

U. S. Government

RESEARCH REPORTS

December 16, 1955

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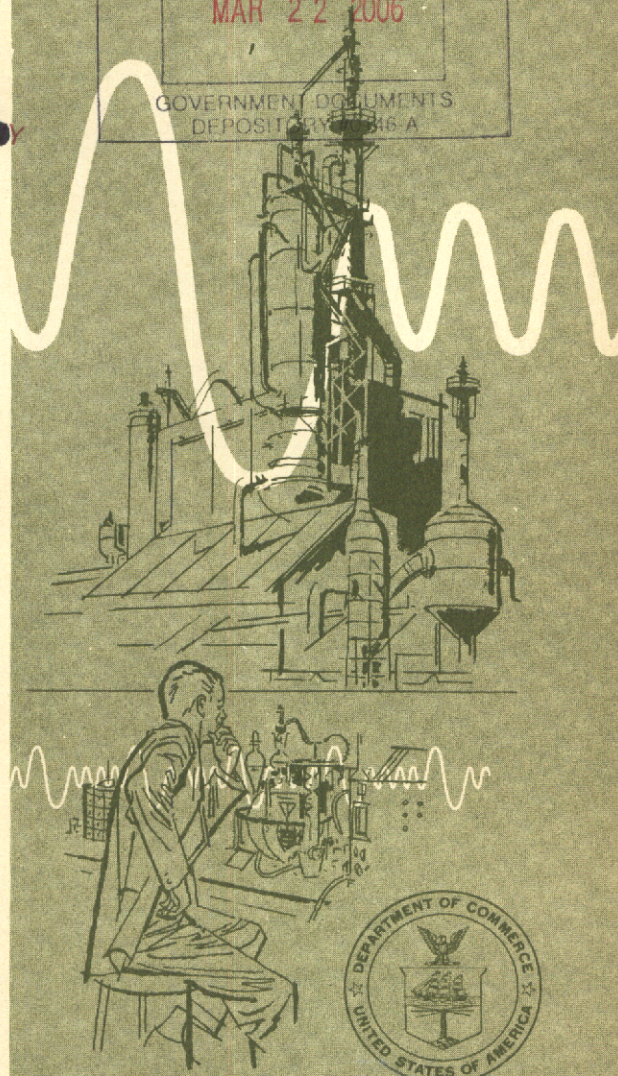
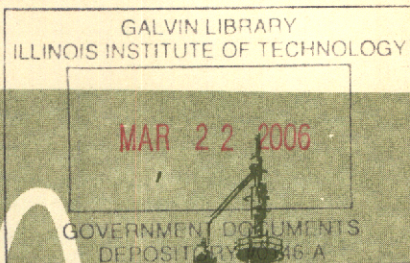
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U. S. DEPARTMENT OF COMMERCE

Office of Technical Services

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

U. S. DEPARTMENT OF COMMERCE
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APPAREL

Development and evaluation of a two-piece rescue (swim) suit with roll closure. Report no. 1, by Ralph Orben. U. S. Naval Supply Activities. Clothing Supply Office, Brooklyn, N. Y. Feb 1955. 24p photos, tables. Order from LC. M1 \$2.70, ph \$4.80. PB 118284

The development of a two-piece rescue (swim) suit with roll closure is described and the significant progressive steps which led to the development are discussed. Preliminary work performed in the design of one-piece suits is also reviewed. Busanda reports Control symbol 3950-2. Project NT 001-045, Subproject no. NT 001-045.01.

Development of a new oxford for Navy women, by J. Brucato. U. S. Naval Supply Activities. Clothing Supply Office, Brooklyn, N. Y. Jun 1955. 19p photo, drawings, tables. Order from LC. M1 \$2.40, ph \$3.30. PB 118726

Busanda reports control symbol 3950-2. Project no. NT 001-018: Service footwear. Sub-project no. NT 001-018.2: Leather footwear.
1. Shoes, Women's - Design 2. Footgear - Design.

Shipboard evaluation of experimental cold weather clothing (aircraft carrier phase). Report no. 3, by Arthur Price. U. S. Naval Supply Activities. Clothing Supply Office, Brooklyn, N. Y. May 1955. 37p photos, tables. Order from LC. M1 \$3, ph \$6.30. PB 118727

A subjective evaluation was conducted on Navy experimental cold weather clothing items which utilize the double moisture barrier principle of insulation. These items were re-designed and modified prototypes of the standard A-1 and A-2 clothing adopted in 1951. The evaluation phase was undertaken to determine the functionability and general utility characteristics of the various experimental items for use by aircraft carrier flight deck personnel. The data presented resulted from on board observations made

by a technical representative of the Bureau of Supplies and Accounts, and from questionnaires completed by a cross section of flight deck personnel who participated as test subjects during the evaluation program. Busanda reports control symbol 3950-2. Project NT 001-002, Cold weather handwear and footwear and NT 001-008, Cold and wet weather clothing.

CHEMICALS AND ALLIED PRODUCTS

Organic Chemicals

Barrier hindering internal rotation in methylamine, by J. G. Aston and Frank L. Gittler. Pennsylvania State University. Cryogenic Laboratory, State College, Pa. Nov 1954. 5p table. Order from LC. M1 \$1.80, ph \$1.80. PB 118546

1. Methylamine - Spectrographic analysis 2. Methylamine - Thermodynamic properties 3. Contract N6 onr-269, T. O. III

Heat stable proteins and enzymes. Final report for the period Jun 28, 1951-Jun 28, 1954, by Harry Sobotka. Mt. Sinai Hospital, New York, N. Y. Jul 1954. 3p. Order from LC. M1 \$1.80, ph \$1.80. PB 118652

Summary of results in developing synthetic media for the growth of a variety of thermophilic microorganisms of the genus Bacillus. Contract Nonr-33900, Project 123-052.

Ring-opening reactions of ethylenimine derivatives, by Paul E. Fanta. Illinois Institute of Technology. Dept. of Chemistry, Chicago, Ill. Dec 1954. 22p tables. Order from OTS. 75 cents. PB 111858

A number of pyrolytic and acid-catalyzed reactions of ethylenimine derivatives have been investigated. It has been found that with derivatives of 1-acyl-2, 2-dimethylethylenimine, cleavage of the nitrogen-

tertiary carbon bond of the ring occurs, followed by the formation of various cyclic and non-cyclic products. These results are rationalized by mechanisms involving the formation and reaction of tertiary carbonium ions. Project no. 7340. AAF WADC TR 54-506. Contract AF 33(616)-457.

Studies on the biosynthesis of coenzyme A. Final report for the period Oct 1, 1951 - Jul 31, 1953 under Contract N onr 606(00), NR 122-143, by G. David Novelli, Massachusetts General Hospital, Boston, Mass. Jul 1954. 3p. Order from LC. Mi \$1.80, ph \$1.80. PB 118651

A brief statement of research project and accomplishments in studying the degradation and biosynthesis of CoA in order to obtain information which would (a) reveal the structure of the coenzyme and (b) indicate the mechanism by which the coenzyme is synthesized from the vitamin, pantothenic acid. Contract Nonr 606(00), NR 122-143.

Synthesis of methyl-substituted fluoranthenes, by D. S. Trifan, J. P. Germot, and S. Bonotto, Princeton University. Plastics Laboratory, Princeton, N. J. Oct 1953. 41p diags, graphs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 118679

Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152B.
1. Fluoranthene - Derivatives - Preparation 2. PU PL TR 30A 3. SIG Contract DA 36-039-sc-133, Report no. 12A.

Detergents

Hydrolysis of oil-dispersed soaps in the presence of carbon dioxide, by H. R. Baker and C. R. Singleberry. U. S. Naval Research Laboratory. Oct 1955. 13p tables. Order from OTS. 50 cents. PB 111738

Oil-soap systems containing a wide variety of carboxylate soaps, although only slightly hydrolyzed by water alone, are subject to progressive hydrolysis of the soap when they are exposed to atmospheres containing both moisture and carbon dioxide. Alkali and alkaline earth sulfonates show little hydrolysis under the same conditions. The acids formed by hydrolysis of carboxylates contribute constructively to rust inhibition, boundary lubrication, and peptizing action, but may promote corrosion of brass and some other alloys frequently met in lubricant applications. Zinc carboxylates are the most resistant to hydrolysis by water and carbon dioxide of any of the carboxylate soaps studied. Inert noncarboxylate thickeners are indicated for greases exposed to water and high concentrations of carbon dioxide. NRL R 4627.

Discontinuity in the temperature coefficient of the velocity of ultrasonic waves in polymeric materials, by Richard N. Work, Princeton University. Plastics Laboratory, Princeton, N. J. Sep 1955. 11p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118708

It is proposed that the discontinuity is a manifestation of the sudden change in the expansion coefficient that occurs at the glass transition temperature. A comparison of volume-temperature data with velocity-temperature and velocity-pressure data taken from the literature gives reasonably good agreement with this explanation. Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152B. PU PL TR 38A. SIG Contract DA 36-039-sc-42633, Report 6A.

Elevated- and room-temperature properties of transparent acrylic sheet materials, by John Van Echo, Gale R. Remely and Ward F. Simmons. Battelle Memorial Institute, Columbus, Ohio. Feb 1952. 40p photos, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118802

Two regular grades of transparent acrylic sheet, Plexiglas Ia and Lucite HC-201, and two heat-resistant grades, Lucite HC-202 and Plexiglas II, were tested in tensile creep and creep rupture, crazing, short-time tensile, and deterioration at room temperature, 160°, and 200°F. RDO no. R-604-303, Aircraft structural laminates. AAF WADC TR 52-38. Contract AF 33(038)-10818.

Measurements of the dielectric properties of solid polymeric materials in the frequency range 35,000-40,000 megacycles. Technical report 31B, by Donald A. Yamada and Richard N. Work, Princeton University. Plastics Laboratory, Princeton, N. J. Dec 1953. 35p diags, table. Order from LC. Mi \$3, ph \$6.30. PB 118680

A method of measuring the complex dielectric constant of low-loss and medium-loss solid dielectric materials at 35,000 mc/s to 39,700 mc/s is described in detail. Sources of errors and accuracy are discussed and analyzed. A table of measured values of ϵ' and ϵ'' is included for ten high polymeric insulating materials and for two glass bonded mica materials. Dept. of the Army project: 3-99-15-022. Signal Corps project: 32-152B. PU PL TR 31B. SIG Contract DA 36-039-sc-113, Technical report no. 13B.

Methods of measuring the birefringence of aircraft glazing materials, by Mary J. Kramer. U. S. Naval Research Laboratory. Oct 1955. 28p diags, graphs, tables. Order from OTS. 75 cents. PB 111825

Three methods of measuring the birefringence of hot-worked acrylics are described. Two of these methods, by utilizing oblique incidence of light upon the sample, avoid the necessity for cutting a specimen out of the material tested. Equipment required for the tests is detailed, and the procedures outlined. Also included are experimental results of trials of the nondestructive tests on ten sheets of hot-worked materials. NRL R 4624.

Preparation of graft copolymers from autoxidized polystyrene derivatives, by Donald J. Metz and Robert B. Mesrobian. Polytechnic Institute of Brooklyn. Institute of Polymer Research, Sep 1954. 18p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118306

Experiments on the low temperature autoxidation of polystyrene and several alkylated derivatives of polystyrene in solution are described. Experiments on the bulk polymerization of vinyl monomers using polymeric hydroperoxides are described, and the results compared with vinyl polymerization initiated by cumene hydroperoxide. The preparation of a graft copolymer by the redox emulsion polymerization of methyl methacrylate using an alkylated polystyrene hydroperoxide is described. Technical report no. VIII under Contract N6 onr-26309, Project no. NR 330-010.

Paints, Varnishes and Lacquers

Development of cold dip strippable compounds. Third report, by M. H. Sandler. U. S. Aberdeen Proving Ground. Development and Proof Services, Aberdeen, Md. Apr 1952. 23p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118321

For 2d report see PB 118331. May not reproduce well. Project TB 4-672B, Report no. 4.
1. Coatings, Protective - Tests 2. Metals - Coatings, Protective 3. APG LSD 157.

Electron microscope and electron diffraction study of optically transparent electrically conducting coatings on glass and acrylic plastic, by Stanley A. Szawlewicz. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Mar 1953. 27p photos, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118266

Efforts are being made to develop conducting coatings for aircraft windshields and transparent canopies to prevent the accumulation of fog, frost, or ice and to dissipate precipitation-static charges. Commercial conducting coatings on glass were investigated by electron microscopy and electron diffraction. These coatings consisted primarily of very small stannic oxide crystals which were uniformly dispersed in a thin film and were firmly bonded to the glass surface. Experimental conducting coatings of stannic oxide

which were formed on glass at relatively low temperatures had poor adhesions to the substrates. A graphite coating in which the conductivity was produced largely by the rubbing process showed a strong orientation of the planes. AAF WADC TR 53-44.

Strippable coating, application and maintenance. Revised. U. S. Bureau of Ordnance. Dec 1954. 53p photos, drawings, diagrs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 55 cents. PB 85255r

First revision of PB 85255.
1. Coatings, Strippable 2. Guns, Spray 3. NAVORD OP 1485 rev.

Inorganic Chemicals

Cleanup of methylphosphonic dichloride spills, by Arthur M. Reeves. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Apr 1955. 4p table. Order from LC. Mi \$1.80, ph \$1.80. PB 118269

Project 4-08-03-016-02. Includes Addendum, 21 July 1955.

1. Phosphine, Dichloromethyl - Solvents 2. Ethylene, Tetrachloro - Solvent properties 3. Carbon tetrachloride - Substitutes 4. CC CRL R 487.

Deformation-induced charge flow in NaCl crystals, by D. B. Fischbach and A. S. Nowick. Yale University. Hammond Metallurgical Laboratory, New Haven, Conn. Jun 1955. 8p graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118383

When a single crystal of NaCl is plastically deformed in an inhomogeneous fashion, a transient electric current flows through the crystal, even when no external field is applied. The direction of the effect is such that negative charge flows in the external circuit away from the side of the crystal to which the higher stress is applied. To explain the observed effects it is suggested that the effective charge carriers are edge dislocations, which carry a net charge by virtue of the predominance of positive over negative jogs. OSR TN 55-169, Contract AF 18(600)-850-1.

Ignition limits of hydrogen peroxide vapor, by C. N. Satterfield, P. J. Ceccotti, A. H. R. Feldbrugge. Massachusetts Institute of Technology. Dept. of Chemical Engineering, Cambridge, Mass. Nov 1954. 14p diagrs, graph, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118640

The ignition limits of mixtures of hydrogen peroxide vapor and various inert diluent gases are of practical concern wherever appreciable concentrations may be encountered, as in a process for concentration of hydrogen peroxide by distillation. The limits are also of theoretical interest in affording clues to the

mechanism of the decomposition reaction. The ignition limits were determined at a total pressure of 200 mm mercury for mixtures of hydrogen peroxide and water vapor with each of the following inert diluents: oxygen, nitrogen, helium, and carbon dioxide. The effect on the ignition limit, between 200 and 50 mm mercury, of packing the explosion vessel with Raschig rings was also determined. Report no. 47. Division of Industrial Cooperation Project 6552. Contract N5ori-07819, NR 092-008.

Quarterly periodic status report under Contract N5 ori-07819, NR 092-008, by R. L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories. Sep 1954. 13p graphs, table. Order from LC. Mi \$2.40, ph \$3.30. PB 118313

DIC 6552.

1. Hydrogen peroxide - Stability 2. Hydrogen peroxide - Decomposition 3. Barium peroxide - Decomposition 4. Flame - Velocity 5. Contract N5 ori-07819, NR 092-008.

