particles - Size 3. Particles, Spherical - Scattering.

Measurement of thermal conductivity of gases at high temperature: Analysis of an alternating plus direct current hot wire method which avoids radiation error, by Charles F. Bonilla, Barry L. Tarmy, and C. S. Lee. Columbia University. Dept. of Chemical Engineering. Jan 1954. 34p graphs, tables. Order from OTS. $1.00. PB 111571

A method is mathematically derived for the measurement of the thermal conductivity of gases which is independent of radiation, and thus particularly suitable at elevated temperatures. The method employs a conventional hot wire cell with its wire heated by a sinusoidal alternating current superimposed upon a direct current. The operating conditions under which the radiation introduces no appreciable error are indicated as well as the inherent limitations of the method. Optimum cell design and operating conditions are suggested. Contract Nonr 266(11).

Mechanics of the geomagnetic dynamo, by Eugene N. Parker. Utah. University. Dept. of Physics, Salt Lake City, Utah. Jun 1954. 43p drawings, diagrs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117423

Cyclonic convection motions in the core produce magnetic loops in meridional plane through interaction with the toroidal magnetic field. It is shown that these loops result in a predominantly dipole field. Together with the nonuniform rotation of the core, which produces the toroidal field from the dipole field, the cyclonic motions result in a complete self-regenerating magnetic dynamo. It is concluded that any rotating, convecting, electrically conducting body of sufficient size will possess a magnetic field generated by this dynamo mechanism. The possibility of an abrupt reversal of the field is discussed. Technical report no. 5 under Contract N onr 1288 (00) Earth's magnetism and magnetohydrodynamics.

Mixed type conical flow with axial symmetry: Summary of the recent work performed at P.L.B.A.L., by Antonio Ferri, Roberto Vaglio-Laurin and Nathan Hess. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Dec 1954. 40p diagrs, graphs. Order from LC. Mi $2.50, ph $5.25. PB 117633

Some problems of mixed type conical flow are considered. Triangular wings with sharp supersonic leading edges at zero angle of attack are analyzed without the assumption of linearized theory. A procedure for the rapid calculation of the hyperbolic region by the method of characteristics is presented. The transonic region is considered from a mathematical and a physical point of view, and it is shown that two sonic lines defining this region can coexist. Methods for analyzing the elliptic region and satisfying the boundary conditions are also discussed and outlined. Contract AF 18(600)-186, Project no. R-352-20-2. PIB AL 264.

New methods for computing parameters of complete or truncated distributions, by Waloddi Weibull. Flygtekniska Försöksanstalten (FFA), Stockholm. Feb 1955. 21p graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117595

The procedure is demonstrated on a particular distribution function which has been found by experience to fit various static and fatigue strength data with good fidelity. The methods are also applicable to truncated or censored distributions which may be required when dealing with distributions composed of more than one component or with fatigue tests stopped at some predetermined time before all the specimens have failed. Numerical examples are given. FFA 58.

On axisymmetric turbulence, by Gilbert B. Melese. Johns Hopkins University, Baltimore, Md. Jun 1954. 119p. Order from LC. Mi $5.00, ph $15.25. PB 117538

Technical report JHU-6-R, Project Squid, a cooperative program of fundamental research as related to jet propulsion for the Office of Naval Research, Dept. of the Navy, Office of Scientific Research, Dept. of the Air Force and the Office of Ordnance Research, Dept. of the Army. Contract N6-ori-105, Task order III, NR-098-038. Contents: - Part A. Kinematics of axisymmetric turbulence. - Part B. On the dynamics of axisymmetric turbulence. - Part C. Spectral analysis. - List of symbols. - References. For earlier reports see PB 98902, PB 105104, PB 116870.
1. Turbulence - Theory 2. Spectrum analysis 3. Turbulence, Axisymmetric - Theory.

On integral relations involving products of spheroidal functions, by Nicholas Chako. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jan 1955. 38p diagrs. Order from LC. Mi $2.50, ph $5.25. PB 117710

Contract no. AF 19(122)-42.
1. Spheroidal functions 2. Equations, Integral 3. Legendre functions 4. Mathematical equations and solutions 5. NYU RR EM 73 6. AAF CRC TN 55-358.

On minimizing an expectation subject to certain side conditions, by Stanley Isaacson and Herman Rubin. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1954. 39p graphs. Order from LC. Mi $2.50, ph $5.25. PB 117591

Contract Nonr-25140 (NR-342-022).
1. Distribution functions 2. Random functions 3. Mathematical equations and solutions 4. SU AMSL TR 25.

On the concept of concentrated loads and an extension of the uniqueness theorem in the linear theory of elasticity, by E. Sternberg and R. A. Eubanks. Illinois Institute of Technology. Dept. of Mechanics, Chicago, Ill. Jun 1954. 61p diagr. Order from LC. Mi $3.25, ph $9.00. PB 117537

Contract N7onr-32906, Project no. NR-035-302.
Bibliography: p. 59-60.
1. Elasticity - Theory 2. Loads, Linear - Theory 3. Boundary layer - Theory.

On the evaluation of integrals of the type $f(\tau_1, \tau_2, \ldots, \tau_n) = \frac{1}{2\pi i} \int F(s) e^{w(s, \tau_1, \tau_2, \ldots, \tau_n)}$ ds and the mechanism of formation of transient phenomena. Pt. 2a: An elementary introduction to the theory of the saddlepoint method of integration, by Manuel V. Cerrillo. Massachusetts Institute of Technology. Research Laboratory of Electronics. May 1950. 79p diagrs. Order from LC. Mi $3.75, ph $10.25. PB 117173

Dept. of the Army Project 3-99-10-022.
1. Electronics - Research 2. Integration, Numerical 3. Equations, Integral 4. SIG Contract DA 36-039-sc-100 5. MIT RLE TR 55, pt. 2a.

On the power of a one-sided test of fit against stochastically comparable alternatives, by Z. W. Birnbaum and Ernest M. Scheuer. Washington. University. Dept. of Mathematics. Jun 1954. 16p. Order from LC. Mi $2.00, ph $2.75. PB 117577

Technical report no. 15 under Contract N8onr-520, Task order II, Project no. NR-042-038.
1. Mathematical equations and solutions 2. Random distribution 3. Probability - Theory.

On the stabilization of the pinch effect by a conducting copper shell, by W. H. Bostick, L. S. Combes, M. A. Levine, I. Koncius & H. Weintraub. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Nov 1954. 27p photos, drawings. Order from LC. Mi $2.25, ph $4.00. PB 117375

A quantitative calculation of the lateral kink or Kruskal instability and the degree of control of this instability by a conducting shell indicate that for a displacement which occurs over a short length of the pinch the conducting shell has little or no effect. However, a lateral displacement in a pinch of long wavelength will be restored by the reaction of eddy currents induced by such a displacement in a conducting shell. Scientific report no. 14 under Contract no. AF 19(122)-89. See also Scientific report nos. 2(PB 115737) and 6(PB 112428).

Rate theory and irreversible thermodynamics: The linear approximation, by Rudolph J. Marcus, Ransom B. Parlin, and Henry Eyring. Utah. University. Institute for the Study of Rate Processes, Salt Lake City, Utah. Jul 1954. 8p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $1.50, ph $1.50. PB 117593

A consideration of model systems leads to the Onsager formulation of irreversible thermodynamics. The advantages of this line of thought are: the summing condition (one flux being given by a sum of terms each proportional to a force) can be derived, and the linear relation of fluxes to forces arises from the expansion of the usual exponential relation. The linear relation holds only within kT/3 of equilibrium and thus is not of interest for chemical reactions. Technical report no. 14 under Contract N7onr-45103, Project no. NR-051-192. UU ISRP TR 14.

Rectification of nearby Gaussian noise, by James A. Mullen and David Middleton. Harvard University. Cruft Laboratory. Jun 1954. 111p drawings, diagrs, graphs, table. Order from LC. Mi $5.00, ph $15.25. PB 117544

This report considers an important sub-class of non-normal statistics, viz., nearly normal noise. A new form for the nearly gaussian probability densities has been found; this is discussed, compared to the conventional Edgeworth series, and related to earlier work. Next a survey of physical noise sources is made in order to classify the statistical nature of the noise that each produces. For the linear and square-law detectors, the cases of prime interest, detailed figures and a number of more tractable formulas are given. Finally, the problem of finite averaging is briefly considered. Contract N5 ori-76, Task order no. 1, NR-071-012. HU CL TR 189.