Analytical Chemistry

Determination of 12-hydroxy stearic acid content in mixed fatty acids, by Max T. Fisher. U. S. Arsenal, Rock Island, Ill. Aug 1955. 15p graph, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118796

A method of extracting fatty acid mixtures containing 12-hydroxystearic acid has been developed such that the solvent will extract all the unsubstituted, straight-chain fatty acids and only a small portion of the 12-hydroxystearic acid. By referring the residue from an extraction to a graph, which is plotted from the extraction of known mixtures, the 12-hydroxystearic acid content of an unknown mixture of fatty acids can be determined within + 1.0%. Ordnance Proj no. TB 5-4010A, Report no. 14. D. A. Proj no. 593-21-053. RIAL R 55-3194.

Miscellaneous Chemicals

Laboratory study of the effectiveness of various chemicals as soil stabilizing agents, by R. C. Mainfort. U. S. Civil Aeronautics Administration. Technical Development Division. Oct 1945. 21p graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 118789

This report describes the laboratory studies made to develop chemicals which, when mixed with natural soils, form an integral material suitable for light paving. In the earlier phases of this work, the most promising chemical appeared to be a 40 percent solution of sodium silicate to which had been added a solution of sodium aluminate. Other chemicals, although yielding lower strength values than the above method, indicated very promising results. The best of these were: raw tung oil, linseed oil,

and a synthetic resin formed by a mixture of furfuryl alcohol and acid. Other materials, including cottonseed oil, rubber latex and aluminum stearate, were tried with varying success, but were not fully evaluated in this study. CAA TDN 40.

On the break-down of thixotropic materials, by Sven-Eric Dahlgren. Chalmers University of Technology, Gothenburg, Sweden. 1955. 19p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118580

Based on the experimental work carried out by Green and Weltmann an analytical treatment of the thixotropic breakdown has been made. To fully characterize a thixotropic Bingham body no less than eight constants are necessary. The process can be described in one single diagram. It is shown that all thixotropic Bingham and Newtonian bodies must have a non-thixotropic region. A condition for a time-dependent breakdown is a delay in the appearance of thixotropy. Chemistry including metallurgy series vol. 4, no. 8, Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 159. Acta polytechnica 171.

Solid state properties and catalytic activity.

Thirteenth periodic status report, for the period Jul 1, 1954-Sep 30, 1954. Princeton University. Dept. of Chemistry. Oct 1954. 4p photos, drawings, diags, graphs, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118386

For reports 9, 10 and 11 see PB 114084, 115107, and 116327.

1. Catalysts, Oxidation 2. Contract N6 onr-27108, Project NR 051-265.

ELECTRICAL MACHINERY

Communication Equipment

Diurnal carrier-phase variation of a 16-kilocycle transatlantic signal, by J. A. Pierce. Harvard University. Cruft Laboratory. Oct 1954. 18p photos, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118403

The diurnal variation of the time of arrival of a 16 kilocycle signal traversing a transatlantic path has been found to be about 40 microseconds. This variation is presumably caused by a day-to-night change in the equivalent height of reflection of 10 to 12 kilometers, and appears to be very predictable. With such stability of propagation, extremely narrow receiving bandwidths are attainable. These bandwidths, in turn, make possible highly reliable networking of frequencies for communication station allocation and for navigational purposes. HU CL TR 209. Contract N5ori-76, T. O. 28, NR-372-011.

Integration method of detection and its application to the transmission of teletype signals, by Henning F. Harmuth. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. May 1955. 101p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 118617

Considerable efforts have been made during the last two decades to increase the reliability of teletype transmission under conditions of severe interference. In this report, problems of coding and detecting are treated. The main purpose is to outline the principles and describe some details of the design of a teletype system for operation under conditions of severe interference. Signal Corps Task no. 132A. Dept. of the Army Task no. 3-99-12-021. SCEL TM M-1648.

Study of surface wave transmission lines. Final report for the period Jun 1, 1954 to May 31, 1955 under Contract DA 36-039-sc-56734, by Elmer N. Schiebe. Wisconsin University. Dept. of Electrical Engineering, Madison, Wis. Jun 1954. 65p photos, diagr, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 118618

This final report describes the engineering research study made on surface wave transmission lines. This research is a continuation and extension of the work done under a previous contract (Contract no. DA 36-099-sc-5585). (See PB 115761). The work done may be divided into five separate topics which are, loss measurements on dielectric covered lines, the effect of rain on the loss of a surface wave line operating near 9000 mc/s, Sommerfeld wave study, the parallel plane resonator, and coupled surface wave lines. Signal Corps project 132B. Dept. of the Army project 3-99-12-022. SIG Contract DA-36-039-sc-56734, Final report.

Electronics

Analysis of angular accuracy in search radar, by Robert Bernstein. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. May 1955. 171p photos (part fold), graphs, tables. Order from LC. Mi \$8.10, ph \$27.30. PB 118291

The determination of the angular position of a target with search radar data is treated as a problem in estimating statistically the value of a parameter of a population. A computer was constructed in the form of a simulator which duplicates the entire search radar process in real time and produces an output whose characteristics are the same as those of an actual radar receiving echoes from a flying target. An estimator which can be implemented in a practical situation is applied to the simulator output. The distribution of this estimator is found for various values of the radar system parameters. Thesis - Columbia University. CU 4-55-AF-2815-EE. Project 4506. AAF CRC TN 55-392. CUN ERL TR 1/128. Contract AF 30(635)-2815, Task IV.

Analysis of clipper diode conditions, by Mortimer H. Zinn. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. May 1955. 21p diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118587

An analysis of conditions imposed on a high vacuum diode serving as a clipper diode in a line type resonant charging pulse modulator circuit. The discussion is confined for the most part to the case of a resistive clipping circuit. Dept. of the Army project nr. 3-19-02-022. Signal Corps project nr. 312 B. SCEL TM 1649.

Analysis of the spiral beam traveling-wave magnetron, by W. E. Lear. Florida. Engineering and Industrial Experiment Station, Gainesville, Fla. Nov 1954. 22p diagrs. Order from LC. Mi \$2.70, ph \$4.80. PB 118569

The gain expression is derived for a traveling-wave magnetron in which waves and electrons are moving in synchronism along a spiral path. The velocity-potential is used in the solution of the electron dynamics problem, and the equation for the propagation constant of the wave is obtained by matching admittances at the surface of the beam. Project no. 4922. Contract Nonr-07201, Technical report no. 3.

Antennas of discontinuous radius, by Carl Faflick. Harvard University. Cruft Laboratory. Sep 1954. 74p diagrs, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 118374

The measured input impedance of several antennas having a single discontinuity in radius is presented. It is noted that input impedance is almost independent of the thickness of the outer section if the length of the outer section is one-quarter wavelength. Measurements for a case calculated by Uda and Mushiake are included for comparison. The current distributions along some of the closed sleeve antennas are also shown. A comparison is made of the several approximate methods of calculation and the effect of neglecting the coupling between sections and the capacity effect at the junction regions is discussed. HU CL TR 171. Contract N5ori-76, T. O. I, NR-372-012.

Asymptotic solution of some diffraction problems, by J. B. Keller, R. M. Lewis, and B. D. Seckler. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Jun 1955. 83p diagrs, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 118624

These problems include diffraction of a plane wave by a parabolic cylinder, a paraboloid of revolution, a cylinder and a sphere; diffraction of a spherical wave by a paraboloid of revolution, a hyperboloid of revolution, and plane interface; diffraction of a cylindrical wave by a parabolic cylinder, a hyperbolic cylinder and a plane interface, etc. The boundary conditions considered are the vanishing of

the function, of its normal derivative and the impedance boundary condition. Formulas are obtained for reflection of any wave from any two dimensional surface, and certain formulas are deduced for three dimensional problems. NYU RR EM-81. AAF CRC TN 55-574. Contract AF 19(122)-42.

Backward-wave oscillator efficiency, by Richard W. Grow. Stanford University. Electronics Research Laboratory, Stanford, Calif. Nov 1954. 142p photo, diags, graphs. Order from LC. Mi \$7.20, ph \$22.80. PB 118564

This report contains the results of a study conducted for the purpose of obtaining information concerning the factors which determine the oscillation level in a backward-wave oscillator and which will permit the design of an oscillator to produce a given amount of r-f power. All of the theoretical results contained in this report are based on linear theory restricted by an arbitrary specification of the degree of saturation of the device. SU ERL TR 80. Contract N6onr 251(07), NR 373-360.

Bibliography of piezoelectricity, 1952. Tenth quarterly progress report under Contract no. DA 36-039-sc-73, by Karl S. Van Dyke and Olive M. H. Hall. Wesleyan University, Middletown, Conn. Apr 1953. 62p. Order from LC. Mi \$3.90, ph \$10.80. PB 118261

Dept. of the Army project no. 3-99-11-022. SIG project no. 37-142B. Supplements Volume 1, 7th quarterly report, 1951.
1. Crystals, Piezoelectric - Bibliography 2. SIG Contract DA 36-039-sc-73, 10th quarterly report, suppl. vol. 2.

Causality and radiation condition, by T. T. Wu. Harvard University. Cruft Laboratory. Nov 1954. 16p. Order from LC. Mi \$2.40, ph \$3.30. PB 118549

The Sommerfeld radiation condition is obtained from the requirement of classical causality under quite general conditions. HU CL TR 211. Contract N5-ori-76, T. O. I, NR-372-012.

Cross-wound twin helices for traveling-wave tubes, by M. Chodorow and E. L. Chu. Stanford University. W. W. Hansen Laboratories of Physics. Microwave Laboratory, Stanford, Calif. Oct 1954. 69p graphs, table. Order from LC. Mi \$3.60, ph \$9.30. PB 118565

This paper describes a structure, namely, a cross-wound twin helix which overcomes the disadvantages of a conventional helix for high-voltage traveling-wave tubes. Appendix A: Formal method of solution. SU ML R 249. Contract N6onr 25123 (NR 373-361).

Detection of propeller and Sambo modulations, edited by James L. Lawson. Massachusetts Institute of Technology. Radiation Laboratory. May 1944. 131p photos, drawings, diags, graphs, tables. Order from LC. Mi \$6.90, ph \$21.30. PB 118275

The asymmetrical treatment of propellers by layers of special material to produce subharmonics of the normal propeller modulation is known as the Sambo project. This report deals with three general phases of the propeller modulation and Sambo problems. (1) An analysis is presented of the receiving system for the detection and display of audio frequency amplitude modulated pulsed signals. (2) Patterns of received echo intensity as a function of the target aircraft propeller rotation angle have been obtained. (3) Extensive tests of propeller modulation effects have been made on an S band radar system. MIT Rad Lab S-10. NDRC Div 14. Contract OEMsr-262.

Dielectric dispersion behavior of selected natural polymers, by Charles F. Ferraro. Fordham University, New York, N. Y. Mar 1955. 88p drawings, diags, graphs, tables. Order from OTS. \$2.25. PB 111857

Studies were conducted from November 1952 to November 1954 on the variation of dielectric constant and loss factor with temperature and frequency for the esters of corn amylose and amylopectin, and cellulose. The systems studied were: (1) polymer solutions in dioxane, and (2) solid discs of the polymers containing varying amounts of plasticizers. Conclusions are drawn concerning: (1) rigidity of the polymer molecules in solution, and (2) the effect on the polymer molecules in the solid state produced by group substitution and plasticizer addition. AAF WADC TR 55-91. Contract AF 33(616)-322.

Electrical study of bicrystal interfaces, by Herbert F. Matare. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Apr 1955. 37p photos, diags, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118619

The discussion in this report covers the following: (a) General discussion of grain-boundary properties and necessary assumptions. (b) Bicrystal growing and orientation measurements. (c) Progress in the field of electrical measurements and theoretical interpretation. (d) Modulation of a current through a bicrystal by means of a polarization of the interface. Signal Corps project no. 132A. Dept. of the Army project no. 3-99-12-021. SCEL TM M-1647.

Electromagnetic transmission characteristics of a lattice of infinitely long cylinders, by Z. Kapriellan. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Nov 1954. 72p photos, diags, graphs. Order from LC. Mi \$4.50, ph \$12.30. PB 118574

Four approaches to the general problem have been employed and the advantages, disadvantages and realms of validity of each have been studied. Several of these methods constitute a substantial improvement over previous analyses and are supported by waveguide and free space experimental work. Report 34 under Contract N7 onr-29529. UC IER Series 60, Issue no. 122.

Ferromagnetics and ferroelectrics, by A. von Hippel. Massachusetts Institute of Technology. Laboratory for Insulation Research, Cambridge, Mass. Aug 1955. 45p photo, drawings, diagrs, graphs, table. Order from LC. Mi \$3.30, ph \$7.80. PB 118884

A comparison between ferromagnetics and ferroelectrics is given that intends to place these states of spontaneous order into clearer perspective by emphasizing their analogies and differences. The formation of the ordered state is followed in more detail in the examples of nickel, barium titanate and magnetite. On the basis of domain rotation and domain-wall nucleation and motion, the dynamics of the ordered state is considered as shaped by anisotropy, resonance and relaxation effects, fabrication parameters, and the short-range order of the material. Presented at the American Institute of Electrical Engineers, Technical Conference on Magnetization, Pittsburgh, Pa., June 16, 1953. MIT LIR TR 99. Contract ONR N5ori-07801.

Experimental investigation preliminary to the design of a model HF shipborne antenna pattern range, by J. W. Wong. National Research Council of Canada. Radio and Electrical Engineering Division, Ottawa. Jul 1955. 11p diagrs, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118731

This report describes an experimental investigation using scaled-model techniques for the purpose of obtaining information in the design of a model HF shipborne antenna pattern range. Results are included to show the effect of size of ground screen and other parameters on the circularity of the measured radiation patterns. NRCC ERA 287.

Further investigations into iterated sine- and cosine-integrals and their amplitude functions with reference to antenna theory, by Erik Hallen. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 46p tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118577

Third order functions are investigated especially with respect to their periodicity. Tables are given for the iterated sine- and cosine-functions and for their amplitude functions up to the third order. Electrical engineering series vol. 6, no. 5. Sweden.

Kungl. Tekniska Högskolans Handlingar nr. 89. Acta polytechnica 168.

Huygen's principle as an exact physical concept, by V. H. Rumsey. California. University. Division of Electrical Engineering. Electronics Research Laboratory. Antenna Group, Berkeley, Calif. Nov 1954. 34p diagrs. Order from LC. Mi \$3, ph \$6.30. PB 118573

Huygens' principle has been the source of many interesting researches since Huygens put forward his ideas in 1690. The recent revival of interest arises from the fact that Huygens' principle is of great value in the analysis of a wide class of boundary value problems such as the scattering and diffraction of electromagnetic waves. The aim in this paper is to arrive at an understanding of the physical concept. Report no. 38 under Contract N7 onr-29529. UC IER Series 60, Issue 128.

Methods for the kinetic study of fast electrode reactions, by Tallvaldis Berzins and Paul Delahay. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Nov 1954-Dec 1954. 41p graphs. Order from LC. Mi \$3.30, ph \$7.80. PB 118556

In Report 20, two methods are described for the study of the kinetics of fast electrode reactions. The potential is initially adjusted at the standard potential, and the departure from this potential (only a few millivolts) caused by the flow of current is studied. The complete solution (including transients) for electrolysis with alternating voltage of low amplitude is given in the Appendix. In Report 21, a theoretical analysis is made of the kinetics of adsorption of neutral organic substances on an electrode whose potential is a sinusoidal function of time of small amplitude (0.005 volt). Reports 20 and 21, Project NR 051-258. Report no. 21 is Electrochemical method for the kinetic study of fast adsorption processes.

Microwave research. Quarterly progress report no. 10, May 1, 1955-Aug 1, 1955 under Contract AF 18(600)-497, Project R-357-10-6, by Walter M. Nielsen and Walter Gordy. Duke University. Dept. of Physics. Durham, N. C. Sep 1955. 38p diagrs, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118465

Contents: (A) Abstracts of current projects. (B) Technical reports: - 1. Electronegativities of the elements, by Walter Gordy and W. J. Orville Thomas. - 2. Paramagnetic resonance of X-irradiated Teflon - Effects of absorbed oxygen, by William B. Ard, Howard Shields and Walter Gordy. - 3. Three-millimeter wave radiation from the sun, by Walter Gordy, Steve J. Ditto, James H. Wyman and Roy S. Anderson. OSR TN 55-230-232.

Mode solutions for radio waves scattered by meteor trails, by Glenn H. Keitel. Stanford University.

Radio Propagation Laboratory, Stanford, Calif.
Apr 1955. 110p diagsr, graphs, tables. Order
from LC. Mi \$5.70, ph \$16.80. PB 118303

The exact evaluation of radio reflections from inhomogeneous columns of ionization is investigated by the wave matching treatment. The forward scattering characteristics of the column are discussed in detail. The differential equations which describe the electromagnetic fields within the column of ionization for a normally incident plane wave were integrated numerically on the National Bureau of Standards Western Automatic Computer at the University of California at Los Angeles. The axial fields at the center of the column were calculated for both polarizations for low and high density columns. Scientific report no. 1 under Contract AF 19(604)-1031. Appendix A. General information regarding SWAC (National Bureau of Standards Western Automatic Computer). - Appendix B. Details of the integration program. - Appendix C. Tabulation of reflection coefficients. AAF CRC TN 55-355. SU RPL TR 55-355.

Network compensation of error-sampled feedback control systems, by Jack Sklansky. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. Apr 1955. 111p diagsr, graphs (part fold). Order from LC. Mi \$6, ph \$18.30. PB 118409

Two techniques, believed to be new, for designing lumped parameter networks to compensate error-sampled feedback control systems have been developed. The theory is substantiated by three illustrative examples. CUN ERL TR 7/B. OSR TN 55-162. Contract AF 18(600)-677, NR 357-50-3.

Noise studies on CW klystrons for the period 1 May 1954 to 31 May 1955, under Contract no. AF 19(604)-1080, by G. A. Espersen, R. A. La Plante and J. W. Rogers. Philips Laboratories, Irvington-Hudson, N. Y. Jun 1955. 30p photo, drawings, diagsr, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118466

The development of techniques for fabricating new tube designs to minimize vibrational noise is undertaken. The development of test equipment and testing techniques capable of identifying different sources of noise, such as microphonic, thermal and collision, is considered. The measuring system is described and the results indicate that the non-microphonic PKX-4 klystron shows considerably less noise than the diaphragm-type PKX-2 klystron. See also PB 116250, PB 116849 and PB 117281. AAF CRC TR 55-158. Contract AF 19(604)-1080, Final report.

Optimum synthesis of sampled-data systems, by John R. Ragazzini. Columbia University. Dept. of Electrical Engineering. Electronic Research Laboratories. May 1955. 87p diagsr, graphs. Order from LC. Mi \$4.80, ph \$13.80. PB 118436

This report presents the derivation of the optimum transfer functions in the least squares sense for a particular class of sampled-data systems. CUN ERL TR 6/B. OSR TN 55-140. Contract AF 18(600)-677.

Orientation of electric-breakdown paths in alkali halide single crystals, by M. E. Caspari. Massachusetts Institute of Technology. Laboratory for Insulation Research. Nov 1954. 57p photos, drawings, diagsr, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118633

Based on a thesis.

1. Crystals, Alkali halide - Dielectric properties
2. Dielectrics - Breakdown theory 3. Crystals - Holders - Design 4. Contract N5 ori-07801, NR 017-421 5. MIT LIR TR 90.

Parasitic sleeve antenna, by Carl Faflick. Harvard University. Cruft Laboratory. Sep 1954. 86p photos, drawings, diagsr, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 118375

This research treats theoretically and experimentally the problem of the parasitic sleeve antenna, consisting of a coaxial sleeve mounted on a cylindrical antenna center driven over an image plane. Equipment is described for measuring both the input impedance and the current distribution of a parasitic sleeve antenna. Current distributions on the outside of the sleeve are measured by a separate probe connected to the detecting system by miniature cable coiled inside the sleeve wall and threaded down the inside of the antenna. The errors in impedance measurement are discussed and it is shown that the measurements are accurate to within a 1 per cent circle on a Smith chart. Finally the effectiveness of the parasitic sleeve antenna in reversing the current in the outer portion of the antenna is compared with that of the phase reversing stub. HU CL TR 157. Contract N5ori-76, T. O. I, NR 372-012.

Performance of high-current-density electron guns, by H. D. Arnett and R. H. Kyser. U. S. Naval Research Laboratory. Aug 1955. 8p drawings, graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118864

As a phase of the development of millimeter wavelength klystrons, an experimental evaluation has been made of electron guns to produce an electron beam having a minimum perveance of 1.6 micropervs and beam voltage of 1600 volts. This report compares the performance of an empirically modified Pierce gun and Heil guns of modified form. NRL R 4588.

Research in physical electronics. Quarterly progress report no. 10 under Contract AF 19(604)-524 for the period 15 Dec 1954 to 15 Mar 1955, edited by H. M. Foerster and Ladiolas Goldstein. Illinois Engineering Experiment Station. Electrical Engi-

neering Research Laboratory, Urbana, Ill. Apr 1955. 65p photos, graphs. Order from LC. Mi \$3.90, ph \$10.80. PB 118292

Continuation of research under Contract AF 19(122)-5 and Contract AF 19(603)-23. For reports 3-9 see PB 112885, 113471, 114240, 115048, 115548, 116696, and 116980. Contents: High speed oscillography and micro-time analysis: 1. Analysis of ultra-high frequency modulated electron beams (Traveling wave tubes), by O. T. Purl. - 2. Considerations in the design of power folded transmission line tubes, by V. J. Fowler. - Gaseous electronics: - 1. Electromagnetic wave propagation in ionized gaseous media: 1. Interaction of electromagnetic waves, cross modulation and associated effects, by J. M. Anderson. - 2. Magnetic properties of a free electron gas; Magneto electron resonance phenomena, by R. C. Hwa. - 3. Quenching of the afterglow with low level microwave signals, by R. T. Chien. AAF CRC TN 55-388.

Some measurements of insulation resistance with particular reference to wafer switches, by R. L. Elliott and D. J. Wilson. Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. 1954. 28p graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 77 cents. PB 118044

1. Electronic equipment - Insulation - Gt. Brit.
2. Switches, Electronic - Measurements - Gt. Brit.
3. AERE EL/R 1564.

Some reliability aspects of systems design, by Fred Moskowitz and John McLean. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. May 1955. 42p diags, graphs. Order from LC. Mi \$3.30, ph \$7.30. PB 118407

A systematic development is presented which leads to formulas, charts and guide rules for engineers involved in the design of systems and equipments. Examples are given which illustrate the use of the formulas and the principles derived. Two very simple redundancy schemes are described and analyzed. It is shown that it is possible to obtain a desired reliability at relatively reasonable cost in terms of increased size and weight. First presented as an IRE paper. AAF RADC TN 55-4.

Sopra lo spostamento per pressione delle righe elevate delle serie spettrali (On the pressure shift of the high-order lines of the spectral series), by Enrico Fermi. Translated by Edith Kuhlstein and John G. Estam. Revised. Mar 1955. 18p diagr. Order from LC. Mi \$2.40, ph \$3.30. PB 118655

The shift of the higher terms of the absorption series of alkaline vapors, observed by Amaldi and Segre when the vapor is present in an atmosphere of foreign gas, has been theoretically studied here. A relation is established between the displacement of the lines and the critical collisional cross section for elec-

trons of very low speed impinging against the molecules of the perturbing gas. Translated from *Il Nuovo Cimento*, New series, vol. 11, p. 157-166, 1934, by the American Meteorological Society under Contract AF 19(604)-1364.

Thermionic emission from surfaces with adsorbed active centers, by George A. Haas. U. S. Naval Research Laboratory. Mar 1955. 24p drawings, diags, graphs. Order from LC. Mi \$2.25, ph \$4. PB 117509

1. Thermionic emissions
2. Surfaces - Electrical properties
3. Cathodes, Tungsten-thorium - Emission
4. NRL R 4508.

Traveling wave amplification of millimeter waves, by Hubert Heffner. Stanford University. Electronics Research Laboratory, Stanford, Calif. Jul 1952. 127f photos, diags, graphs, tables. Order from LC. Mi \$6.30, enl pr \$21.30. PB 118674

An investigation of the helix and certain heavily loaded waveguides is made to determine their suitability as slow wave structures for millimeter wave amplifiers. A detailed analysis of the expected gain in the vicinity of the low frequency cut-off including the effects of loss and space charge for the first space harmonic of the fin-opposite-fin and fin-opposite-slot corrugated guide is made. The probable occurrence of backward wave oscillations in forward wave space harmonic amplifiers is pointed out and methods for their elimination proposed. The easitron, consisting of a resonant wall surrounding an electron beam, is analyzed and shown to form a high gain narrow band amplifier. Results of a representative sample of nine experimental tubes of both the space harmonic and easitron type are given and compared with the theory presented. SU ERL TR 51. Contract N6 onr-251, T. O. 7, NR 078-360.

UHF filtering networks. Final scientific report under Contract AF 19(604)-962 for period 1 May 1955 to 30 Jun 1955, by D. E. Mode. Lehigh University. Institute of Research, Bethlehem, Pa. Jun 1955. 13p. Order from LC. Mi \$2.40, ph \$3.30. PB 118623

For earlier reports under this contract see PB 113767, 117236-117237, 117778.

1. Filters, Ultra high frequency - Design
2. Wave guides - Filters
3. Filters, Band-pass
4. Detectors, Radio frequency
5. AAF CRC TR 55-160
6. Contract AF 19(604)-962, Final report.

Zur theorie der kopplungsverbreiterung von spectrallinien (Theory of spectral-line broadening due to coupling effect), by Lucy Schutz-Mensing. Translated by James Gough, Jr. Mar 1955. 9p. Order from LC. Mi \$1.80, ph \$1.80. PB 118653

Translated from Zeitschrift für Physik, 61: 655-659, 1930, by the American Meteorological Society under Contract AF 19(604)-1364.

1. Spectral lines - Broadening - Theory - Germany
2. Contract AF 19(604)-1364.

Generators, Motors, Transmission

Corona and dielectric losses in pulse transformers.

Final report for the period 1 Apr 1951 to 30 Apr 1954, under Contracts DA-36-039-sc-5552 and DA-36-039-sc-52859, by William G. Hoover, Stanford University, Dept. of Electrical Engineering, Ryan Laboratory, Stanford, Calif. May 1954. 63p photos, diagrs. Order from LC. Mi \$3.90, ph \$10.80. PB 118804

Summary of activities on these two contracts, with special emphasis on discussions and descriptions of the Corona Intensity Meter, Model 2, and the Pulsed Sinusoidal Wave-Train Source. Includes a description of revisions to the original Corona Intensity Meter which was produced as a result of Contract W36-039-sc-32159, Dept. of the Army proj. no. 3-99-15-022. Signal Corps proj. no. 32-152B (C-036401.2).

Investigation of the nonlinear operation of Ramey's fast-response magnetic amplifier, by Otto William Riemer. Polytechnic Institute of Brooklyn, Microwave Research Institute, Brooklyn, N. Y. Dec 1954. 26p photos, diagrs, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118803

This investigation is conducted in order to determine the mechanism by which Ramey's Fast-Response Magnetic Amplifier becomes nonlinear under conditions of large control circuit resistance. The investigation begins with an experimental illustration of nonlinear performance of a half-wave Fast-Response Magnetic Amplifier. From the conventional analysis a calculated transfer curve is obtained and compared to the experimental data. Conclusions are made with regard to the cause of nonlinear operation and to the validity of the analysis which includes nonlinear operation. PIB-342. PIB R 409-54. Contract N6ori-98, T. O. IV, NR-075-214.

Synthetic methods for interruption tests on circuit-breakers, by H. Bertil Thoren. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 63p photos, diagrs, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 118575

A general theory relating to synthetic test circuits is propounded, and conditions for the equivalence between direct and synthetic tests are formulated. The influence of the arc voltage on the energy conditions of a circuit-breaker is calculated, and values of arc voltages for different types of circuit-breaker are given. From this, the possible increase in testing power by means of synthetic methods is estimated. Different proposed synthetic circuits are discussed.

Results of tests with different types of synthetic circuit are in close agreement with the theories put forward. The design of synchronized tripping circuits and other auxiliary equipment is described. Electrical engineering series vol. 6, no. 4. Sweden. Kungl. Tekniska Högskolan, Stockholm. Handlingar nr. 87. Acta polytechnica 166.

FUELS AND LUBRICANTS

Burning velocities of various premixed turbulent propane flames on open burners, by Paul Wagner. U. S. National Advisory Committee for Aeronautics. Oct 1955. 32p photos, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118749

Turbulent burning velocities were measured as a function of Reynolds number for open propane flames. Flames of propane and oxygen diluted with nitrogen, argon, or helium were studied in a variety of burners up to a maximum pipe Reynolds number of 26,000. The ratio of turbulent to laminar burning velocity correlates with the cold-flow Reynolds number for systems of a given diluent. This ratio also correlates with a Reynolds number calculated from values of the turbulent intensity measured at the burner exit. NACA TN 3575.

Combustion problems in liquid-fuel rocket engines, by S. S. Penner and P. P. Datner. California Institute of Technology. Daniel and Florence Guggenheim Jet Propulsion Center, Pasadena, Calif. Aug 1954. 49p diagr, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118677

Technical report no. 7.

1. Rocket motors - Combustion 2. Propellants, Liquid - Performance 3. Nozzles, Fuel - Flow 4. Jet engines - Fuels - Combustion 5. Combustion - Theory 6. Contract DA 495-Ord-446 7. Contract AF 18(600)-799.

Development of qualification test methods for gear lubricants. Progress report no. 32, June 15, 1955 to July 15, 1955, under Contract no. DA 11-022-ord-905, by J. N. Foster and H. Ruwe Barton. Armour Research Foundation, Chicago, Ill. Jul 1955. 9p photos, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118590

Work discussed in this report completes the program outlined in Progress reports 28-31. Instruments have been developed and simplified for measuring instantaneous gear torques. Equipment has been installed, and a correlation test has been conducted, on the proposed combination high speed-low torque and high torque-low speed test. A moisture corrosion test has been developed which is repeatable and which differentiates among cur-

rently marketed products. Project no. TB 5-3010. ARF Proj L030, Report no. 32. Contract DA 11-022-ord-905.

Development of schematic analytical procedures for synthetic lubricants and their additives, by Josef J. E. Schmidt and Francis S. Bonomo. Denver, University. Denver Research Institute, Denver, Colo. Apr 1955. 223p photos, drawings, diags, graphs, tables. Order from OTS. \$5.75.

PB 111856

General properties and methods for the identification, determination, and separation of components of synthetic greases and synthetic lubricants are presented and discussed. Included in these components are inorganic and organic gelling agents, soap and urea type thickeners, and such additives as antioxidants. A schematic analytical procedure for the separation of grease components is presented along with the application of paper chromatographic methods for the identification and separation of antioxidants in greases and synthetic lubricants. Initial investigations for the separation and identification of dibasic acid esters in synthetic lubricants are presented. Appendix A: Method of analysis for silicon, aluminum, and iron. - Appendix B: Method of separation and analysis of dibasic acid esters. Bibliography is included. AAF WADC TR 54-464. Contract AF 33(616)-2204.

INSTRUMENTS

Automatic noise-factor meter, by Henry Wallman. Chalmers University of Technology, Gothenburg, Sweden. 1955. 19p photo, diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118581

A relatively simple instrument is described for automatic and direct indication of the noise factor of amplifiers. The most important feature of the instrument lies in the fact that, as a servosystem based on a null-method, its indication of noise factor is not affected by whether the detector characteristic is linear, square-law, or something in between, or by variations in amplifier gain. The only element in the servosystem requiring calibration is a fixed resistive 3-dB attenuator. Electrical engineering series vol. 6, no. 6. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 161. Acta polytechnica 172.

Description and installation of meteorological equipment aboard Navy PBV-6A, 46683, by Andrew F. Bunker and Kenneth McCasland. Woods Hole Oceanographic Institution, Woods Hole, Mass. Nov 1954. 28p photos, diags. Order from LC. Mi \$2.70, ph \$4.80. PB 118632

Unpublished manuscript.