Removal of spherical harmonics of first order from a field of observed gravity anomalies, by R. A. Hirvonen. Ohio State University Research Foundation. Mapping and Charting Research Laboratory, Columbus, Ohio. Dec 1954. 15p tables. Order from LC. Mi $2.00, ph $2.75. PB 117625

The derivation of Stokes' formula is based on developments of spherical harmonics which do not contain first order terms. Due to the defectiveness of observations, the field of gravity anomalies might reveal first order terms. These terms should be removed by an adjustment before Stokes' formula can be employed. Contract no. AF 19(604)-287. Technical paper no. 504-8. AAF CRC TN 55-280. OSURF Proj 504.

Research in high-frequency ultrasonics. Final report under Contract AF 18(600)-593, by Walter G.

Cady. California Institute of Technology. Norman Bridge Laboratory of Physics, Pasadena, Calif. Mar 1955. 20p diagrs. Order from LC. Mi $2.00, ph $2.75. PB 117587

This final report summarizes the work done during the two years of the contract. After a survey of proposed undertakings, abstracts are given of completed work on composite piezoelectric resonators, theory of compressional waves in crystals, and theory of acoustic filters having a periodic structure. A report is given on the attempts to generate acoustic vibrations at a frequency of 3000 megacycles per second.

Separation, stability, and other properties of compressible laminar boundary layer with pressure gradient and heat transfer, by Morris Morduchow and Richard G. Grape. U. S. National Advisory Committee for Aeronautics. May 1955. 45p diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117600

A theoretical study is made of the effect of pressure gradient, wall temperature, and Mach number on laminar boundary-layer characteristics and, in particular, on the skin-friction and heat-transfer coefficients, on the separation point in an adverse pressure gradient, on the wall temperature required for complete stabilization of the laminar boundary layer, and on the minimum critical Reynolds number for laminar stability. A simple and accurate method of locating the separation point in a compressible flow with heat transfer is developed. NACA TN 3296.

Sequential inspection plan for quality control, by M. A. Girschick. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Jul 1954. 33p graphs. Order from LC. Mi $2.50, ph $5.25. PB 117599

A continuous production process results in a sequence of units of product each of which is classified as either defective or non-defective. The production process may or may not be in a state of statistical control, but in either case it is desired to inspect the finished product in order to (a) improve, when necessary, the quality of the outgoing product by removing and replacing the defective units found and (b) get an estimate of the quality of the product for control purposes. Contract N6onr-25126 (NR-042-002). SU AMSL TR 16.

Tables of 1% and 5% probability levels for Hotelling's generalized T^2 statistic (Bi-variate case). U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Jul 1954. 32p tables. Order from LC. Mi $2.50, ph $5.25. PB 117588

Introduction by Frank E. Grubbs. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007L.
1. Tables, Mathematical 2. Probability - Tables 3. APG BRL TN 926.

Turbulent-heat-transfer measurements at a Mach number of 1.62, by Maurice J. Brevoort and Bernard Rashis. U. S. National Advisory Committee for Aeronautics. Jun 1955. 15p drawing, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117648

An axially symmetric annular nozzle was used to obtain essentially flat-plate results for turbulent-heat-transfer coefficients and temperature-recovery factors. The heat-transfer-coefficient results agree with theoretical results. The recovery factors are on the average 1.5 percent lower than data for a Mach number of 2.4. NACA TN 3461.

Two machine methods for determination of eigenvalues and eigenvectors of real symmetric matrices, by George W. Reitwiesner. U. S. Aberdeen Proving Ground. Ballistic Research Laboratories, Aberdeen, Md. Oct 1954. 23p table. Order from LC. Mi $2.25, ph $4.00. PB 117446

Two methods for determining eigenvalues and eigenvectors of real symmetric matrices are described - one based on successive rotations, the other based on the tridiagonal form. Routines for machine use and results of computations with several hundred separate matrices of order up to 30 are described. The connection with the problem of matrix inversion is pointed out. Dept. of the Army project no. 503-06-002. ORD project no. TB 3-0007K. APG BRL M 850.

Nuclear

Elastic scattering of pions on aluminum, by Aikud Pevsner. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Jun 1954. 124p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $5.25, ph $16.50. PB 117410

Contract N6-ori 110, Task no. 1. Joint ONR-AEC program. Nevis 3.
1. Mesotrons - Scattering - Measuring equipment 2. Aluminum - Mesotrons - Scattering 2. Aluminum - Nuclear properties 4. Detectors, Scintillation - Design 5. Atomic power - Research.

Ionization chamber measurements with tritium, by E. J. Wilson. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Nov 1954. 16p drawing, graphs. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $0.50. PB 117597

1. Atomic power - Research - Gt. Brit. 2. Tritium - Radioactivity - Gt. Brit. 3. Ionization chambers - Design - Gt. Brit. 4. Tracers, Radioactive - Materials - Gt. Brit. 5. AERE I/M 34.

Magnetic shielding of nuclei in molecules by a variational method, by James F. Hornig and J. O. Hirschfelder. Wisconsin. University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Jul 1954. 7p. Order from LC. Mi $1.50, ph $1.50. PB 117480

The accurate measurement of nuclear magnetic moments requires a calculation of the magnetic field at the nucleus arising from the orbital motions of the electrons in the external magnetic field. A solution of the problem using the quantum mechanical variation principle is outlined. Contract N7onr-28511. WIS-ONR-9.

Nuclear magnetic resonance in imperfect crystals, by N. Bloembergen. Harvard University. Cruft Laboratory. Jun 1954. 60p drawing, diagrs, graphs. Order from LC. Mi $3.00, ph $7.75. PB 117426

In accordance with Seitz's classification the following imperfections are considered: (a) dislocations; (b) vacant lattice sites and interstitial atoms; (c) foreign atoms in either interstitial or substitutional position; (d) electrons and holes; (e) phonons; (f) excitons. Their interaction with the magnetic dipole moment and the electric quadrupole moment of the nuclei at the normal lattice sites is discussed and the available experimental information is reviewed. Contract N5 ori-76, Task order no. 1, NR 071-012. HU CL TR 199.

Research on the size and shape of large molecules and colloidal particles. Technical report no. 6. Protective action of hydrophilic polymers on gold sol, by Thomas L. Pugh. Wayne University. Dept. of Chemistry, Detroit, Mich. Jul 1954. 50p diagrs, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117533

Contract Nonr 736(00), Project NR330-027.
Bibliography: p. 45.
1. Colloidal gold - Polymerization 2. Colloidal gold - Refractive index 3. Colloids, Protective - Stabilization 4. Polymers, Hydrophilic - Protective action 5. Stabilizing agents 6. Colloids - Particle size.

Statistics of the adjustment and comparison of counters, by K. D. Outteridge. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Jun 1954. 14p graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $0.50. PB 117598

1. Atomic power - Research - Gt. Brit. 2. Geiger counters - Gt. Brit. 3. Detectors, Scintillation - Gt. Brit. 4. AERE I/M 32.

Technical report no. 3 under Contract ONR-1220(00). Catholic University of America. Chemistry Dept., Washington, D. C. Jun 1954. 75p drawings, diagrs, graphs, table. Order from LC. Mi $3.75, ph $10.25. PB 117539

Contents: A. Molecular orbital theory of the activation energy between molecules and atoms, by Virginia Griffing. - B. Interaction between two He atoms, by Virginia Griffing and J. F. Wehner. - C. Energy of the linear H_4 complex, by Virginia Griffing and Joseph T. Vanderslice. - D. Molecular orbital approach to the H & H_2 reaction, by Virginia Griffing and Joseph T. Vanderslice.

PSYCHOLOGY

Comparative study of intelligibility values: Forms A and B, by John J. O'Neill. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Apr 1955. 28p tables. Order from LC. Mi $2.25, ph $4.00. PB 117655

Two panels of 87 listeners each were presented words from forms A and B of the multiple-choice intelligibility test. The words were presented either in their original form or as write-down items. The values obtained for the two types of tests were compared statistically. The obtained item values as well as values obtained by three other investigators are presented for use in future research which would utilize similar experimental conditions. Contract N6onr-22525, Project no. NR 145-993.

Comparison of two methods of conducting critiques, by Mario Levi and Albert C. Higgins. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 17p tables. Order from LC. Mi $2.00, ph $2.75. PB 117495

Forty-six combat crews (481 subjects) were divided at random into two experimental and two control groups. Each experimental group was administered a problem-solving test, critiqued in an evaluative or non-evaluative way, and then administered a survival problem in which every crew member had to outline individually his own solution. Project no. 7713, Task no. 57151. AAF PTRC TR 54-108.