1. Meteorological equipment 2. PBV-6A (Airplane)

3. Psychographs - Design 4. Humidity - Measuring equipment 5. WHOI Ref 54-82 6. Contract N6 onr-27702 (NR 082-021), Report no. 33.

Development and test of a performance test for use in evaluating penetrant methods of flow detection, by R. W. Miller. U. S. Naval Engineering Experiment Station, Annapolis, Md. Dec 1950. 8p drawing, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 118676

The test fixture was designed and fabricated for use in determining the acceptability of penetrants and detecting powders intended for use in nondestructive testing methods. A series of nondestructive examinations employing the Zyglo and oil powder methods of flaw detection were performed to evaluate the test fixture. NS-013-122. NAV EES 6C101730.

Development of vibrating reed techniques for measuring properties of polymers, by Stephen Strella. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Mar 1955. 36p photo, diags, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118600

An apparatus known as the vibrating reed was improved for determining the complex dynamic modulus of polymeric materials. An electro-mechanical system was used to vibrate the reed-shaped specimen. Electrical means were used to measure the relevant motions. Equations were derived which gave the complex dynamic modulus from these determinations. Ordnance project TB 2-0001. Dept. of the Army project 559-01-004. Appendix: Solution of vibrating reed differential equation. PA TR 2143.

Effect of diffraction on sound velocity measurement in an idealized acoustic interferometer, by J. C. Parker. U. S. Naval Research Laboratory. Aug 1955. 27p diagr, graph. Order from LC. Mi \$2.70, ph \$4.80. PB 118866

This study has shown that, in general, the effect of diffraction is to cause the measured, or apparent, velocity to be in excess of the actual velocity. This excess is further shown to be a monotonic decreasing function of the source-reflector separation. The magnitude of the fractional excess velocity depends critically on the directivity of the source and on the ratio of the reflector impedance to the impedance of the fluid contained by the interferometer. NRL R 4559.

Establishment of design criteria for the development of dirt insensitive fluid pressure control elements, by J. C. Lee and O. E. Teichmann. Armour Research Foundation, Chicago, Ill. Mar 1952. 195p photos, drawings, diags, graphs, tables. Order from LC. Mi \$8.70, ph \$30.30. PB 118492

The performance in terms of frictional resistance to sliding of three types of metering valves, (sleeve, poppet, and piston type) operated in contaminated fuels was determined experimentally. Valves with various hardnesses and diametrical clearances were tested, and three particle size fractions (5 to 10, 40 to 80, and 150 to 250 microns) of Arizona road dust in constant concentration of 400 grams/1000 gallons were used as contaminant. It was found that of the three types the poppet valves, which have the smallest bearing area and shortest leading edges, were least sensitive to dirt particles. AAF TR 6442. Contract AF 33(038)-6494.

Investigation of evaporative air cooling. Final report for the period 3 Apr 1952-31 Dec 1953 under Contract NOy-27492, by John R. Walt. Texas University. Dept. of Mechanical Engineering, Austin, Texas. Jan 1954. 198p photos, fold drawings, graphs (part fold), tables. Order from LC. Mi \$8.70, ph \$30.30. PB 118435

This report deals with comfort air cooling by the evaporation of water. Two methods are examined: A. Indirect evaporative cooling in which the air is cooled without humidifying it. B. Direct or ordinary evaporative cooling in which the air is cooled by humidifying it. A bibliography of 102 items relating to evaporative cooling is given.

Miniature condenser microphone employing a flexible diaphragm controlled by air stiffness, by Theodore J. Schultz. Harvard University. Acoustics Research Laboratory. Sep 1954. 62p photos, drawing, diags, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 118377

A very small condenser microphone has been developed which exploits materials and methods of construction only recently made available by the post-war interest in plastics. These techniques have made possible a microphone with extremely regular voltage amplitude and phase responses as functions of frequency (to 15 kc/s) and with a reasonable high sensitivity. Theoretical and design considerations are followed by a description of the method of construction and the report concludes with an account of a series of tests of the new microphones. HU ARL TM 35. Contract N5ori-76, T. O. X, NR-014-903.

Monthly progress report under Contract DA 36-034-ORD-1646, Project TB 3-0538, by Herman H. Goldstine. Princeton University. Institute for Advanced Study. Electronic Computer Project, Princeton, N. J. Order separate parts described below from LC, giving PB number of each part ordered.

Jun 1955. 7p diagr, table. Mi \$1.80, ph \$1.80.
I. Computers, Electronic. PB 118659

Jul 1955. 7p table. Mi \$1.80, ph \$1.80.
I. Computers, Electronic. PB 118660

Note concernant un nouveau dispositif de localisation de sources perturbatrices HF pour réseaux électriques aériens (Note concerning a new device for localizing and ranging high frequency interference sources for aerial electric networks). Translated and edited by F. A. Raven. International Special Committee on Radioelectric Disturbances. May 1955. 14p diags. Order from LC. Mi \$2.40, ph \$3.30. PB 118272

Translated from R. I. (Suisse) 17.

1. Radio interference - Locators - Switzerland
2. Electric lines - Monitoring - Switzerland
3. Instruments, Measuring - Electrical - Switzerland
4. NAVSHIPS T 590
5. STS 217.

Oceanographic instrument: Recovery buoy, by David H. Frantz, Jr. Woods Hole Oceanographic Institution, Woods Hole, Mass. Nov 1954. 24p photos, drawings, diags, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118634

This report describes a subsurface instrument recovery buoy designed and developed under Contract Nonr-769(00) with the Office of Naval Research. It is a vehicle for carrying certain recording instruments and can be recovered on demand after a considerable period of time. At present it is limited in carrying capacity and in life, but tests have been encouraging enough to warrant its use with such recording instruments as can be made neutrally buoyant while meeting the size requirement. Unpublished manuscript. WHOI Ref 54-80. Contract Nonr-769(00), NR 083-069.

Slope-o-meter, an instrument for the rapid determination of particle radius and concentration in the laboratory and field, by Victor K. LaMer and Seymore Hochberg. Columbia University, New York, N. Y. Jun 1944. 13p drawings, diags, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118274

Informal report no. 10.2-15.

1. Particles - Size - Measuring equipment
2. Instruments, Measuring - Particles
3. NDRC 10.2-15
4. Contract OEMsr-148.

Summary of component life in the logistics computer, by D. L. Ream. Engineering Research Associates, Inc., Arlington, Va. Nov 1954. 4p table. Order from LC. Mi \$1.80, ph \$1.80. PB 118558

1. Computers - Components
2. Computers - Tubes - Replacements
3. Contract Nonr-1022(00), NR 345-106.

LUMBER AND WOOD PRODUCTS

Field evaluation of termite repellents, by John D. Bultman, Ruth N. Little, and John M. Leonard.

U. S. Naval Research Laboratory. Oct 1955. 10p
diagr, tables. Order from OTS. 50 cents.
PB 111737

Thirty-seven chemical agents were used in field tests to measure their repellent features against termites. Wooden panels treated with these agents were exposed to termites in the Panama jungle. Some of the panels were impregnated by a high-pressure technique with compounds that had previously demonstrated possible termite repellent activity. Additional panels were impregnated by a low-pressure immersion technique with the remaining 25 agents. Of these, Arochlor 1260, naphthalene tetrachloride, phenanthrene, and a series of fortified and otherwise altered creosotes provided good protection. NRL R 4620.

MEDICAL RESEARCH AND PRACTICE

Behavioral studies of visual processes in the pigeon, by Floyd Ratliff and Donald S. Blough. Harvard University. Psychological Laboratories. Sep 1954. 39p diagr, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118307

Report is divided into three parts. Part I: A new method of animal psychophysics, Part II: Visual intensity discrimination in the pigeon, and Part III: Dark adaptation in the pigeon. PLR-16. Contract N5ori-07663, Project NR 140-072.

Biological basis of nervous and emotional instability. Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine. Contract ONR 1001(01) NR 160-093. Order separate parts described below from LC, giving PB number of each part ordered.

Report of scientific progress for the period Sep 1, 1952 to Apr 1, 1953, by C. C. Little. May 1953. 3p. Mi \$1.80, ph \$1.80. PB 118531

1. Psychology, Applied 2. Biological research
3. Genetics - Research 4. Heredity - Research.

Final report for period Apr 1, 1953-Aug 31, 1953, by J. L. Fuller and Margaret Dickie. Oct 1954. 5p. Mi \$1.80, ph \$1.80. PB 118532

1. Biological research 2. Genetics - Research
3. Heredity - Research.

Biometrics of dental caries, with considerations pertaining to growth of dental organs. Final report for period Feb 1, 1953 to Jun 30, 1954, by V. O. Hurme. Forsyth Dental Infirmary for Children, Boston, Mass. Jul 1954. 3p diagr, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 118647

1. Teeth - Caries 2. Dental research 3. Contract
N onr-1133(00), NR 180-033.

Cumulative effects of repeated bursts of white noise on threshold for 4000-c.p.s. tone-pips, by Charles Lightfoot and James F. Jerger. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1955. 11p diagr, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118862

Cumulative effects of a 2-second burst of thermal noise on the threshold shift for 35-msec. tone pips were examined by tracing the threshold shift over the course of 100 successive noise bursts. A systematic increase in the threshold shift over the 100-burst series was observed. The degree of this cumulative phenomenon showed wide individual differences among subjects. It is concluded that, unless proper allowances are made, the repetitive stimulation required by burst-pip audiometry may be a source of serious error. On the other hand, the reaction of an ear to repeated stimuli may be a useful index of the ear's susceptibility to irreversible acoustic trauma. AAF SAM Proj 21-1203-0001, Report no. 10.

Evaluation of threshold tracing audiometry as a method for studying effects of strong acoustic stimulation, by Charles Lightfoot. U. S. Air Force. School of Aviation Medicine, Randolph Field, Tex. Apr 1955. 19p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118628

An audiometric procedure is described which involves the subject's tracing of his threshold by oscillating an attenuator and thus causing a test tone to fluctuate continually between audibility and in-audibility. This procedure was followed by a number of normal-hearing persons both before and after 3 minutes of strong (105 db re 0.0002 microbar) acoustic stimulation. Data were thus provided to facilitate evaluation of the procedure as a possible means of measuring "fatigability," which was assumed to be a correlate of susceptibility to stimulation deafness. Four combinations of fatiguing sound and test tone were each used twice for each subject. AAF SAM Proj 21-1203-0001, Report no. 8.

Inheritance of behavior: Behavioral differences in fifteen mouse strains, by William R. Thompson. Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine. n.d. 8p graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118533

Project: The inheritance of behaviour.
1. Biological research 2. Psychology, Applied
3. Genetics - Research 4. Heredity - Research
5. Contract ONR 1001(01).

Investigation on the effect of anoxia on the electroencephalogram and on the behavior of patients with combat fatigue, psychoneurosis, and in normal control subjects. Final report under Contract N7 onr-39706, NR 112-054 for the period Jan 1, 1954 to Jun 30, 1954, by J. E. Finesinger and R. G. Grenell. Maryland. University. Psychiatric Institute, College Park, Md. Jul 1954. 41p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118535

Objectives are the continuation and further development of infra-red spectrophotometric studies of brain tissue, extension of the work on mechanisms of narcosis and initial measurements of adenosine-triphosphate in various areas of the cerebral cortex under various conditions. All these studies are carried out on the basis that they are either related to or will indicate basic mechanisms involved in neuronal alterations in anoxia.

Liver functional studies as a screening method for possible carriers of homologous serum hepatitis virus. Technical report no. 1 for the period Jun 1, 1954 to Nov 30, 1954 under Contract Nonr-1300(00) NR 102-259, by Max M. Strumia. Bryn Mawr Hospital, Bryn Mawr, Pa. Dec 1954. 5p. Order from LC. Mi \$1.80, ph \$1.80. PB 118529

1. Jaundice, Infectious - Research 2. Blood transfusion - Infections 3. Liver - Research 4. Contract Nonr-1300(00), NR 102-259.

Metabolic changes associated with nerve conduction. Final report for the period Jan 1, 1952 - Jul 1, 1954, by Benson E. Ginsburg and Dorothea Stark Miller. Chicago. University. Jul 1954. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118650

1. Heredity - Research 2. Nerves - Metabolism
3. Contract N6 ori-02037, NR 110-500.

Metabolism of vitamins, with particular emphasis on thiamin and thioctic acid. Final project report under Contract Nonr-994(00), NR 160-160, for period 1 Nov 1953 to 31 Oct 1954, by Gerald R. Seaman. Texas. University, Austin, Texas. Nov 1954. 15p graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118591

Discusses theoretical performance evaluation for chemical propellants; combustion in liquid-propellant rocket engines; burning rates of fuels, fuel sprays, and monopropellants; carbon formation; and engineering problems. Bibliography is included.

Pathology of acute diffuse external otitis, by L. H. Sophian and Ben H. Senturia. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Feb 1955. 18p photos, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118589

The histopathology of the skin of the external auditory canal of 5 patients with acute diffuse external otitis is described. The epidermis showed varying degrees of abnormal keratosis, hyperplasia, edema, and vesicle and abscess formation. The inflammatory process in the dermis had unusual characteristics, which included vascular inflammation, thrombosis, and perivascular exudation. The exudate was notable for its high content of eosinophil leukocytes. The apocrine glands seemed to be de-

generative and nonfunctioning and secondarily involved by the surrounding inflammation. AAF SAM R 55-27.

Periodic status report XXIV, period 16 May-15 Nov 1954. Harvard University. Psycho-Acoustic Laboratory. Nov 1954. 27p. Order from LC. Mi \$2.70, ph \$4.80. PB 118550

Includes Check-list of reports issued under this contract.

1. Acoustic research 2. PNM-60 3. Contract N5 ori-76, Project order II, NR 142-201.

Physiological and pathological study of experimental immersion foot (prolonged exposure of a limb to cold short of freezing), with particular reference to the part played by anoxia as measured polarographically. Annual progress report for period Jan 1-Nov 31, 1954, under Contract 551 03, NR 102-018, by Hugh Montgomery, George Peirce and Ann Sayen. Pennsylvania. University, Philadelphia, Pa. Dec 1954. 6p photos, drawings, diags, graphs, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118534

1. Pathology - Research 2. Physiology - Research
3. Oxygen deficiency 4. Contract ONR 551 03, NR 102-018.

Quarterly report, Apr-Jun 1955. Massachusetts Institute of Technology. Acoustics Laboratory. Jun 1955. 42p photos, diags, graphs. Order from LC. Mi \$3.30, ph \$7.80. PB 118622

Contains brief statements of all significant research progress in the Laboratory during this quarter, and lists theses, publications in scientific journals, and activities. AAF CRC TN 55-575. Contract AF 19(604)-626.

Studies on coccidioidomycosis at Air Force bases in the southwestern United States, by Jack J. Williams and Harold V. Ellingson. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Dec 1954. 27p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118588

In coccidioidin and histoplasmin skin test studies conducted at five Air Force bases in southwestern United States, over 12,000 subjects received initial tests; 3,452 first retests, and 106 second retests were performed, at intervals of 3 to 6 months. Findings confirm previous reports that the endemic area extends into western and central Texas. The geographic distribution of histoplasmin sensitivity is presented. Coccidioidin-histoplasmin cross reactions are discussed. Suggestions are presented for further study of systemic fungus infections. AAF SAM Unnumbered report.

METALS AND METAL PRODUCTS

Cemented borides. Summary progress report from June 1, 1952 to May 1, 1953 under Contract N6 onr-256, by Frank W. Glaser and others. American Electro Metal Corporation, Yonkers, N. Y. May 1953. 188f photos, diagsr, graphs, tables. Order from LC. Mi \$8.40, enl pr \$30.30. PB 118675

See also PB 117522 for 1953-1954 report. Appendix I: Borides and their use for high temperature applications, by Frank W. Glaser, presented at Conference on Cermets, WADC, Oct 6, 1952. - Appendix II: Elevated temperature properties of zirconium boride alloys, by Frank W. Glaser, presented at confidential meeting on refractory type materials, ASM, Nov 1952.

1. Borides, Cemented - Physical properties
2. Alloys, High temperature - Physical properties
3. Borolite I (Trade name) 4. Zirconium boride - Thermal properties 5. Contract N6 onr-256/1.

Constitution of titanium alloy systems. Supplement I, by David W. Levinson, Donald J. McPherson, and William Rostoker. Armour Research Foundation, Chicago, Ill. Sep 1954. 155p diagsr, graphs. Order from OTS. \$4. PB 111508s

New information available in the period Feb 1953 to Sep 1954 relating to binary and ternary systems, including crystal structures, is compiled and critically evaluated. Project no. 7351. Supplement to PB 111508. AAF WADC TR 53-41 Suppl. 1. Contract AF 33(616)-2559.

I. Deformation studies of metals at elevated temperatures. - II. Iron-chromium-nickel ternary system. - III. Effect of structure and composition on the strength properties of stainless steel. Periodic status report no. 9, for the period Sep 1954-Nov 1954 under Contract N5 ori-07881, NR 039-007, by N. J. Grant, H. C. Chang, F. C. Monkman, and P. E. Price. Massachusetts Institute of Technology. Dept. of Metallurgy. Nov 1954. 4p. Order from LC. Mi \$1.80, ph \$1.80. PB 118662

For 6th-8th reports see PB 116312, 117129, 117907.
1. Metals - Deformation 2. Metals - Heat treatment
3. Steel, Stainless - Physical properties 4. Steel, Stainless - Strength 5. Contract N5 ori-07881, NR 039-007.

Development of forging and casting alloys for turbine buckets, by Ralph P. De Vries, Jr. and Gunther Mohling. Allegheny Ludlum Steel Corp., Pittsburgh, Pa. Aug 1951. 59p photos, graph, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118760

This project was undertaken with the object of further investigating the forging and cast turbine

bucket alloys developed under the preceding contract AF 33(038)-2040. (See PB 108035). The effects of various compositional variations were studied on the forging alloy V-912, 34.9 cobalt, 6.5 tungsten, 1.6 columbium, 20.0 chromium, 20.0 nickel, 3.0 molybdenum, 0.3 silicon, 1.0 manganese, 0.3 carbon, balance iron, and the cast alloy W-834, 29.5 cobalt, 8.0 tungsten, 0.5 carbon, 25.0 chromium, 20.0 nickel, 3.0 molybdenum, 0.5 silicon, 1.0 manganese, balance iron. AAF TR 6615.

Electrical conductivity and thermoelectric power of magnesium oxide, by Harold F. John. Missouri University. Dept. of Physics, Columbia, Mo. Nov 1954. 28p diagsr, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 118568

The electrical conductivity of MgO has been measured in the temperature range 850°K to 1400°K for single crystals and powders and for material from several different sources. Measurements in air give non-reproducible results and suggest either surface conduction or an oxygen dependence. Reproducible results are obtained in vacuum on both single-crystals and powder samples which have not been given previous heat-treatment in air. ONR TR 16. Contract N7onr-292, T. O. 5, NR 074-081.

Electroplating on titanium. Final report for period Sep 1, 1952-Sep 30, 1953, under Contract DA-11-022-ORD-1045, by Harold L. Shick. Armour Research Foundation, Chicago, Ill. Oct 1953. 12p. Order from LC. Mi \$2.40, ph \$3.30. PB 118294

As yet no method has been developed for producing satisfactory metal bonds on titanium. During the first part of the present period, work was continued along the lines of the previous contract period. However, it was not possible to replace the mechanical adherence obtained thereby with true metal to metal adherence. Later work during the present study has utilized fused salt baths, other pickling media, surface pretreatments, and plating techniques used for other active metals. Project no. B041-2. D/A Project 513-08-021. O. O. project no. TB 4-15B. WAL R 401/46-29. Contract DA-11-022-ORD-1045.

Fundamental studies related to the origin and creep of metals. Thirteenth technical report. Effects of impurities and imperfections on mechanical properties of metals, by Earl R. Parker and Jack Washburn. California University. Institute of Engineering Research. Minerals Research Laboratory, Berkeley, Calif. Nov 1954. 31p diagsr, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118571

Experiments undertaken on the study and control of dislocation networks in common metals, and the effects of such networks upon the mechanical properties of both single crystal and polycrystalline metals. For reports 10, 11 and 12 see PB 116835, 117028 and 117029. Contract N7onr-29516, NR 039-009, Technical report 13.

Investigation and calculation of the remaining tensile strength in wire ropes with broken wires, by Wilhelm Davidsson. Royal Swedish Academy of Engineering Sciences. 1955. 39p photos, diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118583

Some fifty discarded crane, lift, and telpher ropes were investigated with regard to the occurrence and distribution of invisible wire breaks. A method is given for calculating the weakening due to wire breaks and wear of the tensile strength of a rope which is still in use. Mechanical engineering series, vol. 3, no. 6. Royal Swedish Academy of Engineering Sciences. Handlingar nr. 214. Acta polytechnica 174.

Magnetic and structural properties of precipitating ferromagnetic systems, by Ami E. Berkowitz. Franklin Institute. Laboratories for Research and Development, Philadelphia, Pa. Contract Nonr 1556(00). Order separate parts described below from LC., giving PB number of each part ordered.

Quarterly progress report, Sep 1-Nov 30, 1954. Nov 1954. 33p diagr, graphs. Mi \$3, ph \$6.30. PB 118559

The purpose of this investigation is to clarify some of the relationships between various magnetic and structural properties of systems in which ferromagnetic precipitates appear. A restricted survey of recent literature on precipitating ferromagnetic systems was undertaken. Some representative systems are discussed, and reasons are given for selecting the Ni-Au system for the initial investigation. Report no. Q-2482-1.

Quarterly progress report, Dec 1, 1954 to Feb 28, 1955. Feb 1955. 9p. Mi \$1.80, ph \$1.80. PB 118560

During the second quarter, research was devoted primarily to instrumentation for the magnetic measurements, equipment for the thermal treatment of the Ni-Au alloys, and the preparation of single crystals of Ni-Au. Report no. Q-2482-2.

Mechanism of cermet oxidation at high temperature, by W. B. Crandall, H. S. Levine, G. E. Lorey, and V. D. Frechette. Alfred University, Alfred, N. Y. Oct 1950. 12p drawing, graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118678

Technical report under Contract N6 ori-143, NR 032-022.

1. Cermets - Thermodynamic properties 2. Cermets - Properties 3. Cermets - Oxidation 4. Contract N6 ori-143, NR 032-022.

NRL shock fracture test for welded joints in armor. First partial report, Sep 1942-Apr 1953, by Clarence E. Jackson. U. S. Naval Research Labo-

ratory. Apr 1943. 98p photos, graphs, tables. Order from LC. Mi \$5.40, ph \$15.30.

PB 118290

1. Armor plate - Fracture - Tests 2. Armor plate - Welding - Tests 3. Joints, Welded - Fracture tests 4. NRL M-2050.

Some studies of the low and high forms of SiO₂ and AlPO₄, by F. H. Gillery. Pennsylvania State University. College of Mineral Industries, State College, Pa. Nov 1954. 16p graph, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118567

A comparison of the phase transformations of AlPO₄ and SiO₂ systems. ONR TR 58. Contract N6onr-269, T. O. 8, NR 032-264.

Studies on boron hydrides. Eighth annual technical report of investigations on water-reactive chemical compounds, for the period Nov 1, 1953 through Oct 14, 1954, under Contract N6 onr-238, T. O. 1, by Anton B. Burg, Carl D. Good, Peter J. Sota, Jr., Gordon L. Juvinal, Francis M. Graber and James L. Boone. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Nov 1954. 31p tables. Order from LC. Mi \$3, ph \$6.30. PB 118544

Work on ring aminoboron hydrides has developed to include compounds derived from the whole series C₅H₁₀NH, C₄H₈NH, C₃H₆NH, and C₂H₄NH. Further studies on the polyborine carbonyl have been carried out. Phosphinoborine chemistry is represented by a study of organophosphorous chemistry directed toward finding new compounds which will react with diborane or a borohydride to produce phosphinoborine polymers. For seventh report see PB 114674.

Tensile deformation of molybdenum as a function of temperature and strain rate, by R. P. Carreker, Jr. and R. W. Guard. General Electric Co. Research Laboratory, Schenectady, N. Y. Jan 1955. 31p photos, drawings, graphs, table. Order from OTS. \$1. PB 111815

True stress-true strain data are reported for nominally pure molybdenum (99.95 per cent) over the temperature range from -196° to 1540°C (0.027 to 0.63 T/T_m). Strain-rate sensitivity was determined by rate-change tests and stress-relaxation tests. Inhomogeneous yielding and strain-aging effects were observed. Project no. 7351. AAF WADC TR 55-111.

Über die thermische zersetzung von kalziumsulfat bei niedrigen temperaturen (Thermal decomposition of calcium sulfate at low temperatures), by J. A. Hedvall, S. Nordengren, and B. Liljegren. Chalmers University of Technology, Gothenburg, Sweden. 1955. 19p tables (Text in German). Order from LC. Mi \$2.40, ph \$3.30. PB 118579

Chemistry including metallurgy series vol. 4, no. 7.
1. Calcium sulfate - Thermal decomposition - Sweden
2. Calcium sulfate - Low temperature effects - Sweden
3. Chalmers University of Technology, Gothenburg, Sweden. Handlingar nr. 158
4. Acta polytechnica 170.

Titanium carbide base cermets, by T. S. Shevlin and C. C. McBride. Ohio State University Research Foundation, Columbus, Ohio, Jan 1950. 28p photos, drawing, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118684

This report records and discusses a preliminary survey of the physical properties of sintered titanium carbide alone and in combination with a number of metals and alloys especially selected, except in the case of iron, for their known or postulated ability to both wet TiC and promote resistance to oxidation at high temperatures. Processing and results are illustrated and tabulated. AAF TR 6089. Contract W 33-038-ac-14217, Report no. 59.

METEOROLOGY AND CLIMATOLOGY

Atlas of the absorption spectrum of the atmosphere from 5400 to 8520A, by J. A. Curcio and G. L. Knestrick. U. S. Naval Research Laboratory. Aug 1955. 19p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118721

Several microphotometer traces of the atmospheric absorption spectrum, in the spectral region of 5400 to 8520A, have been reproduced in atlas form. Two previously unreported water-vapor bands were found at about 5050A and 5400 to 5470A. It was found that many of the weaker water-vapor lines were apparently coincident with unidentified lines in the solar spectrum. NRL R 4601.

Atlas of the auroral spectrum, by A. Vallance Jones. Saskatchewan. University. Physics Dept. 1955. 11p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118426

This report comprises a set of microphotometer tracings of photographs of the auroral spectrum obtained at Saskatoon from 1952 to 1954. The positions of molecular bands and atomic lines known or claimed to be present in the auroral spectrum have been drawn in on the charts. The relative intensities for L-S coupling of the lines within the multiplets have been indicated. SASK AR 20. Contract AF 19(122)-152.

Bemerkungen zum jet-stream im Atlantik wetterdienst (Comments on the jet stream in Atlantic weather service), by P. Kaufman. Translated by Edith Kulstein. Revised, Jun 1955. 6p. Order from LC. Mi \$1.80, ph \$1.80. PB 118530

This report points out some relationships of the jet stream concept to opinions expressed in various reports. An opinion is stated here regarding the practical application of the jet stream with respect to every-day events and requirements. Translated from Germany. Deutscher Wetterdienst in der U. S. Zone. Berichte vol. 2, p. 200-201, 1950, under Contract AF 19(604)-1364.

Bibliography on polar atmospheric circulation, by B. H. Bonlander and A. D. Belmont. McGill University. Arctic Meteorology Research Group, Montreal, Canada. Jun 1955. 88p. Order from LC. Mi \$4.80, ph \$13.80. PB 118797

1. Meteorology, Polar - Bibliography 2. Contract AF 19(604)-1141, Report no. 5, Appendix 1 3. AAF CRC TN 55-666.

Contribution to the measurements of the earth's albedo, by H. R. Shackleton and A. L. Quirk. Rhode Island. University. Dept. of Physics. Upper Air Research Laboratory, Kingston, R. I. Jul 1955. 16p photos, graph. Order from LC. Mi \$2.40, ph \$3.30. PB 118508

A balloon-borne instrumentation for the measurement of insolation at high altitudes as described in Scientific Report No. 2 was modified for the purpose of making high altitude measurements of the irradiance of a pyrhelimeter due to the radiation reflected from the earth's surface, its atmosphere and clouds. From the irradiance an estimate of the earth's albedo has been deduced. The irradiance was measured by a fifty junction Eppley global pyrhelimeter which was mounted in an inverted position on the bottom of the instrumentation. A microammeter which was connected to the pyrhelimeter was photographed at half-minute intervals during flight. Two additional cameras were employed to photograph the terrain and/or clouds. Scientific report no. 3. AAF CRC TN 55-669. Contract AF 19(122)-249.

Investigation of polarization of skylight, by Kinsell L. Coulson, Diran Deirmendjian, Robert S. Fraser, Clay Seaman and Zdenek Sekera. California. University. Dept. of Meteorology, Los Angeles, Calif. Jun 1955. 198p photos, diags, graphs, tables. Order from LC. Mi \$8.70, ph \$30.30. PB 118410

Measurements were made in six narrow spectral regions at several locations and under different turbidity conditions, with a specially constructed photoelectric polarimeter, making it possible for the first time to extend polarization measurements into the ultraviolet region and to measure the polarization continuously from sunrise to sunset. The results of the measurements were compared with the theoretical values for a molecular atmosphere, computed by Chandrasekhar's method with the effects of multiple scattering and of the

Lambert ground reflection included. Future research to be carried on under Contract no. AF 19(604)-1303, Scattering of light in a turbid atmosphere (Study of polarization of the daylight sky). Appendixes: - A. Photoelectric polarimeter for measurement of skylight polarization. - B. Distribution of polarization and the orientation of the plane of polarization of sky radiation over the entire sky in a Rayleigh atmosphere. - C. Theoretical positions of maximum degree of polarization. - D. Scattering matrix for spherical particles and its transformation. - E. Effect of specular reflection in a Rayleigh atmosphere. Contract AF 19(122)-239, Final report.

Jet stream. U. S. Bureau of Aeronautics. Jun 1953. 88p maps, diagrs, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 118493

This publication encompasses the synoptic structure of the jet stream, as well as its climatology and relation to middle latitude cyclones and extended forecasting. In addition, one chapter is devoted to the techniques and procedures of high-level wind analysis. The dynamic principles relating to jet stream formation and maintenance are also incorporated. Formerly NAVAER 50-1R-249. NAVAER 50-1 P-521.

Notes on cyclone development in the United States, by Jerome Spar. New York. University. College of Engineering. Research Division. Dept. of Meteorology and Oceanography. Sep 1954. 79p maps, diagrs, graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 118319

Technical paper no. 2. Contents: 1. Composite 200 mb temperature fields over extratropical cyclones, by Emmanuel M. Ballenzweig. - 2. Vertical motions in an upper level cyclone, by Benjamin M. Herman and John J. R. Kinney. - 3. Computations of long wave radiational cooling in extratropical cyclones, by George Ohring. - 4. Monthly frequencies of cyclogenesis in the east coastal region of the United States. Contract Nonr 285(09) Project Scud.

Preparation of extended forecasts of the pressure height distribution in the free atmosphere over North America by use of empirical influence functions, by R. M. White. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate. Atmospheric Analysis Laboratory, Cambridge, Mass. May 1955. 93p maps, graphs, tables (part fold). Order from LC. Mi \$5.40, ph \$15.30. PB 118510

The forecast technique has been designed specifically for use in the field. The application of this technique by-passes the need for analyzing the contour height distribution and makes direct use of coded teletype data. The forecasts can be prepared by non-meteorologists. Hence, observing personnel can actually carry through the required computations.