Control of the sound pressure level of voice, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Feb 1955. 15p tables. Order from LC. Mi $2.00, ph $2.75. PB 117653

Experimental subjects attempted to say a monosyllable with the same loudness that they heard repeated bursts of an external noise. The spoken syllables were of greater sound pressure level than the stimulus except when the stimulus exceeded an 80-db level. The same subjects when dividing their total vocal dynamic range into four equal steps employed almost double the increment of sound pressure (db) between the two softest levels that they employed between the successive pairs of louder levels. Contract N6onr 22525, Project no. NR 145-993. NMRI Proj NM 001 104 500.42.

Effect of attenuating one channel of a dichotic circuit upon the word reception of dual messages, by Gilbert C. Tolhurst and Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Dec 1954. 18p diagr, graphs, tables. Order from LC Mi $2.00, ph $2.75. PB 117618

Listeners responded to two simultaneous messages through dichotic headset circuits. The simultaneous messages were word groupings from the multiple-choice intelligibility tests. The signal level of one of the messages remained constant. The level of the other message was attenuated in five steps of three decibels each step. The variable under study was the effect of these attenuation levels upon the reception of the two messages. Messages were received under conditions of noise and quiet. The general effect of attenuating one simultaneous message was that of decreasing the reception of the attenuated message and increasing the reception of the unattenuated message. The effect was more pronounced in noise than in quiet. Contract N6onr-22525, Project no. NR-145-993. NMRI Proj NM 001 064.01.36.

Effect of length of exposure to speaker's voice upon listener reception, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Mar 1955. 11p tables. Order from LC. Mi $2.00, ph $2.75. PB 117651

Listeners who had received either no exposure, two-minute exposure, four-minute exposure, or eight minute exposure to speakers' voices responded to the speakers' reading of intelligibility lists. Reception values for listening in quiet were significantly higher for the listeners who were exposed to the speakers' voices two, four, or eight minutes than were the reception values for listeners who had not been exposed to the speakers' voices. Joint project report no. 44, Contract N6-onr-22525, Project no. NR 145-993. NMRI Proj NM 001 104 500.44.

Factor-analytic study of planning. I: Hypotheses and description of tests, by J. P. Guilford, R. M. Berger, and P. R. Christensen. University of Southern California. Psychology Laboratory. Jul 1954. 26p drawings, diagrs. Order from LC. Mi $2.25, ph $4.00. PB 117627

This study is the fifth in a series of investigations designed to explore abilities considered to be important in the successful performance of high-level personnel. This reports the first phase of an attempt to isolate and define abilities which may be important in the domain of planning. Publication no. 10.

Intelligibility as a function of constant sidetone level when frequency response and speaker's vocal effort are varied, by Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Mar 1955. 16p diagrs, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117649

The frequency response of a speaker's side-tone circuit was altered without affecting his intelligibility when the listeners received his speech in 114 db of ambient noise. Significant differences in intelligibility resulted, however, when the listeners were in quiet. Changes in sound pressure level of a speaker's voice, up or down from a normal level, resulted in significant differences in speaker intelligibility scores. Joint Project report no. 46, Contract N6onr22525, Project NR 145-993. NMRI Proj NM 001 104 500.46.

Interaction of vestibular stimuli of different magnitudes and opposite directions. Part 1: Perception of visual apparent motion during angular accelerations, by F. E. Guedry, Jr., and J. I. Niven. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Tulane University. Dec 1954. 16p graphs. Order from LC. Mi $2.00, ph $2.75. PB 117615

Where a positive angular acceleration is immediately followed by a negative one, the actual direction of rotation is perceived well into the latter period. This perception is terminated by a clear-cut reversal in direction of apparent motion. Theoretically, the time between commencement of deceleration and the point of reversal is indicative of the time of travel of the cupula from a deviated position and also of the cupula's responsiveness to an acting force. An extension of van Egmond's equations permits prediction of the time interval (t_R) where the duration and magnitude of positive and negative angular accelerations are known. Data obtained from three subjects were in good agreement with theoretical curves and displayed a striking degree of consistency between subjects and within subjects. Contract N7onr-434, T. O. 1, Project no. NR-143-455. NMRI Proj NM 001 063.01.36.

Nonverbal messages in voice communication, by John W. Black and John J. Dreher. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Mar 1955. 17p tables. Order from LC. Mi $2.00, ph $2.75. PB 117650

Groups of experimental subjects demonstrated the ability to restore recordings of unfamiliar voices to the original turntable speed within a standard deviation of 1.4 rpm. Phrases that were read before the readers' pupils were dilated were reliably differentiated from subsequent recordings made after a mydriatic had been administered but before the stage of serious reading impairment. Phrases read to simulate certainty and uncertainty were reliably distinguished. Phrases read as appropriate to three characterizations were reliably distinguished. Joint project report no. 45, Contract N6-onr 22525, Project no. NR 145-993. NMRI Proj NM 001 104 500.45.

Persistence of the effects of delayed side-tone, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation,

Columbus, Ohio. Jan 1955. 8p tables. Order from LC. Mi $1.50, ph $1.50. PB 117621

Twenty-eight male experimental subjects read 10 lists of five 5-syllable phrases, including one practice list. Lists 3 and 4 were read in the presence of 0.30-second delayed side-tone. A similar control group read with no delayed side-tone. Measurements were secured of reading rate and sound pressure level. The incremental effects of delayed side-tone upon sound pressure level were transitory; the retarding effects upon rate of reading persisted throughout the remaining reading time, 150 seconds. Contract N6onr-22525, Project no. NR 145-993. NMRI Proj NM 001 104 500.39.

Psychiatric screening of flying personnel: Conditioning and extinction of the galvanic skin response as a function of adjustment to combat crew training, by M. E. Bitterman, W. H. Holtzman, and J. R. Barry. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1955. 10p graph, tables. Order from LC. Mi $2.00, ph $2.75. PB 117622

A group of 208 pilots assigned to combat crew training were tested in a conditioning situation and their subsequent adjustment to training was independently evaluated. Four conditioning variables were selected on the basis of factor analyses for correlation with the criterion evaluations of adjustment. No significant relation was found between the two sets of measures. Although an earlier study of 37 university men produced positive findings under laboratory conditions, the present research fails to support the laboratory findings with trained pilots entering combat crew training. AAF SAM R 55-29.

Relationships between sociometric measures and performance in medium bomber crews in combat, by William W. Haythorn. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 23p tables. Order from LC. Mi $2.25, ph $4.00. PB 117497

In this report the responses to the sociometric instrument were analyzed for their reliability and their relationships with the attitude scales, the crew-description form, and ratings of over-all crew effectiveness by superior officers (squadron and wing officers). Significant correlations were found indicating that crew mean sociometric scores co-vary with crew mean attitude scores, particularly attitude scales related to pride in the crew, and with ratings of the crew by superior officers. The correlations between sociometric scores of individuals and the criterion measures were found to be to some degree a function of the formal crew position of the individual. AAF PTRC TR 54-101.

Relative effectiveness of brief instructions to achieve loud speech, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Dec 1954. 7p table. Order from LC. Mi $1.50, ph $1.50. PB 117616

Twenty-four male naval personnel read intelligibility tests under a particular instruction relative to vocal sound pressure level; 24 others read with a different instruction; and so on, through six different instructions. The instructions were derived from current manuals and practices in voice communication courses. The instructions were differentially effective; the ones that produced the greatest increments in level referred directly to shouting or talking loudly. Contract N6onr-22525, Project no. NR-145-993. NMRI Proj NM 001 064.01 Report no. 37.

Review of some major Rorschach scoring categories and hypothesized personality correlates, by Arthur E. Eschenbach and Edgar F. Borgatta. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Oct 1953. 45p. Order from LC. Mi $2.75, ph $6.50. PB 117350

The report, in order to facilitate empirical confirmation and research on Rorschach scoring category interpretations, presents in a systematic fashion the hypothesized and empirically derived relationships between Rorschach scores and personality variables. AAF HRRI RM 19.

Some effects of changing time patterns and articulation upon intelligibility and word reception, by Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Jan 1955. 18p diagr, graphs, tables. Order from LC. Mi $2.00, ph $2.75. PB 117620

Multiple-choice intelligibility items were read by one voice successively in a prolonged, a normal, and a staccato manner of delivery. The listener judgments indicated a preference for the normal and prolonged delivery over staccato; they also accorded different intelligibility values to the three conditions. Contract N6onr-22525, Project no. NR 145-993. NMRI Proj NM 001 104 500.40.