All the tables necessary to prepare the forecasts are included in this report. Project 7609, Development of extended and long range forecasting techniques. AAF CRC TN 55-205. AAF GRD SG 68.

Some techniques for deriving objective forecasting aids and methods. U. S. Army Air Force. Air Weather Service. Apr 1955. 52p graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118276

Supersedes basic issue AWSM 105-40 dated Apr 1953.

1. Weather - Forecasting - Methods 2. AAF WSM 105-40 (revised).

Study of the usefulness of unitary differential notation for storing and using meteorological data, for the period 15 Jun 1954 to 15 Jun 1955 under Contract no. AF 19(604)-1108, by Leo G. Killian. Cook Electric Company. Cook Research Laboratories, Skokie, Ill. Jun 1955. 47p charts, diagrs, graphs. Order from LC. Mi \$3.30, ph \$7.80. PB 118322

The feasibility of utilizing incremental records for storing radiosonde observations of temperature as a continuous function of pressure is evaluated. This form of record was developed during an investigation of optimum processing techniques for recording observations of physical conditions which can be represented by continuous functions. Includes isometric charts for 5 May 1950, 0300Z, and 6 May 1950, 0300Z. Scientific report SR 62-1. Contract AF 19(604)-1108.

Tables for eclipse functions and for reduction of drift curves in radio astronomy, by Gordon Grant. U. S. Naval Research Laboratory. Aug 1955. 20p diagrs, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118703

A technique often used in radio astronomy is to determine whether an observed drift curve can be reproduced utilizing the known antenna pattern and the proposed model of the radio source. A method has been developed for use in cases in which the intensity distribution of the source and the antenna pattern have circular symmetry so that their distributions may be approximated by concentric circles of differing intensities. NRL R 4561.

Total solar radiation measurements in the upper atmosphere by balloon-borne pyrheliometers, by H. R. Shackleton and A. L. Quirk. Rhode Island. University, Dept. of Physics. Upper Air Research Laboratory, Kingston, R. I. Jun 1955. 66p photos, drawings, diagrs, graphs, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 118507

This report summarizes the balloon phase of the program directed toward the measurement of the intensity of solar radiation in the upper atmos-

phere. A balloon-borne instrumentation employing Eppley global pyrhemometers as solar radiation receivers is described. Data are photographically recorded at half-minute intervals throughout the duration of the balloon flights. Eight flights were undertaken with this type of instrumentation of which four yielded usable data. Scientific report no. 2 under Contract AF 19(122)-149. AAF CRC TN 55-650.

MINERALS AND MINERAL PRODUCTS

Effect of nuclear radiation on the structure of zircon, by Heinrich D. Holland and David Gottfried. Princeton University. Sep 1954. 47p graphs (part fold). Order from LC. Mi \$3.30, ph \$7.80.
PB 118328

The effect of nuclear radiation from the decay of uranium, thorium, and their daughter elements on the specific gravity, unit cell dimensions, and optical properties of zircon has been studied. During the course of the irradiation the specific gravity of zircon drops 16%, the material becomes isotropic, and so disordered as to fail to yield x-ray diffraction peaks. Technical report no. 2 under Contract N onr-250(00), NR 081-149.

Investigation of the activity of calcium carbonate in mixtures of fused salts, by Tormod Forland. Pennsylvania State University. College of Mineral Industries, State College, Pa. Sep 1954. 20p diagr, graphs. Order from LC. Mi \$2.40, ph \$3.30.
PB 118267

1. Calcium carbonate - Energy levels 2. Calcium carbonate - Melting point 3. Salts, Fused - Thermodynamic properties 4. Contract N6 onr-269, T. O. 8, NR 032-264. 5. ONR TR 57.

Refractoriness of some types of quartz and quartzite. Part 2, by Folke Sandford and Stig Fransson. Chalmers University of Technology, Gothenburg, Sweden. 1955. 25p photos, drawing, graphs, tables. Order from LC. Mi \$2.70, ph \$4.80.
PB 118582

The investigation showed that the chemical analyses of quartz and quartzite will give a rough estimate of the refractoriness of the materials, but that it must be supplemented by direct determinations of the refractoriness, particularly if more detailed information is wanted about the softening conditions during the early stage of the firing. Chemistry including metallurgy series, vol. 4, no. 9. For part I see PB 116339. Chalmers University of Technology, Gothenburg, Sweden. Transactions no. 162. Chalmers University of Technology, Gothenburg, Sweden. Institute for Silica Chemistry Research. Report no. 37. Acta polytechnica 162.

Structure of silica alumina cracking catalysts, by Joseph D. Danforth. Grinnell College. Dept. of Chemistry, Grinnell, Iowa. 1954. 8p diagr, graph. Order from LC. Mi \$1.80, ph \$1.80. PB 118314

A study of the acidity developed in condensation products of certain methylsiloxanes and aluminum hydroxide indicated that compounds of definite atomic ratios of silicon to aluminum were formed as a function of number of available hydroxyl groups on the silicon. A logical extension of these data indicates that the active centers of the silica alumina catalysts can be represented as a combination of a Lewis acid (three coordinated aluminum) and a Bronsted acid. The proposed structure permits correlation of much of the known data on cracking catalysts. Seventh technical report under Contract N8 onr-141, NR 356-141.

PERSONNEL APTITUDE TESTING

Factor analysis of a checklist of shipboard Junior Officers' Activities, by Albert S. Glickman. American Institute for Research, Pittsburgh, Pa. Nov 1954. 138p tables. Order from LC. Mi \$6.90, ph \$21.30.
PB 118537

Officer Personnel Research Program.
1. Personnel, Naval - Classification 2. Tests, Officer qualification 3. NAVPERS TB 54-17
4. Contract Nonr-890(01).

Moonlight IV: Training the rifle squad in night technique of fire, by Edgar L. Shriver, John Sivy, and Henry S. Rosenquist. George Washington University. Human Resources Research Office. May 1955. 62p tables. Order from LC. Mi \$3.90, ph \$10.80.
PB 118434

Squads instructed by the methods and in the techniques set forth in this study apply such training to achieve significantly better scores in realistically simulated battle tests than do squads not so trained; the natural deduction is that they would be more effective night-fighting units in the actual situations of combat. For Moonlight II see PB 116573. GWU HRRO TR 17.

Multiple classification by the method of least squares. Report of research under Contract M-743 MH(1), by Paul Horst. Washington University. Division of Counseling and Testing. Bureau of Testing, Seattle, Wash. Jun 1955. 26p tables. Order from LC. Mi \$2.70, ph \$4.80.
PB 118385

1. Personality - Research 2. Least squares
3. Personnel - Classification 4. Contract M-743 MH(1).

Research on the development of shipboard performance measures. Technical report V. - Interrelationships between aptitude test scores, performance in submarine school, and subsequent performance in submarines as determined by ratings and tests, by Robert R. Mackie, Clark L. Wilson and Donald M. Buckner. Management and Marketing Research Corporation, Los Angeles, Calif. Oct 1954. 62p photos, diags, tables. Order from LC. Mi \$3.90, ph \$10.80. PB 118323

This report describes research that has been conducted to determine the relationships among scores on a variety of aptitude tests, standing in Basic Enlisted Submarine School, New London, and subsequent performance aboard submarines as measured by ratings, written tests, and job sample tests. The interrelationships of the several shipboard performance measures are described and the results of a factor analysis of the intercorrelations of aptitude test scores and Submarine School criteria are presented. Contract N8 onr-70001. Contract Nonr-1241(00).

PHOTOGRAPHIC AND OPTICAL GOODS

Construction and operation of a rotating-mirror framing camera and synchronizer, by W. O. Ursenbach. Utah. University. Institute for the Study of Rate Processes. Explosives Research Group, Salt Lake City, Utah. Nov 1954. 14p photos, diags. Order from LC. Mi \$2.40, ph \$3.30. PB 118562

A rotating-mirror framing camera has been designed and constructed at this laboratory for the purpose of studying detonation phenomena. This camera consists of an oil pressure-lubricated air turbine driving a rotating mirror at a maximum rate of 5000 r.p.s. with an air pressure of 126 p.s.i. The light reflected from the mirror is focussed on 35 mm film through a bank of 24 relay lenses. This gives a maximum photographing speed of 1,200,000 frames per second. UU ISRP TR 40. Contract N7-onr-45107, Project NR 357-239.

PHYSICS

General

Analytical and numerical methods for hyperbolic conical flows, by Roberto Vaglio-Laurin and Nathan Ness. Polytechnic Institute of Brooklyn. Dept. of Aeronautical Engineering and Applied Mechanics. Jul 1955. 87p diags, table. Order from LC. Mi \$4.80, ph \$13.80. PB 118501

Methods for the investigation of the hyperbolic portion of mixed-type conical flows are presented.

Characteristic procedures are used and the corresponding equations are derived. Two modifications of the general method, which reduce the amount of numerical work, are presented with all the details of their practical application to the determination of the flow-field and of the boundary conditions. Also the method of linearized characteristics is extended to conical flow problems and the additional results, which can be obtained thereby, are indicated. Project no. R-352-20-2. PIB AL 273. Contract AF 18(600)-186.

De la mécanique lineaire a la mécanique non lineaire (From linear mechanics to nonlinear mechanics), by Julien Loeb. Oct 1955. 18p diags. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118755

Consideration is first given to the technique used in telecommunication where a nonlinear system (the modulator) results in a linear transposition of a signal. It is then shown that a similar method permits linearization of electromechanical devices or nonlinear mechanical devices. A sweep function plays the same role as the carrier wave in radio-electricity. The linearizations of certain nonlinear functionals are presented. Translated by Mary L. Mahler from Annales des Télécommunications, v. 5, no. 2, Feb 1950, p. 65-71. NACA TM 1396.

Diffusion of momentum from free and confined slot jets into moving secondary streams, by Alvin S. Weinstein. Carnegie Institute of Technology. Dept. of Mechanical Engineering, Pittsburgh, Pa. May 1955. 157p photos, drawings, diags, graphs, tables. Order from LC. Mi \$7.50, ph \$24.30. PB 118320

Results are presented for an experimental impact tube study of the diffusion of momentum for isothermal, incompressible turbulent mixing of a slot jet issuing into a slower moving secondary stream with various boundary conditions. The flow pattern for this problem is discussed and it is shown by using a particle-stream model how changes in turbulent intensity affect the flow pattern. Well behaved changes in momentum flux are shown to exist for both of these problems along with axial variations in the static pressure. Thesis - Carnegie Institute of Technology. AAF CRC TN 55-476. Contract AF 18(600)-969, Supplemental agreement 2, Scientific report no. 2.

Distribution of quadratic forms and some applications, by Arthur Grad and Herbert Solomon. U. S. Office of Naval Research and Columbia University. Teachers College. Jul 1954. 22p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118649

This paper discusses the exact distribution of Q_k and then obtains and tabulates the exact distributions of Q_2 and Q_3 to four places. Three other approaches to the distributions are discussed and compared with

the exact results. Technical report no. 3. Tables in the report were computed at Columbia University and Stanford University. Contract N6 onr-271, T. O. II (NR 042-034). Contract N6 onr-251, T. O. II (NR 042-993).

Electrical clean up of gases. Quarterly report under Contract AF 18(600)-1049 for period Apr 1955-Jun 1955, by L. J. Varnerin and J. H. Carmichael. Westinghouse Electric Corporation. Westinghouse Research Laboratories, East Pittsburgh, Pa. Jul 1955. 6p graph. Order from LC. Mi \$1.80, ph \$1.80. PB 118391

The work reported on here involves an extension of the pumping of helium in the Bayard-Alpert ionization gauge described in previous quarterly reports. Research report 71F191-R5. For reports 1-4 on this contract see PB 116570, 116571, 116569, and 117718.

Equation of a simple flame solved by successive approximations to the solution of an integral equation. (Pt. II: Second order reaction), by G. Klein. Wisconsin University. Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Sep 1954. 43p graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118388

For Part I see PB 117421.

1. Equations, Integral - Flame 2. Flame - Chemical reactions - Theory 3. WIS ONR 11 4. Contract N7 onr-28511.

Experimental comparison of the Lagrangian and Eulerian correlation coefficients in homogeneous isotropic turbulence, by William R. Mickelsen. U. S. National Advisory Committee for Aeronautics. Oct 1955. 42p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118746

The Lagrangian correlation coefficient was characterized by diffusion measurements, and the Eulerian coefficient was measured by hot-wire anemometry. The Lagrangian and Eulerian correlation coefficients had similar shapes connected by a linear relation between their coordinates. The proportionality factor in the linear relation was roughly constant over a range of turbulence intensities from 1.8 to 14 feet per second. The linear relation permits solution of mixing problems from the Eulerian turbulence parameters. NACA TN 3570.

Experimental research on plastic deformation. Final report on Contract Nonr-177-(00), NR 017-417, by J. S. Koehler. Illinois University. Dept. of Physics, Urbana, Ill. Nov 1954. 3p. Order from LC. Mi \$1.80, ph \$1.80. PB 118557

Outlines the technical accomplishments for the period Sept 1950-Sept 1954. Covers 8 papers, a

survey article on dislocation theory, and 7 letters to the editor. Continued by Contract N6 ori-071(54).

New formula for particle size distribution of products produced by comminution, by Jonas Svensson. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 53p graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118576

A general distribution function is presented. The new formula has been thoroughly tested on particle size analyses for products obtained by comminution, most of which have been published by other workers. Quite a large number of particle size distributions have been found for which the new formula must incontestably be considered applicable. However in its simple form the new function is not generally valid. The greatest practical utility of the new formula has been in the calibration of test sieve. A method for this purpose is given. An extensive table has been worked out to facilitate the use of the new formula. Chemistry including metallurgy series vol. 4, no. 6. Sweden. Kungl. Tekniska Högskolan. Handlingar nr. 88. Acta polytechnica 167.

On the solid phase of the rare gases, by R. U. Ayres and R. H. Tredgold. Maryland. University. Dept. of Physics, College Park, Md. Aug 1955. 19p. Order from LC. Mi \$2.40, ph \$3.30. PB 118616

This paper is being submitted for publication in the Proceedings of the Physical Society. Technical report no. 20.

1. Gases, Rarefied - Crystal structure 2. Gases, Rarefied - Properties 3. Contract AF 18(600)-1015 4. OSR TN 55-252.

Proof of the Bieberbach conjecture for the fourth coefficient, by P. R. Garabedian and M. Schiffer. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Nov 1954. 78p. Order from LC. Mi \$4.50, ph \$12.30. PB 118541

1. Mathematical equations and solutions 2. Schlicht functions 3. SU AMSL TR 30 4. Contract N onr-255(11),(NR 041-086), Technical report no. 30.

Research in gaseous electronics. Terminal report under Contract Nonr-81604, 1 Jun 1953 through 30 Nov 1954. Washington University. Dept. of Physics, St. Louis, Mo. Nov 1954. 2p. Order from LC. Mi \$1.80, ph \$1.80. PB 118561

Three projects described in the contract have been completed to varying degrees: 1) Design and construction of a small mass spectrograph for study of formation of heavy ions in nitrogen and carbon monoxide. 2) Design and construction of apparatus for determining drift velocities of ions in gases, especially at low temperatures. 3) A theo-

retical investigation of the influence of initial velocity distribution of electrons from a cathode surface on the back-diffusion of the electrons to the surface.

Sampling tables for inspection by variables, by W. Grant Ireson. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. May 1952. 55p graphs, tables (part fold). Order from LC. Mi \$3.60, ph \$9.30. PB 118613

1. Sampling (Statistics) - Variables 2. Tables, Mathematical 3. SU AMSL TR 7 4. Contract N6 onr-25126 (NR 042-002).

Les theories de la turbulence (Theories of turbulence), by L. Agostini and J. Bass. Oct 1955. 166p photo, diagrs, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118754

The report includes a discussion of the kinematics of statistical mediums, particularly those which are isotropic. A mathematical study is made of the applications of Navier's equations to turbulent motion. Physical theories involving similarity are dealt with. Review is made of much of the work in turbulence. The theoretical discussions are illustrated by some correlation and spectrum curves based on measurements taken in the wind tunnel at the laboratory of the mechanics of the atmosphere at Marseille. Translated from France. Ministere de l'Air. Publications Scientifiques et Techniques no. 237, 1950. NACA TM 1377.