Speaker intelligibility of repeated messages acquired by visual, aural or visual-aural channels, by Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Feb 1955. 9p diagr, graph, tables. Order from LC. Mi $1.50, ph $1.50. PB 117652

Fifty-six naval aviation cadets spoke to 196 fellow listeners and received their verbal material by reading (visual channel), listening (aural channel), and by a combination of simultaneous reading and listening (visual-aural channel). Listeners and speakers were tested in "classroom-quiet" conditions. Statistically significant differences in speaker intelligibility scores were found between the visual and aural condition; between the aural and visual-aural; but not between visual and visual-aural. Joint project no. 43, Contract N6-onr-22525. NMRI Proj NM 001 104 500.43.

Variables of environment and printed materials in intelligibility testing, by Gilbert C. Tolhurst. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Dec 1954. 13p tables. Order from LC. Mi $2.00, ph $2.75. PB 117617

Listeners and speakers in administrations of the multiple-choice intelligibility tests were exposed to comparison noises of two different spectra but of similar level. The noise recorded at the copilot's position in a twin-engine aircraft produced more masking to speaker intelligibility than the noise that simulated a single-engine spectrum. Contract N6-onr-22525, Project no. NR-145-993. NMRI Proj NM 001 064.01.38.

Voice intelligibility as a function of speakers' knowledge concerning the conditions under which their transmissions will be received by listeners, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Florida, and Ohio State University Research Foundation, Columbus, Ohio. Feb 1955. 10p tables. Order from LC. Mi $1.50, ph $1.50. PB 117619

Speakers read multiple-choice intelligibility test words immediately after receiving voice transmissions under conditions of quiet or under various levels of noise. The speakers were informed that these transmissions represented conditions under which listeners would hear their voices. Of the speakers used, only those who were inexperienced in communication procedures became more intelligible in response to information that listeners would hear their voices under conditions of noise as opposed to conditions of quiet. In no instance did voice intelligibility vary consistently as a function of the amount of noise accompanying transmissions to the speaker. Contract N6onr-22525, Project no. NR-145-993. NMRI Proj NM 001 104 500.41.

RUBBER AND RUBBER PRODUCTS

Development of high-temperature oil-resistant rubber, by William H. Gillen, William J. Mueller, Richard A. Clark, Randall G. Heiligmann. Battelle Memorial Institute, Columbus, Ohio. Jan 1955. 134p drawing, diagrs, tables. Order from OTS. $3.50. PB 111693

This project has been set up with two objectives. The first is the development of a rubber composition which will withstand MIL-L-7808 lubricants for at least 500 hours at 350 F. The second objective is the development of a rubber which will withstand ester-type hydraulic fluids at 400 to 550 F. Minimum target properties for these compounds are given in Appendix A. Contract no. AF 33(616)-476, Project no. 7340. AAF WADC TR 54-190.

Synthetic diene elastomers prepared at high temperatures. Final report, by Bailey Bennett, L. E. Novy, R. M. Kell, W. J. Mueller, P. B. Stickney, and R. G. Heiligmann. Battelle Memorial Institute, Columbus, Ohio. Mar 1954. 59p photos, drawings, diagrs, graphs, tables. Order from OTS. $1.50. PB 111641

The purpose of the present research program has been to explore the possibilities of high-temperature emulsion polymerization. Particular emphasis has been placed on the effects of polymerization temperatures on the balance of oil resistance and low-temperature properties of butadiene-acrylonitrile copolymers. G-1787.

Vulcanization of rubber with high-intensity gamma radiation, by Wallace W. Jackson and Denver Hale. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Apr 1955. 37p photos, drawings, graphs, tables. Order from OTS. $1.00. PB 111675

Techniques of vulcanizing both natural and synthetic rubber polymers, using high intensity gamma radiation are described. Evaluation of this technique shows considerable promise in developing elastomers for specialized uses, such as producing high temperature oil resistant rubber compounds and for improving the compression set of specialized rubber compounds. Project no. 7340, Task no. 73405. AAF WADC TR 55-57.

STRUCTURAL ENGINEERING

Development of nondestructive tests for structural adhesive bonds. Part 3: Mechanical impedance technique "Stub-Meter", by J. S. Arnold. Stanford Research Institute, Stanford, Calif. Apr 1955. 39p photos, diagrs, graphs, tables. Order from OTS. $1.00. PB 111678

An ultrasonic technique is being developed for the non-destructive evaluation of structural adhesive bonds. A ferroelectric transducer is excited by a variable frequency driving current of constant amplitude, and the voltage developed across the transducer is displayed on an oscilloscope as a function of frequency. The variation in the voltage-frequency curves that occur when the transducer is applied to satisfactory and defective test specimens can usually be correlated with the strength of the adhesive bonds, as indicated by subsequent destructive tests performed on the specimens. Block circuitry, typical oscilloscope patterns, and data on the correlation between destructive and non-destructive tests are presented. Contract no. AF 33(616)-2035, Project no. 7340, Task no. 73401. AAF WADC TR 54-231, Part 3.

Effect of acceleration time on plastic deformation of beams under transverse impact loading, by D. S. Green. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Jun 1954. 22p diagrs, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117417

This paper considers a special case of point impact loading on a beam which is free to move in the direction of striking. The impact is such as to impart to the mid-point of the beam constant acceleration for a certain period, and then constant velocity for all subsequent time. The analysis shows how the magnitude of the deformation depends on the final velocity and the duration of the acceleration, assuming that the beam behaves in a perfectly plastic-rigid manner. Contract N7 onr-35801, Task order 1, NR-041-032. GDAM A11-112.

Effect of pressure on thermal conductance of contact joints, by Martin E. Barzelay, Kin Nee Tong and George F. Holloway. Syracuse University, Syracuse, N. Y. May 1955. 52p drawing, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117455

Tests were conducted to determine the factors influencing the thermal conductance across the interface formed between stationary plane surfaces of 75S-T6 aluminum alloy and AISI Type 416 stainless-steel blocks. The types of joints investigated included bare metal-to-metal contact, contact surfaces separated by a good conductor (brass shim stock), and contact surfaces separated by a thin sheet of insulation (asbestos). NACA TN 3295.

On traveling waves in beams, by Robert W. Leonard and Bernard Budiansky. U. S. National Advisory Committee for Aeronautics. 1954. 30p diagrs, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.30. PB 117465

The basic equations of Timoshenko for the motion of vibrating nonuniform beams are presented in several forms. The propagation of sharp disturbances is discussed. Numerical traveling-wave solutions are obtained for some elementary problems of finite uniform beams for which the propagation velocities of shear and bending discontinuities are equal. Supersedes NACA TN 2874 (PB 108604). NACA 1173.

Thermal stresses in viscoelastic structures, by William Prager. Brown University. Graduate Division of Applied Mathematics, Providence, R. I. Apr 1955. 14p diagrs, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117369

The paper is concerned with the thermomechanical behavior of a statiscally indeterminate truss that consists of Maxwell bars. The effects of typical variations of loads and temperatures on the stresses in the truss are discussed. While the actual relation between creep rate and stress in structural metals is less simple than the linear relation stipulated for a Maxwell material, the structural model considered in this paper may be expected to indicate the qualitative effect of creep on the stresses in indeterminate structures. Contract DA-19-020-ORD-798. Dept. of the Army project 503-06-005. Ordnance project TB-3-0122. GDAM DA-798/19. GDAM TR 19.

Vibration tests of a steel-frame building, by D. E. Hudson and G. W. Housner. California Institute of Technology. Earthquake Research Laboratory, Pasadena, Calif. Jul 1954. 27p photos, drawings, diagrs, graphs. Order from LC. Mi $2.25, ph $4.00. PB 117444

The natural frequency and damping of a steel-frame building were experimentally determined for the first two modes of vibration from a steady state resonance curve obtained with a variable frequency mechanical oscillator. The value of the first natural frequency was 3.5 cps, which may be compared with the 2.9 cps frequency which was determined from calculations of the response to the transient excitation of a quarry blast. 7th technical report under Contract N6 onr-244, Task order 25, Project NR-081-095.