Thermodynamic temperature scale below 90°K, the normal boiling point of normal hydrogen, by G. W. Moessen, J. G. Aston, and R. G. Ascah. Pennsylvania State College. School of Chemistry and Physics, State College, Pa. Sep 1954. 8p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118381

1. Hydrogen, Liquid - Boiling point 2. Temperature coefficients 3. Contract N6onr 269, T. O. III & X, Technical report.

Turbulent flow in smooth pipes, a reanalysis of Nikuradse's experiments, by Donald Ross. Pennsylvania State College. School of Engineering. Ordnance Research Laboratory, State College, Pa. Sep 1952. 27p graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 118776

As a first step in a general study of turbulent boundary layers, the study by J. Nikuradse of fully developed turbulent flow in smooth pipes has been re-analyzed from a more modern point of view. This analysis began simply as an attempt to derive a pipe friction formula in terms of the three-dimensional momentum thickness. In the course of this work it was noticed that some of Nikuradse's correlations were only approximate and that several conclusions should be modified in the light of more modern developments. Several inconsistencies in his data

were also revealed. Project NR-067-139. Serial no. NOrd 7958-246. For reports 7958-89, 7958-97, 7958-143 see PB 118773, PB 118774, PB 118775. Contract Nord 7958-246.

Nuclear

Annual report, 4th, under Contract N6 ori-144, Task Order 1, NR 026-021, Franklin Institute. Bartol Research Foundation, Swarthmore, Pa. Sep 1954. 271p diagrs, graphs, tables. Order from LC. Mi \$11.10, ph \$42.35. PB 118392

W. F. J. Swann, Director. Contents: I. Nuclear physics: A. Radioactivity: 1. Resonance fluorescence studies, by F. R. Metzger. - 2. Disintegration schemes, a) Iridium - b) Pm 151 and Nd 147. - c) Pd 103 and Ru 103. - d) Cd 115, by C. E. Mandeville. - B. Dosimetry: Energy storage in phosphors, by C. E. Mandeville. - C. Theoretical note, by W. F. G. Swann. - D. Large Van de Graaff generator, by C. P. Swann. II. Cosmic rays: A. Balloon flights, by M. A. Pomerantz. - B. Theoretical investigations, by W. F. C. Swann. - C. Emulsion exposures, by D. W. Kent, Jr. - III. Publications. - IV. Reprints.

Comparison of semi-classical and quantum mechanical Coulomb excitation integrals for large L, by R. L. Gluckstern, J. P. Lazarus and G. Breit. Yale University, New Haven, Conn. Jul 1955. 13p. Order from LC. Mi \$2.40, ph \$3.30. PB 118637

Technical report 11. Project R-357-40-8. 1. Mathematical equations and solutions 2. Coulomb function 3. Equations, Integral 4. Quantum mechanics 5. OSR TN 55-256 6. Contract AF 18(600)-771.

Diffusion cloud chamber study of very slow mesons. I: Internal pair formation, by C. P. Sargent, R. Cornelius, M. Rinehart, L. M. Lederman, and K. Rogers. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Oct 1954. 29p photos, diagrs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118855

A beam of negative pi and mu mesons was moderated to very low energies and allowed to enter a hydrogen filled 20 atmosphere continuously sensitive cloud chamber. The various phenomena were observed and classified. A detailed study was made of the internal pair formation of mesic gamma rays produced in the pion hydrogen reactions. Distributions in angle and energy were obtained from thirty-five of the forty-seven observed cases. Nevis-5. R-87. Cu-72. Contract N6-ori-110, T. O. 1.

Distribution of gamma-rays and neutrons in the control face shield of B.E.P.O., by J. R.

Harrison, A. M. Mills, and D. Bendell. *Gt. Brit. Ministry of Supply. Atomic Energy Research Establishment. Feb 1955. 17p diagrs, graphs, tables. Order from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. 50 cents. PB 118771*

SWP/P20.

1. Gamma rays - Distribution - *Gt. Brit.* 2. Concrete - Research - *Gt. Brit.* 3. Concrete - Shielding properties - *Gt. Brit.* 4. Atomic power - Research - *Gt. Brit.* 5. Neutrons - Distribution - *Gt. Brit.* 6. AERE RP/R 1604.

Electronic states of molecules. II: Automatic computation of the electronic wave functions of the $B^2\Sigma^+$ and $X^2\Sigma^+$ states of the n_2 molecule, by R. C. Sahfl. University of Western Ontario. Dept. of Physics, London, Ontario, Canada. May 1955. 27p graph, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118725

Part I see PB 117276. Scientific report no. 21 under Contract AF 19(122)-470. Computation of work in this report was performed at the Electronic Computer Project, Institute for Advanced Study, Princeton, N. J. and was co-sponsored by the Office of Naval Research and the U. S. Army under Contract N7 onr-388(01) and Contract DA 36-ORD-1646.

1. Molecular theory - Canada 2. Atomic power - Research - Canada 3. Vibration - Theory - Canada 4. Molecules - Rotation - Theory - Canada 5. AAF CRC TN 55-681 6. Contract no. AF 19(122)-470 7. Contract N7 onr-388(01).

Excitation of heavy nuclei by the electric field of low-energy protons, by Clyde L. McClelland, Hans Mark and Clark Goodman. Massachusetts Institute of Technology. Laboratory for Nuclear Science. Oct 1954. 114p diagrs, graphs, tables. Order from LC. Mi \$6, ph \$18.30. PB 118270

Electric excitation of nuclei has been used to study the low-lying level structure in heavy nuclei. Experimental data for seventeen nuclides are presented, including isotopes of lutecium, hafnium, tantalum, wolfram, rhenium, and platinum. Bohr and Mottelson's hypothesis of rotational states of the nucleus is further confirmed by this work. Approximate intrinsic quadrupole moments of these nuclides have been determined from the experimental data, including the even-even nuclei studied. MIT LNS TR 66. Contract N5ori-07806, NR-028-001.

Final report under Office of Naval Research Contract N6 ori-102/III, for the period Jun 19, 1946 to Dec 31, 1954, by Carl D. Anderson and H. Victor Nehers. California Institute of Technology, Pasadena, Calif. Jan 1954. 17p. Order from LC. Mi \$2.40, ph \$3.30. PB 118728

Covers use of cosmic rays for a study of elementary particles of matter and geomagnetic effects of cosmic

rays. Includes bibliography of all publications issued or to be issued under Contract N6 ori-102/III, from 1947 through 1955.

Note on agreement of classical and quantum Coulomb excitation integrals, by John P. Lazarus and S. Sack. Yale University, New Haven, Conn. Jun 1955. 8p graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118658

A comparison is made between classical and quantum Coulomb excitation integrals. It is shown that the indefinite Coulomb excitation integrals show agreement at nearly the same distances as the corresponding density integrals. The agreement of the Coulomb excitation integrals for small excitations is therefore believed to be caused at least partly by the agreement of the density integrals. Project R-357-40-8. OSR TN 55-178. Contract AF 18(600)-771, Technical report 9.

On the absorption of light by atoms in solids, by R. L. Dexter. Rochester. University. Institute of Optics, Rochester, N. Y. May 1955. 30p. Order from LC. Mi \$2.70, ph \$4.80. PB 118729

The interactions of an atom with its neighbors in an idealized solid are taken into account explicitly in treating the absorption of light, as contrasted with the usual introduction of an "effective" field and mass. In the discussion of the magnitude of the absorption coefficient, two cases are treated: one, the absorption by an impurity atom, in which case we are led to an equation similar to Smakula's; and two, the absorption by one of the atoms of the perfect crystal. The computations are based on a simple idealized model whose validity is discussed for existing systems. Project R-355-20-7. OSR TN 55-175. Contract AF 18(600)-688.

Photoprotons from lead 208 and tantalum, by M. Elaine Toms and William E. Stephens. Pennsylvania. University. Dept. of Physics, Philadelphia, Pa. Sep 1954. 13p diagrs, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118661

The photoprotons ejected from thin foils of tantalum and enriched lead 208 by the 23 Mev bremsstrahlung X rays from the University of Pennsylvania betatron have been observed in nuclear emulsions. Yields, measured in units of 10^4 protons per mole per roentgen unit, are: tantalum, 5.6 ± 0.5 ; lead 208, 2.6 ± 0.3 . The angular distribution of the lead 208 protons shows a strong forward asymmetry while the tantalum protons are more isotropic. Both proton energy distributions are in good agreement with the predictions of the direct process. Technical report no. 8 under Contract N6 onr-249-3, NR 022-019.

Pi-electron forces between conjugated double bond molecules, by Eugene F. Haugh and Joseph O. Hirschfelder. Wisconsin University, Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Contract N7onr-28511. Order separate parts described below from LC, giving PB number of each part ordered.

Sep 1954. 90p diagrs, graphs, tables. Mi \$4.80, ph \$13.80. PB 118387

Dispersion forces between conjugated molecules are treated in an attempt to obtain a simple explanation for their complicated angular dependence. Results of the present calculations for linear polyenes and benzene are in essential agreement with the results of Coulson and Davies, the principal difference being a scale factor. Polarizabilities of linear polyenes are also calculated using free electron molecular orbitals, and the results agree within a few percent with the results of Davies. WIS-ONR-11.

Nov 1954. 56p diagrs, graphs, tables. Mi \$3.60, ph \$9.30. PB 118536

Three types of dispersion forces: $\sigma\sigma$, $\sigma\pi$ and $\pi\pi$ are calculated for ethylene, acetylene, and the higher polyenes. In addition the $\pi\pi$ interaction energy is calculated for benzene. The free electron molecular orbitals are used for the π electrons and products of these orbitals are approximated by "transition monopoles". In the appendix, the free electron model is used to calculate the pi-electron contribution to the polarizability and excellent agreement is obtained with the LCAO calculations of Davies. WIS-ONR-14.

Redistribution of classical and quantum densities, by G. Briet and P. B. Daltch. Yale University, New Haven, Conn. Jun 1955. 15p. Order from LC. Mi \$2.40, ph \$3.30. PB 118315

A study of quantum mechanical densities of particles impinging on a completely reflecting one-dimensional potential barrier. Project R 357-40-8. Technical report no. 10. OSR TN 55-179. Contract AF 18(600)-771.

Semi-classical theory of molecular collisions, by James Frederick Horning. Wisconsin University, Naval Research Laboratory. Dept. of Chemistry, Madison, Wis. Sep 1954. 84p diagrs, graphs, tables. Order from LC. Mi \$4.80, ph \$13.80. PB 118382

1. Atomic power - Research 2. Molecules - Collisions 3. Molecular theory 4. WIS ONR 10 5. Contract N7 onr-28511.

Spectrum of the glow from a radioactive source, by L. F. Drummeter, Jr. and J. A. Curcio. U. S. Naval Research Laboratory. Aug 1955. 7p photo,

diagr, graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118865

A low dispersion spectrum has been obtained of the glow from a water solution of radioactive barium-lanthanum. The spectrum shows a continuum beginning at 3000 A and increasing in intensity to the photographic plate cut-off at 5000 A. NRL R 4583.

Steric effects in elimination reactions, by Herbert C. Brown, Ichiro Moritani, M. Nakagawa and Y. Okamoto. Purdue University. Dept. of Chemistry, Lafayette, Ind. Oct 1954. 77p graphs, tables. Order from LC. Mi \$4.50, ph \$12.30. PB 118330

Contents: I. Directive effects in unimolecular eliminations; a case of Hofman rule reaction in an E1 reaction, by Herbert C. Brown and Ichiro Moritani. - II. Effect of the steric requirements of alkyl substituents upon the extent and direction of unimolecular elimination in the solvolysis of tertiary alkyl bromides, by Herbert C. Brown and M. Nakagawa. - III. Effect of the steric requirements of alkyl substituents upon the extent and direction of unimolecular elimination in the solvolysis of secondary alkyl brosylates, by Herbert C. Brown and M. Nakagawa. - IV. Question of rearrangements as a factor in the extent and direction of unimolecular elimination, by Herbert C. Brown and Y. Okamoto. - V. Importance of steric strains in the extent and direction of unimolecular elimination, the role of steric strain in the reactions of highly branched carbonium ions, by Herbert C. Brown and Ichiro Moritani. Contract Nonr-394, T. O. III, NR 055-127.

Theoretical and experimental investigations of the atomic phenomena occurring on and near the surfaces of solids, by R. C. Bradley and Lloyd P. Smith. Cornell University. Dept. of Physics, Ithaca, N. Y. Jun 1955. 25p photo, diagrs, graphs. Order from LC. Mi \$2.70, ph \$4.80. PB 118519

A study of the operational characteristics of various types of ion sources and ion analyzers has been made for the purpose of investigating the kinds of atoms present on the surfaces of solids. Ion source and analyzer studies, Technical report no. 2. OSR TR 55-17. Contract AF 18(600)-874, Project R-355-30-4.

Theory of multiple Coulomb scattering from extended nuclei, by Leon N. Cooper and James Rainwater. Columbia University. Physics Dept. Nevis Cyclotron Laboratories, Irvington-on-Hudson, N. Y. Aug 1954. 53p graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118854

1. Atomic power - Research 2. Coulomb functions 3. Particles, Charged - Scattering - Theory 4. Electrons - Angular correlations 5. Nevis 4 6. R 83 7. CU 70 8. Contract N6ori-110, T. O. 1.

Time dispersion of secondary electron emission.
Technical report no. 6 under Contract AF 19(604)-524, by Edward W. Ernst. Illinois. Engineering Experiment Station, Electrical Engineering Research Laboratory, Urbana, Ill. Jul 1955. 109p photos, drawings, diagrs, graphs, table. Order from LC. Mi \$5.70, ph \$16.80. PB 118724

1. Atomic power - Research
2. Electrons - Emission, Secondary - Measuring equipment
3. Electrons - Emission, Secondary - Measurement
4. Analyzers, Electron
5. AAF CRC TN 55-583
6. Contract AF 19(604)-524, Report no. 6.

PHYSIOLOGY

Dynamic thoracic pressure-volume relationships with mask and tank respirators, by Richard W. Bancroft and Syreel S. Wilks. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Apr 1955. 9p photos, graphs, table. Order from LC. Mi \$1.80, ph \$1.80. PB 118701

Thoracic pressure-volume relationships were determined during intermittent mask and tank pressure breathing by measuring simultaneously the esophageal and mask pressures, the tidal volumes, expiratory reserves, and vital capacities to compare the physiological characteristics of the two pressure breathing methods. AAF SAM R 55-24.

Physiology of flight. U. S. Air Force. Jul 1953. 200p photos, map, drawings, diagrs (part col.) graphs (part col.), tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. \$2. PB 118795

The environmental changes of greatest physiological significance involved in flight are (1) marked changes in barometric pressures, (2) considerable variation in temperature, (3) movement at high speed in three dimensions, and (4) change reflected in the mechanical characteristics of the airplane itself. An effort is made to outline some of the important factors in the physiological effects of flight and to describe the devices that contribute to the welfare and tactical efficiency of flying personnel. Air Force Manual no. 160-30. Color in diagrams and graphs will not reproduce. AAF M 160-30.