TEXTILES AND TEXTILE PRODUCTS

Stress relaxation of fibers as a means of interpretting physical and chemical structure, by Theodore Lemiszka. Textile Research Institute, Princeton, N. J. Jul 1954. 233p photos, drawings, diagrs, graphs, tables. Order from OTS. $6.00. PB 111655

Stress-relaxation behavior of nylon, Dynel, Dacron, textile rayon, and ramie in distilled water, hydrochloric acid, and in some instances, a few other reagents including sodium hydroxide, sodium fluoride, and lithium chloride. Various methods are considered for interpretation of data. The experimental data agree with the assumption that cellulose contains a distribution of ordered material ranging between the crystalline and amorphous states. Other interpretations follow. Technical report no. 12 under Contract no. Nonr-09000 and Nonr-09001.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Rotary wing aircraft handbooks and history, vol. 11: Special types of rotary wing aircraft, by Eugene K. Liberatore. Prewitt Aircraft Co., Clifton Heights, Pa. 1954. 133p photos, drawings, diagrs, graph. Order from OTS. $3.50. PB 111633

Contract W 33-038-ac-21804(20695). For Preview of the series see PB 110454. For vols. 6-7, 10, 13-14 see PB 111390, 111289, 111521, 111288, 111391. 1. Helicopters - History 2. Helicopters - Design 3. Cyclogiros - Design 4. Orthopters - Design.

Instruments

Heat-loss characteristics of hot-wire anemometers at various densities in transonic and supersonic flow, by W. G. Spangenberg. U. S. National Bureau of Standards. May 1955. 82p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117456

Speeds ranged from low subsonic to Mach number 1.9. Density and temperature loading were varied over wide limits, and wire diameters ranged from 0.00005 to 0.0015 inch. The effects of each of the several variables on the heat loss-characteristics of both normally oriented and swept wires were measured. NACA TN 3381.

NACA vane-type angle-of-attack indicator, by Jesse L. Mitchell and Robert F. Peck. U. S. National Advisory Committee for Aeronautics. May 1955. 8p photos, drawing, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117488

1. Instruments, Flight - Design 2. Indicators, Angle of attack - Design 3. Flow, Subsonic - Research 4. Flow, Supersonic - Research 5. Angle-of-attack - Measurements 6. NACA TN 3441.

Research on materials and surface coatings for aircraft-arresting wire rope and hook points. Final report, June 30, 1952 to June 30, 1954, by R. J. MacDonald, J. K. Thompson, and G. K. Manning. Battelle Memorial Institute, Columbus, Ohio. Jun 1954. 18p tables. Order from LC. Mi $2.00, ph $2.75. PB 117567

The following were tested: Colmonoy coating, flame-plated tungsten carbide, molybdenum disulfide, vapor and spray deposited tungsten and molybdenum, Elgiloy, fiberglas-combinations.

Theoretical investigation of a proportional-plus-flicker automatic pilot, by Ernest C. Seaberg. U. S. National Advisory Committee for Aeronautics. May 1955. 55p photo, drawings, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117486

1. Pilots, Automatic - Servomotors 2. Servomechanisms - Stabilization 3. NACA TN 3427.

Water injection system (Preliminary information) models F4U-1, F3A-1, FG-1, by S. Townsend. United Aircraft Corp. Chance Vought Aircraft Div., Stratford, Conn. Revised. Jan 1944. 39p fold drawings, graphs, table. Order from OTS. $1.00. PB 111679

Report no. 6283. Contract no. NOa(s)-198, Amendment no. 1.

1. Airplanes - Water injection systems 2. F4U-1 (Airplane) 3. F3A-1 (Airplane) 4. FG-1 (Airplane) 5. NAVAER 03-10-510.

Engines and Propellers

Comparison of effectiveness of convection-, transpiration-, and film- cooling methods with air as coolant, by E.R.G. Eckert and John N. B. Livingood. U. S. National Advisory Committee for Aeronautics. 1954. 19p drawing, diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.20. PB 117481

Supersedes NACA TN 3010 (PB 112191).

Dynamic-model study of the effect of added weights and other structural variations on the blade bending strains of an experimental two-blade jet-driven helicopter in hovering and forward flight, by John Locke McCarty and George W. Brooks. U. S. National Advisory Committee for Aeronautics. May 1955. 47p photo, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117483

1. Helicopters - Rotors - Dynamics 2. Helicopter blades - Stability 3. Helicopter blades - Stresses 4. Helicopters - Balancing 5. NACA TN 3367.

Investigation of several NACA 1-series nose inlets with and without protruding central bodies at high-subsonic Mach numbers and at a Mach number of 1.2, by Robert E. Pendley and Harold L. Robinson. U. S. National Advisory Committee for Aeronautics. May 1955. 51p photos, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117395

1. Ducts, Air - Inlet pressure 2. Ducts, Air - Design 3. Mach number - Effect 4. NACA TN 3436.

Low-speed investigation of the effects of angle of attack on the pressure recovery of a circular nose inlet with several lip shapes, by James R. Blackaby. U. S. National Advisory Committee for Aeronautics. May 1955. 30p photo, drawing, diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117484

1. Airplanes - Design 2. Diffusers, Subsonic 3. Ducts, Air - Inlet pressure 4. Angle-of-attack - Measurement 5. NACA TN 3394.

On the calculation of the 1-P oscillating aerodynamic loads on single-rotation propellers in pitch on tractor airplanes, by Vernon L. Rogallo and Paul F. Yaggy. U. S. National Advisory Committee for

Aeronautics. May 1955. 28p photo, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117601

1. Yawing moments - Calculation 2. Propellers, Tractor - Tests 3. Wings - Flutter - Tests 4. Thrust - Measurements 5. Wings - Vibration - Tests 6. Interference, Propeller - Tests 7. Loads, Linear - Theory 8. NACA TN 3395.

Theoretical performance characteristics of sharp-lip inlets at subsonic speeds, by Evan A. Fradenburgh and DeMarquis D. Wyatt. U. S. National Advisory Committee for Aeronautics. 1954. 10p diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.15. PB 117693

Supersedes NACA TN 3004 (PB 110935).
1. Ducts, Air - Performance 2. Ducts, Air - Inlet pressure 3. Diffusers, Subsonic - Theory 4. Flow, Subsonic - Theory 5. NACA TN 3004 Revised 6. NACA 1193.

Training and Training Devices

Comparison of training media: Trainee manipulation and observation of functioning electrical systems versus trainee drawing of schematic electrical systems, by J. A. Murnin, A. W. Van der Meer, T. Vris. Pennsylvania State University, State College, Pa. Jun 1954. 32p photos, diagrs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117532

Contract N6onr-269. Project 20-E-4. Instructional film research program.
1. Training methods 2. Training devices - Effectiveness 3. Education, Electrical 4. Individual Wiring Board 5. SDC TR 269-7-101.

Method for determining human engineering design requirements for training equipment, by Robert B. Miller. American Institute for Research, Inc., Pittsburgh, Pa. Jun 1953. 22p. Order from LC. Mi $2.25, ph $4.00. PB 117701

This report summarizes and integrates three other technical reports, (PB 110763, 117702, 110763) each of which plays a role in a procedure intended to determine the human behavioral requirements of complex training devices. Contract no. AF 33(038)-22638. AAF WADC TR 53-135.

Preliminary study of informal crew conferences as a crew training adjunct, by Bernard L. Levy. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Dec 1954. 29p tables. Order from LC. Mi $2.25, ph $4.00. PB 117489

This Research Bulletin reports the results of using a nontechnical training experience as an addition to the B-29 crew training program. The procedure involves relatively informal discussion periods during which crew members in training for combat gather together periodically and talk about those topics which are of interest to them. Project no. 7713, Task no. 77234. AAF PTRC TR 54-87.

Role of practice schedule in pedestal sight gunnery practice, by Carl H. Rittenhouse and Mymon Goldstein. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 40p graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117498

Four studies were conducted in an attempt to discover a schedule of practice and rest intervals which would yield optimal results in pedestal sight gunnery training. It appears that 16 to 64 target flights per session should be satisfactory, and one- or two-minute rests after every two or three trials would be advisable. AAF PTRC TR 54-97.

Some aspects of part and whole task performance in flexible gunnery pedestal sight manipulation, by Robert B. Parks. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 11p graphs, table. Order from LC. Mi $2.00, ph $2.75. PB 117494

This study is concerned with inter-day performance reliabilities with respect to each of the three sighting components, azimuth, elevation, and range, when the three are performed together in the A-E-R whole-task context. It is also the purpose of this study to examine the form of ranging and azimuth performance data when these sighting components are separated from the usual whole-task context. AAF PTRC TR 54-117.

Target flight characteristics as determinants of training transfer and task difficulty in flexible gunnery, by Carl H. Rittenhouse and Mymon Goldstein. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 35p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117499

The effects of target movement characteristics on performance with a pedestal sighting station were investigated. Each of the target attack components--azimuth, elevation, range, and speed--was represented by two to four alternatives called subpatterns. The study was devoted primarily to the comparison of subpatterns within each attack component. Use was made of a rather complex design, requiring 24 groups and a total of 244 subjects. The subjects were airmen awaiting assignment at Lowry Air Force Base. AAF PTRC TR 54-90.

Training film evaluation: FB 254, cold weather uniforms, by Charles J. McIntyre. Pennsylvania

State University, State College, Pa. Aug 1954. 16p tables. Order from LC. Mi $2.00, ph $2.75. PB 117531

Contract N6onr-269. Project 20-E-4. Instructional film research program.
1. Motion pictures, Educational 2. SDC TR 269-7-51.

Verbal feedback in pedestal sight manipulation, by Robert B. Parks. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Armament Systems Personnel Research Laboratory, Lowry Air Force Base, Colo. Dec 1954. 11p graph, table. Order from LC. Mi $2.00, ph $2.75. PB 117492

The present study is concerned primarily with the potential effectiveness of verbal knowledge-of-results variables. Within the limited treatment of this variety of variable, the study was designed to explore specifically the role of accuracy of information in the effectiveness of verbal feedback. It is felt that the dimension of accuracy may provide a basis for the re-evaluation of verbal feedback methods. The study also considers group versus individual feedback conditions and the role of subjective personal attention thought to be of inherent consequence in verbal feedback methods. Project no. 7708, Task no. 77141. AAF PTRC TR 54-91.

Airports and Airways

Field moisture content investigation. Report no. 2, Oct. 1945 - Nov. 1952 phase. U. S. Waterways Experiment Station, Vicksburg, Miss. Apr 1955. 300p photo, diagrs, graphs, tables. Order from LC. Mi $9.25, ph $38.25. PB 117500

Prepared for the Office of the Chief of Engineers, Airfields Branch, Engineering Division, Military Construction. Supersedes Interim report no. 1, May 1948. Appendix A. - Study of variations in moisture content and base course identity values. B. - Bibliography on soil moisture.
1. Soils - Moisture content 2. Airports - Pavements - Moisture - Tests 3. WES TM-3-401.

Aerodynamics

Acoustical treatment for the NACA 8-by 6-foot supersonic propulsion wind tunnel, by Leo L. Beranek, Samuel Labate and Uno Ingard. Bolt Beranek and Newman, Inc., Cambridge, Mass. Jun 1955. 86p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117647

Sound measurements in the neighborhood surrounding the tunnel were conducted to evaluate the noise-attenuation requirements. A muffler-development program was continued until these attenuations were achieved. The final design for the acoustic treatment is described and experimental performance curves are compared with anticipated theoretical results. NACA TN 3378.

Calculation of pressure on slender airplanes in subsonic and supersonic flow, by Max A. Heaslet and Harvard Lomax. U. S. National Advisory Committee for Aeronautics. 1954. 13p diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.20. PB 117461

Supersedes NACA TN 2900 (PB 108786).
1. Airplanes - Pressure distribution 2. Flow, Subsonic - Theory 3. Flow, Supersonic - Theory 4. Tail surfaces - Loads 5. Wings - Pressure distribution - Theory 6. NACA TN 2900 Revised 7. NACA 1185.

Effect of a discontinuity on turbulent boundary-layer-thickness parameters with application to shock-induced separation, by Eli Reshotko and Maurice Tucker. U. S. National Advisory Committee for Aeronautics. May 1955. 21p graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117605

1. Boundary layer - Transition point 2. Boundary layer, Turbulent - Theory 3. Flow, Supersonic - Theory 4. Moment of momentum 5. Flow, Axially symmetric - Theory 6. NACA TN 3454.

Hovering flight tests of a four-engine-transport vertical take-off airplane model utilizing a large flap and extensible vanes for redirecting the propeller slipstream, by Louis P. Tosti and Edwin E. Davenport. U. S. National Advisory Committee for Aeronautics. May 1955. 26p photos, drawings, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117487

1. Airplanes, Transport - Performance 2. Airplanes - Slipstream 3. Airplanes - Stability - Testing methods 4. NACA TN 3440.

Investigation of flow in the throat region for a hypersonic nozzle, by R. E. Oliver and H. T. Nagamatsu. California Institute of Technology. Guggenheim Aeronautical Laboratory. Hypersonic Wind Tunnel, Pasadena, Calif. Jan 1955. 21p drawings, diagrs. Order from LC. Mi $2.25, ph $4.00. PB 117634

An experimental investigation was conducted in the GALCIT $2\frac{1}{2}$" supersonic wind tunnel to determine the flow conditions in the vicinity of the throat region of a potential 16" x 16" hypersonic wind tunnel nozzle designed for a Mach number of 8. Contract no. DA-04-495-Ord-19. CIT GAL M 24.

Investigation of unsteady aerodynamic and friction effects on rudder-free yawing oscillations of aircraft, by H. Asbley, A. Codik, R. M. Pratt and H. J. Campbell, Jr. Massachusetts Institute of Technology. Aeroelastic and Structures Research Laboratory. Mar 1953. 62p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $3.25, ph $9.00. PB 117396

A series of numerical and electronic analog computations are compared with simple wind-tunnel tests in an effort to determine the importance of unsteady aerodynamic effects on the rudder-free lateral stability of aircraft. Attention is centered on the longer-period rudder-rotation - vs. - yawing mode known as "snaking", which is normally observed to be the least stable lateral motion. Contract no. AF 18(600)-97. AAF WADC TR 53-273.

Longitudinal turbulent spectrum survey of boundary layers in adverse pressure gradients, by Virgil A. Sandborn and Raymond J. Slogar. U. S. National Advisory Committee for Aeronautics. May 1955. 40p diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117459

1. Boundary layer - Aerodynamics 2. Boundary layer, Turbulent - Pressure distribution 3. Flow, Turbulent - Theory 4. NACA TN 3453.

Measurements of free-space oscillating pressures near a propeller at flight Mach numbers to 0.72, by Arthur W. Vogeley and Max C. Kurbjun. U. S. National Advisory Committee for Aeronautics. May 1955. 24p photos, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117602

See PB 112193 for Garrick-Watkins theory.
1. Garrick-Watkins theory 2. Mach number - Effect 3. Instruments, Measuring - Pressure 4. Pressure distribution - Theory 5. Propellers - Pressure - Measurement 6. Noise, Propeller - Measurements 7. Torque, Propeller - Measurements 8. NACA TN 3417.

On the kernel functions of the integral equation relating lift and downwash distributions of oscillating wings in supersonic flow, by Charles E. Watkins and Julian H. Berman. U. S. National Advisory Committee for Aeronautics. May 1955. 43p diagr. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117579

1. Wings - Aspect ratio 2. Downwash (Aerodynamics) - Theory 3. Kernel functions (Aerodynamics) 4. Flow, Supersonic - Calculations 5. Wings - Pressure distribution - Theory 6. Equations, Integral 7. NACA TN 3438.

Preliminary investigation of aerodynamic characteristics of small inclined air outlets at transonic Mach numbers, by Paul E. Dewey. U. S. National Advisory Committee for Aeronautics. May 1955. 21p photos, drawings, diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117578

1. Mach number - Effect 2. Ducts, Air - Supersonic 3. Ducts, Air - Flow - Measurements 4. NACA TN 3442.

Some calculations of the lateral response of two airplanes to atmospheric turbulence with relation to the lateral snaking problem, by John D. Bird. U.S. National Advisory Committee for Aeronautics. May 1955. 24p drawings, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117485

1. Airplanes - Stability 2. Turbulence - Research 3. NACA TN 3425.

Theoretical and experimental investigation of additive drag, by Merwin Sibulkin. U. S. National Advisory Committee for Aeronautics. 1954. 14p diagrs, graphs. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. $0.15. PB 117687

1. Ducts, Air - Supersonic 2. Drag - Measurements 3. Drag, Aerodynamic - Theory 4. Mach number - Effect 5. NACA 1187.

Total lift and pitching moment on thin arrowhead wings oscillating in supersonic potential flow, by H. J. Cunningham. U. S. National Advisory Committee for Aeronautics. May 1955. 43p diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117603

1. Mach number - Effect 2. Damping derivatives - Stability 3. Stability, Longitudinal - Dynamic tests 4. Wings - Arrow-shaped - Drag 5. Vibration - Damping 6. Flutter - Surface control 7. NACA TN 3433.

Transonic characteristics of 38 cambered rectangular wings of varying aspect ratio and thickness as determined by the transonic-bump technique, by Warren H. Nelson and Walter J. Krumm. U. S. National Advisory Committee for Aeronautics. Jun 1955. 172p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117645

1. Mach number - Effect 2. Wing profiles - Wind tunnel tests 3. Wind tunnels - Aerodynamics 4. NACA TN 3502.

Zero-lift wave drag of a particular family of unswept, tapered wings with linearly varying thickness ratio, by Arthur Henderson, Jr. and Julia M. Goodwin. U. S. National Advisory Committee for Aeronautics. May 1955. 28p diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., Washington 25, D. C. PB 117392

1. Flow, Supersonic - Theory 2. Wings, Tapered - Lift 3. Wings, Tapered - Drag 4. Wing theory 5. NACA TN 3418.

Investigation of jet-engine noise reduction by screens located transversely across the jet, by Edmund E. Callaghan and Willard D. Coles. U. S. National Advisory Committee for Aeronautics. May 1955. 27p photos, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117458

1. Jet engines, Turbo-jet - Noise - Reduction 2. NACA TN 3452.

Technique utilizing rocket-propelled test vehicles for the measurement of the damping in roll of sting-mounted models and some initial results for delta and unswept tapered wings, by William M. Bland, Jr. and Carl A. Sandahl. U. S. National Advisory Committee for Aeronautics. May 1955. 25p photos, drawings, diagrs, graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117482

1. Wings, Tapered - Rolling moment 2. Wings, Triangular - Rolling moment 3. Rockets, Aircraft - Propellants 4. Mach number - Effect 5. NACA TN 3314.

Marine Transportation

Asymptotic developments of water waves obliquely incident to a dock, by R. A. Fuchs. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 62p. Order from LC. Mi $3.25, ph $9.00. PB 117385

This investigation concerns a particular example of what has been generally termed "developments at the confluence of analytic boundary conditions." The general problem is to describe the behavior of the solution of an analytic elliptic differential equation in the neighborhood of the confluence of two different analytic boundary conditions in terms of appropriate asymptotic developments. Contract N7 onr-295(28). UC IER Series 3, Issue 368.

Laboratory studies of gravity waves generated by the movement of a submerged body, by R. L. Wiegel. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 30p photo, drawings, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117390

In order to gain some insight into the phenomenon of gravity waves generated by underwater seismic disturbance, the Tsunami, a laboratory study was made of the waves resulting from an idealized two dimensional model of the movement of a submerged body. Bodies of several shapes, sizes and weights were allowed to drop vertically or to slide down inclines of several angles, in water of various depths, from several heights above the bottom, but always below the water surface. Contract N7 onr-295(28). UC IER Series 3, Issue 362.

Marine meteorology; an example of an orographic-convection cell in the trade-wind region, by Joanne Starr Malkus. Woods Hole Oceanographic Institution, Woods Hole, Mass. Jun 1954. 49p photos, map, diagrs, graphs, tables. Order from LC. Mi $2.75, ph $6.50. PB 117415

A series of four helical aircraft soundings across the island of Puerto Rico on a sea-breeze day are analyzed and interpreted. The observations give the height distribution of temperature, moisture, and small-scale turbulence at four verticals along the air flow, together with cloud observations which were supplemented by photography. The existence of a fairly symmetrical orographic-convection cell with ascent over the island and compensating subsidence in a surrounding ring is established. Technical report no. 30 under Contract N6Onr-27702 (NR-082-021). Unpublished manuscript. WHOI Ref 54-43.

Model study of wave action on a cylindrical island, by A. D. K. Laird. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 11p graphs, table. Order from LC. Mi $2.00, ph $2.75. PB 117297

The height and phase relationships of non-breaking ocean waves about a cylindrical island are shown by a model study to be in agreement with the corresponding diffraction theory. The variation of pressure with depth, however, was found to be more rapid than the hyperbolic cosine variation which has been used for forces on piling. Contract N7 onr-295(28). UC IER Series 3, Issue 370.

Mooring cable forces caused by wave action on floating structures, by K. E. Beebe. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1953. 34p photos, drawings, graphs, tables. Order from LC. Mi $2.50, ph $5.25. PB 117387

Experiments have been conducted to determine the forces in mooring cables caused by wave action on floating structures. Empirical data are presented in graphical form showing the relationship of these forces to the several variables involved. All data are presented in tabular form, and a few typical cases are extrapolated to prototype conditions. Contract N7 onr 295(28), NR 083-008. UC IER Series 3, Issue 366.

Motion of an LCM underway in waves, by R. C. MacCamy. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jul 1954. 11p drawings, graphs. Order from LC. Mi $2.00, ph $2.75. PB 117452

The motion of a model LCM-6 underway in a uni-

form, long-crested wave train is investigated by means of the semi-empirical methods based on the Froude-Kriloff hypothesis. The model is treated as a rectangular block and the calculation of the response factors is thus related to earlier investigations of the motion of a block which is not underway. Only in the case of stern seas were reasonably good predictions of the motion possible, and only these results are included in the report. Contract Nonr 222(18), NR-084-079. UC IER Series 67, Issue 7.

Patuxent River - summer cruise, 23 Jun - 28 Jun 1952, by D. W. Pritchard. Johns Hopkins University. Chesapeake Bay Institute. Jun 1954. 48p maps, tables. Order from LC. Mi $2.75, ph $6.50. PB 117416

Joint research project of U. S. Government and states of Maryland and Virginia to study physical and chemical structure of the area in the summer season. Well tabulated on depth, temperature, salinity, and current. Data report 19 under Contracts Nonr248(30), Project NR 083-070.

Progress report for period 1 Jun 1953 to 30 Apr 1954, by Carter R. Sparger. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Jun 1954. 24p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $2.25, ph $4.00. PB 117424

3rd annual (and final) report under Contract N7 onr-487, Task order 3. A & M project 29, Reference 54-39F.
1. Sea water - Temperature 2. Oceans - Heat distribution 3. Ocean temperature - Measurement 4. Oceanography - Research.

Propagation of radial waves generated by an oscillating body, by O. Sibul and K. Pister. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 18p photos, drawings, diagrs, graphs, table. Order from LC. Mi $2.00, ph $2.75. PB 117386

A series of experiments was performed for the purpose of investigating the characteristics of the gravity waves resulting from the periodic vertical oscillation of a plunger in water. Wave heights were measured along a radial line at various distances from the plunger. Graphs are presented which show the relationships between wave height and radial distance, wave height and frequency with constant amplitude of plunger movement, wave height and amplitude of plunger movement with constant frequency. Contract N7 onr 295(28). UC IER Series 3, Issue 367.

Some references on wave motion, by Joseph H. Sorenson. California. University. Institute for Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jun 1954. 34p. Order from LC. Mi $2.50, ph $5.25. PB 117378

Contract N7 onr-295(28).
1. Waves, Ocean - Motion - Bibliography 2. UC IER Series 3, Issue 369.

SS Warrior, an analysis of an export transportation system from shipper to consignee. Maritime Cargo Transportation Conference, 1954. Nov 1954. 78p maps, drawings, diagrs, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. $1.00, with supplement. PB 117517

This is an initial study in a program undertaken at the request of the Dept. of Defense and Dept. of Commerce for the purpose of providing guidance on means and techniques leading to improvement in the sea transportation of general cargo. It is a background study to document a typical system as a model for later analyses and comparisons within the system and with other systems. It consists of an analysis of an entire export transportation system from points of origin of the cargo in the United States to delivery at destinations in Germany. NRC 339.

Supplement: Meteorological and oceanographic analysis of the passage of the SS Warrior, by Louis Allen. Nov 1954. 24p map, diagrs, graphs, tables. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C., with PB 117517. $1.00. PB 117517s

From a study of the passage of the WARRIOR with the logical variations in routing of the vessel, it becomes obvious that differing weather, sea and current conditions are responsible for differences in passage time. Through the science of meteorology and oceanography these differing conditions can be predicted to a significant degree prior to departure of the vessel, and specific routes can be laid out to utilize the best of these conditions for every individual passage. Astute route selection results not only in dollar and time savings but also in improvement in safety of life and property at sea. NRC 339 Supplement.

Travel time for periodic waves on beaches of small constant slope, by R. A. Fuchs. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Jul 1954. 11p graphs, table. Order from LC. Mi $2.00, ph $2.75. PB 117453

Graphs are presented for rapidly estimating the time required for ocean waves to travel between any two near shore points on a beach with parallel depth contours. Results cover wave periods from 3 to 18 seconds, deep-water refraction angles of 0 degrees to 70 degrees and all small beach slopes. A similar graph is presented for unrefracted wave groups with wave periods of 5, 10, 15, and 20 seconds. Contract Nonr 222(15). UC IER Series 29, Issue 55.

Wave transformation. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Contract Nonr 222-(15) NR-256-001. Order separate parts described below from LC, giving PB number of each part ordered.

Final report, by R. L. Wiegel. Dec 1954. 4p. Mi $1.50, ph $1.50. PB 117714

Contains abstracts of reports issued under this contract.
1. Waves, Ocean - Movement 2. Waves, Ocean - Forecasting 3. UC IER Series 29, Issue 59.

Linear least squares prediction, by R. R. Putz. Dec 1954. 25p graphs. Mi $2.25, ph $4.00. PB 117715

The results are given from an investigation of least-squares prediction of time histories of the surface elevation and subsurface pressure for gravity waves in water. Tests were made of the degree of linear predictability between time histories corresponding to particular configurations of wave recorders and particular wave conditions in the ocean and in the laboratory channel. UC IER Series 29, Issue 58.

WATER SUPPLY, SANITATION AND PUBLIC HEALTH

Ground water in California, the experience of Antelope valley, by J. Herbert Snyder with a foreword by S. V. Ciriacy-Wantrup. California. University. Giannini Foundation of Agricultural Economics, Berkeley, Calif. Feb 1955. 187p maps (2 fold), graphs, tables. Order from LC. Mi $7.00, ph $24.00. PB 117516

Giannini Foundation Ground Water Studies, no. 2.
1. Water supply, Ground - California 2. Irrigation - California.

Quantitative geomorphic study of drainage basin characteristics in the Clinch Mountain area, Virginia and Tennessee, by Victor C. Miller. Columbia University. Dept. of Geology. n.d. 91p map (fold), diagrs, graphs, tables (1 fold). Order from LC. Mi $4.50, ph $12.75. PB 117358

Quantitative study of stream length, basin area, drainage density, basin circularity, bifurcation ratio, valley-side slopes, and hypsometric curves was made of two kinds of topography in the Clinch Mountain area of Virginia and Tennessee: (1) Clinch Mountain, a homoclinal ridge whose lithology is constant, but whose dip changes along the strike. (2) Three maturely dissected areas of homogeneous topographic facies and dendritic drainage, one of which is underlain by Copper Creek dolomite, a second by sandstones and shales of the Athens formation, a third by the shaly Pennington formation. Technical report no. 3 under Contract N6 onr 271-30.

MISCELLANEOUS

Final report under Contract no. AF 19(122)-441, by Jack Oliver. Columbia University. Lamont Geological Observatory, Palisades, N. Y. Mar 1955. 17p. Order from LC. Mi $2.00, ph $2.75. PB 117357

Theoretical and experimental investigations of seismic wave phenomena revealed significant new knowledge about the structure of the earth's crust, mantle and core. Particular attention centered on (1) seismic surface waves, (2) coupling between the atmosphere and the oceans or the ground, (3) microseism characteristics, mechanisms and causes (4) quarry blast recording for the determination of crustal structure (5) model investigations of significant seismic problems. List of technical reports on seismology included.

Island bibliographies: Micronesian botany; Land environment and ecology of coral atolls; Vegetation of tropical Pacific Islands, by Marie-Helene Sachet and F. Raymond Fosberg. Pacific Science Board. 1955. 586p. Order from NAS-NRC Publications Division, 2101 Constitution Ave., N. W., Washington 25, D. C. $6.00. PB 117317

1. Pacific Islands - Bibliography 2. Vegetation, Tropical - Bibliography - Pacific Islands 3. NRC 335.

Limiting factors in the mass culture of unicellular algae. Annual progress report, 1 Jan 1953 to 31 Dec 1953, under Contract Nonr 556(00), by Hugh G. Gauch, W. M. Dugger, Robert W. Krauss, and William H. Thomas. Maryland. University. Botany Dept., College Park, Md. Jan 1954. 10p tables. Order from LC. Mi $1.50, ph $1.50. PB 116487

1. Algae - Culture 2. Algae - Metabolism.

Nonprofit research and patent management organization, by Archie M. Palmer. National Research Council. 1955. 152p. Order from Office of Patent Policy Survey, NAS-NRC, 2101 Constitution Ave., N. W., Washington 25, D. C. $3.00. PB 117614

Second in a series of four publications. Detailed analysis of organic structure of 104 nonprofit agencies, their institutional affiliations, articles of incorporation and by-laws, objectives, operating procedures, research and patent policies, and experience with research and patent management problems. NRC 372.

Non-visual orientation of fish. Progress report for period 15 Mar to 31 Dec 1953 under Contract N-onr-233(15), by Theodore J. Walker. California. University. Scripps Institution of Oceanography. Jan 1954. 9p drawings. Order from LC. Mi $1.50, ph $1.50. PB 116485

1. Fish - Anatomy 2. Sense organs - Fishes 3. Orientation - Fish 4. CU SIO Ref 54-6.

Progress report no. XV on O.N.R. Contracts N5-ori-07801, NRori-07858. Massachusetts Institute of Technology. Laboratory for Insulation Research. Jun 1954. 84p photos, drawings, diagrs, graphs, tables. Order from LC. Mi $4.00, ph $11.50. PB 117412

1. Spectroscopy, Dielectric 2. Crystallography, X-ray 3. Ferromagnetism - Research 4. Ferroelectricity - Research 5. Dielectric research.

Report on studies of stratification in modern sediments and in laboratory experiments, by Edwin D. McKee. U. S. Office of Naval Research. n.d. 65p photos, drawings, diagr, tables. Order from LC. Mi $3.25, ph $9.00. PB 116544

Issued after 1952. Project Nonr 164(00), NR 081 123. 1. Sediment - Stratification 2. Beaches - Stratification.

Restudy of test: Shore nourishment by offshore deposition of sand, Long Branch, New Jersey, by Robert L. Harris. U. S. Beach Erosion Board. Nov 1954. 22p diagrs, graphs, maps, tables. Order from LC. Mi $2.25, ph $4.00. PB 116605

1. Sands, Beach - Deposition 2. Beaches - Erosion - Prevention 3. ENG BEB TM 62.

Summary of educational patterns in the Soviet Union, by Irving Rosow. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1954. 14p tables. Order from LC. Mi $2.00, ph $2.75. PB 116625

The purposes of this report are twofold: First, to inquire into the availability of educational opportunity for Soviet citizens in general and for subgroups within the population; second, to inquire into the significance of education for the Soviet system and for Soviet citizens. Contract AF 33(038)-12909. Research digest no. 4. AAF HRRI RD 4.

Survey of manufacturing activity in Australia. Australia. Dept. of National Development. Division of Industrial Development, Melbourne, Australia. Oct 1954. 92p tables. Order from LC. Mi $4.50, ph $12.75. PB 116474

1. Manufactures - Australia.

Transition from civilian to army life, by Richard Christie. George Washington University. Human Resources Research Office, Washington, D. C. Oct 1954. 20p diagrs, tables. Order from LC. Mi $2.00, ph $2.75. PB 116803

1. Personnel, Military - Psychiatric records 2. Personnel, Military - Performance 3. GWU HRRO TR 13.

Word-of-mouth communication in the Soviet Union, by Raymond A. Bauer and David B. Gleicher. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Aug 1953. 24p tables. Order from LC. Mi $2.25, ph $4.00. PB 116481

Contract AF 33(038)-12909.
1. Communications, Auditory - Russia 2. Information - Dissemination - Russia 3. AAF HRRI RM 15.

ATOMIC ENERGY REPORTS OF INTEREST TO INDUSTRY

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

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

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Biology and Medicine

Nuclear activation with cobalt-60 gamma rays, by W. Wayne Meinke. Univ. of Michigan. Dept. of Chemistry. Fission Products Lab., Ann Arbor, Michigan. May 1954. Contract Nos. AT(11-1)-70 and AT(11-1)-162. 17p. Order from OTS. $0.15. AECU-2904

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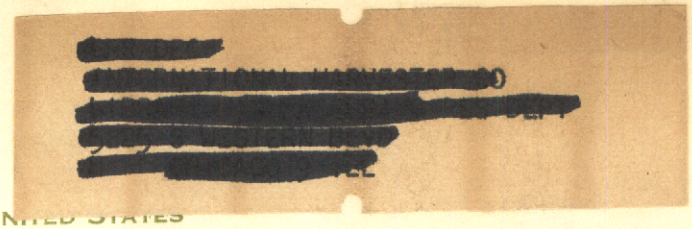

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