PSYCHOLOGY

Achievement test research and development for the Naval Officer Candidate School and the Naval Reserve Officer Training Corps, by A. J. Bernstein. American Institute for Research. Personnel Analysis Division, Pittsburgh, Pa. Nov 1954. 62p tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118542

1. Tests, Officer qualification
2. Psychology, Applied
3. NAVPERS TB 54-21
4. Contract N onr-890(01).

Alternative speaker lists for multiple-choice intelligibility tests, by John W. Black. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio. May 1955. 43p tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118498

Possible error responses on the answer forms of the multiple-choice intelligibility tests outnumber the correct responses three to one. Each of these error responses in the printed answer sheets of Forms A, B, C, and D was read by at least 10 speakers to determine the usefulness of the words as test items. The speakers also read the standard lists of the tests. From the subsequent item analysis 12 alternative speaker lists were constructed for each form of the test. Mean intelligibility values for the lists are included. These permit the researcher to select and combine lists from the original and alternative lists within predetermined criteria of equality. Contract N6onr-22525, Project NR 145-995. NMRI Proj NM 001 104 500.51.

Annotated bibliography on operations research, by Vera Riley. Johns Hopkins University. Operations Research Office, Chevy Chase, Md. Jun 1953. 54f. Order from LC. Mi \$3.60, enl pr \$10.80. PB 118673

Bibliographic reference series, no. 1, vol. 1.
1. Psychology, Applied - Bibliography
2. Operations research - Bibliography.

Assessment of attitudes relevant to team performance, by Lee S. Christie and Charles S. Morrill. Tufts College, Medford, Mass. Aug 1954. 18p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118389

Report 1954-494-03-26.
1. Personality - Research
2. Psychological tests - Rating scales
3. Group behavior
4. Contract Nonr-494-(03).

Behavior of individuals and personnel systems in surveillance functions of an air defense direction center. III: Distribution of responses with respect to job functions, by Jay D. Cohen and Robert K. McKelvey. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Jun 1955. 21p diagrs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118606

Project no. 7712, Task no. 77207. For Parts 1-2 see PB 117319-117320.
1. Job analysis
2. Air defenses - Psychological

aspects 3. Personnel, Air defense - Performance tests 4. Personnel, Radar - Training 5. AAF PTRC TN 55-11.

Changes in voice intelligibility, sound pressure level of response, and duration of response as a function of the speaker's being repeatedly informed that he is not being understood by his listeners, by Robert W. Peters. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. and Ohio State University Research Foundation, Columbus, Ohio, May 1955. 10p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118625

Criterion measures of voice intelligibility, relative sound pressure level of response, and duration of response were determined for 24 speakers who were repeatedly informed during their reading of testing materials that their voice transmissions were not being understood by their listeners. Voice intelligibility did not progressively improve even when significant increases in both sound pressure level and duration of vocal responses resulted from an increase in the number of times the speaker was informed that he was not being understood. Joint project report no. 50. Contract N6 onr-22525, NR 145-993. NMRI Proj NM 001-104-500.50.

Development of short alternatives of factor-reference tests for five primary aptitudes, by Helen Tomlinson. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1955. 26p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118630

Project 7703, Task no. 77083. Appendix A. - Supplementary tables of statistical detail. Appendix B. Factor solutions of the 34-variable correlation matrix, by John Schmid, Jr.
1. Ability tests - Evaluation 2. Personnel, Flying - Ability tests 3. Factor analysis 4. AAF PTRC TN 55-6.

Estimating the chance expectancies of diadic relationships within a group, by Renato Tagiuri, Jerome S. Bruner, Nathan Kogan. Harvard University. Laboratory of Social Relations. n.d. 24p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118547

Date is 1953 or later.

1. Group behavior 2. Psychology, Applied 3. Contract N5 ori-7646.

Factor-analytic study across the domains of reasoning, creativity, and evaluation. I: Hypotheses and description of tests. Studies of aptitudes of high-level personnel, by J. P. Guilford, N. W. Kettner, and P. R. Christensen. University of Southern California. Psychological Laboratory, Los Angeles, Calif. Jul 1954. 24p table. Order from LC. Mi \$2.70, ph \$4.80. PB 118648

The three main objectives of the study are: (a) verification of factors, some of which have been found only once previously, (b) clarification of the nature of the factors, and (c) derivation of information leading to improvement of tests measuring the factors. Report no. 11. Contract N6onr-23810.

Implications of regional differences in aptitude for personnel classification, by Mary Agnes Gordon. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1955. 20p map, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118608

Project no. 503-001-0001.

1. Ability tests 2. Personnel, Flying - Classification 3. AAF PTRC TR 55-13.

Methods for studying work and emotionality in group operation, by Herbert A. Thelen, Dorothy Stoch, Saul Ben-Zeev, Ida Gradolph, Philip C. Gradolph and William F. Hill. Chicago. University. Human Dynamics Laboratory. 1954. 215p graphs, tables. Order from LC. Mi \$9.60, ph \$33.30. PB 118408

The purposes of the research were methodological, substantive, and practical. The methodological aim was to test the feasibility of sequential analysis as a means for diagnosing dynamics in training groups. The substantive aim was to test the usefulness and interpretability of basic categories of emotionality and work, as proposed by Bion and given partial operational definition through preceding work in the Laboratory. The practical aim was to test the effectiveness for group growth of feedback to the training groups of research data on interaction. Contract Nonr 660(00) NR 170-176.

Non-intellective determinants of scientific interests, by R. H. Knapp. Wesleyan University, Middletown, Conn. Jun 1951. 38p tables. Order from LC. Mi \$3, ph \$6.30. PB 118636

1. Psychology, Applied 2. Sociology - Research 3. Ability tests 4. Scientists - Psychological records 5. Contract Nonr-181(00).

Optimal test length for maximum differential prediction, by Paul Horst. Washington. University, Seattle, Wash. Nov 1954. 23p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118540

1. Aptitude tests 2. Mathematical equations and solutions 3. Psychological tests 4. Contract Nonr-477(08).

Psychiatric screening of flying personnel: Evaluation of assumptions underlying interpretation of sentence completion tests, by David K. Trites. U. S. Air Force. School of Aviation Medicine,

Randolph Field, Texas. Mar 1955. 10p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118702

An 84-item sentence completion test was used to evaluate two assumptions often made in the objective interpretation of this type of test. These are: (a) incomplete sentence stimulus items whose verbal content and meaning are immediately apparent and generally agreed upon will elicit responses which refer to this "generally agreed upon" meaning; and (b) systems of response classification which represent the attitudes and objects referred to by both stimulus and response may be developed by considering only the verbal content of the stimuli. A factor analysis of the intercorrelations of 74 of the 88 items yielded partial support for both assumptions. AAF SAM R 55-33.

Response mechanisms at the visual threshold.

Status report II: A methodological study for the period 1 Jul-15 Oct 1952, by William S. Verplanck, Floyd Ratcliff, Donald S. Blaugh, Willard C. Day, Donald W. O'Connell, George H. Collier, and John W. Cotton. Harvard University. Psychological Laboratories. Oct 1952. 17p graphs. Order from LC. Mi \$2.40, ph \$3.30. PB 118615

For Status report I see PB 107381.

1. Visual perception 2. Visual research 3. Contract N5 ori-07639, Project NR 140-015.

Role of language in behavior. Technical report no.

10: Implicit verbal chaining in paired-associate learning, by Wallace A. Russell and Lowell H. Storms. Minnesota. University. Dept. of Psychology, Minneapolis, Minn. n.d. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118654

This experiment was designed to study the effects of mediating verbal processes paired-associate learning when the mediating process is implemented in part by pre-existing language habits and extends over more than one implicit verbal term. For reports 5-9 see PB 113990-113994. Contract N8onr-66216.

Studies in the visual discrimination of multiple unit

displays, by Gilbert K. Krulee and Alexander Welsz. Tufts College, Medford, Mass. Aug 1954. 17p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118411

Report number 1954-494-03-23.

1. Vision - Contrast thresholds 2. Visual perception - Research 3. Range, Visual 4. Contract Nonr 494(03), Report no. 23.

RUBBER AND RUBBER PRODUCTS

Development of ozone and/or oxygen resistant polymers. Final technical report, Jun 1, 1952 to Feb

28, 1954, under Contract no. DA-20-089-ORD-36531, by R. G. Spain. Burke Research Co., Van Dyke, Mich. Feb 1954. 105p tables. Order from OTS. \$2.75. PB 111722

1. Antioxidants - Tests 2. Polymers - Additives 3. Polymers - Tests 4. Rubber, Synthetic - Polymerization 5. Rubber, Synthetic - Oxidation 6. Contract DA-20-089-ORD-36531, Final report.

STRUCTURAL ENGINEERING

Analysis of stresses in the plastic range around a circular hole in a plate subjected to uniaxial tension, by Bernard Budiansky and Robert J.

Vidensek. U. S. National Advisory Committee for Aeronautics. Oct 1955. 39p graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118742

An approximate theoretical solution is based on the simple deformation theory of plasticity and is found by application of a variational principle in conjunction with the Rayleigh-Ritz procedure and the use of a high-speed computing machine (SEAC). Numerical results are obtained for four different materials, which are characterized by four distinct uniaxial stress-strain curves. NACA TN 3542.

Comparison between theoretical and experimental stresses in circular semimonocoque cylinders with rectangular cutouts, by Harvey G. McComb, Jr.,

and Emmet F. Low, Jr. U. S. National Advisory Committee for Aeronautics. Oct 1955. 20p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118743

Comparisons are made between a theory for calculating stresses about rectangular cutouts in circular cylinders of semimonocoque construction published in NACA TN 3200 and previously published NACA experimental data. The comparisons include stresses in the stringers and shear stresses in the center of the shear panels in the neighborhood of the cutout. The theory takes into account the bending flexibility of the rings in the structure, and this factor is found to be important in the calculation of stresses about cutouts. NACA TN 3544.

Influence of shear deformation on the cross section on torsional frequencies of box beams, by Edwin

T. Kruszewski and William W. Davenport. U. S. National Advisory Committee for Aeronautics. Oct 1955. 23p diagr, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118735

An exact analysis has been carried out on the torsional vibrations of a four-flange box beam with cross sections which can change shape because the stiff-

TEXTILES AND TEXTILE PRODUCTS

ness of the bulkheads is finite. The effect of shear deformation of the cross section on the torsional frequencies is illustrated by numerical calculations. An approximate method for quickly estimating the effects of bulkhead shear stiffness on the torsional frequencies of box beams has been devised. NACA TN 3464.

Investigation of the vibrations of a hollow thin-walled rectangular beam, by Eldon E. Kordes and Edwin T. Kruszewski. U. S. National Advisory Committee for Aeronautics. Oct 1955. 24p photos, diags, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118734

Experimental modes and frequencies of an unstiffened hollow beam of rectangular cross section are presented, and comparisons are made between experimental and theoretical frequencies. Theories based on rigid cross sections were found to be sufficiently accurate to predict the frequencies of only the lowest three bending modes. For the higher bending modes and all the torsional modes, it was necessary to include the effects of cross-sectional distortions in the calculations. NACA TN 3463.

Propagation of elastic impact stresses. Progress report no. 3, by M. Dengler, M. Goland and P. Wickershaw. Midwest Research Institute. Engineering Division, Kansas City, Mo. Oct 1952. 39p graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118614

A theoretical and experimental comparison is made of the strain propagation in steel beams impacted by a sharp, transverse blow. The theoretical analysis is based on an earlier paper by Dengler and Goland, in which a solution based on the Timoshenko bending mechanism is deduced. The experimental work was performed on a square beam, impacted by a steel sphere. Measurements are reported both for the strain propagation in the beam, and also for the history of forces acting between the ball and beam. Project 709-E-327. Contract Nonr-704(00) Progress report no. 3.

Universal column formula for load at which yielding starts, by L. H. Donnell and V. C. Tsien. U. S. National Advisory Committee for Aeronautics. Oct 1955. 48p photos, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118733

An analysis is presented of the load at which yielding first occurs in actual columns, taking adequately into account all the factors which have an important effect upon this load. The results are expressed as a formula or chart applicable to all cases. NACA TN 3415.

Degumming of ramie: Development of degumming methods with allied tests and microscopical examinations, by George Thomson and Horace N. Lee. Fabric Research Laboratories, Inc., Boston, Mass. Feb 1949. 74f photos, drawing, tables. Order from LC. Mi \$4.50, enl pr \$13.80. PB 118672

Methods tried in evaluating degummed fiber are described. A detailed discussion of materials, procedures, and results in experimental work is presented. Tests indicate that successful degumming requires a chemical treatment to attack the bonds holding the cell fibers together, a mechanical treatment to cause complete separation of the fibers, and a coating or other processing of fibers to prevent re-adherence on drying. The aluminum sulfate process is thoroughly investigated and tested in fiber and yarn form. F.R.L. case number C47736. Technical report no. 2. Contract N70nr-421, T. O. 1.

Study of the control of permeability of nylon parachute cloth at high and low differential pressures, by Hamilton J. Bickford, Donald K. Kuehl, Thomas L. Rusk, Jr. Cheney Bros., New York, N. Y. Mar 1955. 53p diags, graphs, tables. Order from OTS. \$1.50. PB 111855

Twenty-four differently constructed samples of nylon cloth in the desired weight range were woven, finished and tested. A special mathematical study of the relationship between air permeability at $\frac{1}{2}$ inch of water pressure differential and at higher pressure differentials was made. AAF WADC TR 54-468. Contract AF 33(600)-26109.

Textiles; accelerated weathering versus outdoor exposure tests, by Joyce C. McGrath. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Oct 1950. 49p tables. Order from OTS. \$1.25. PB 111761

1. Textiles - Testing methods 2. Textiles - Exposure tests 3. Fabrics - Exposure tests 4. Fabrics - Testing methods 5. Fabrics - Weathering 6. AAF TR 5894.

Vibroscope measurements of the elastic moduli of nylon 66 and dacron filaments of various draw ratios, by J. H. Wakelin, E. T. L. Voong, D. J. Montgomery and J. H. Dusenbury. Textile Research Institute, Princeton, N. J. Nov 1954. 31p diags, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118539

By use of the electrostatic vibroscope method, dynamic measurements have been made of the Young's modulus derived from bending and the torsional modulus of nylon 66 and Dacron filaments ranging in draw ratio from one (undrawn) to six. Quasi-static measurements have also been made to obtain the Young's modulus derived from extension. Results indicate that both filaments become progressively anisotropic with drawing, the extent of the anisotropy reflecting mainly the changes in the Young's modulus. As a check on the experimental procedures, the elastic moduli have also been measured for a 1-mil drawn tungsten wire. Contracts Nonr-09000 and Nonr-09001, Technical report 13.

TRANSPORTATION EQUIPMENT

Aeronautics

Aircraft

Analysis of acceleration, airspeed, and gust-velocity data from one type of four-engine transport airplane operated over two domestic routes, by Martin R. Copp and Thomas L. Coleman. U. S. National Advisory Committee for Aeronautics. Oct 1955. 30p map, diagrs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 118750

1. Gust loads 2. Loads, Aerodynamic - Theory
3. Airplanes, Commercial - Acceleration 4. NACA
TN 3475.

Crash survival study: DeHavilland Dove accident at Staten Island Airport, Dec 9, 1952, by A. Howard Hasbrook. Cornell University. Aviation Crash Injury Research, Cornell-Guggenheim Aviation Safety Center, New York, N. Y. Nov 1954. 30p photos, diagrs. Order from LC. Mi \$2.70, ph \$4.80.

PB 118545

Transport aircraft: Release 3-13.

1. Airplanes - Accidents - Injuries 2. Airplanes -
Accidents - Research 3. Crash survival, Airplanes
- Research 4. Contract N6 onr-264-12.

Emergency escape procedures, a report of joint studies with the Military Air Transport Service and the Civil Aeronautics Administration on the C-124 and supplementary data, by Barry G. King, Ralph Ostrich and Mary C. Richardson. U. S. Civil Aeronautics Administration. Office of Aviation Safety. Medical Division, Washington, D. C. Aug 1954. 96p drawings, diagrs, graph, tables. Order from LC. Mi \$5.40, ph \$15.30. PB 118467

USAF ARDC Proj 504-025-0009.

1. Airplanes - Escape - Procedures 2. AAF CRC
TR 54-56.

Ice formation on aircraft. U. S. Bureau of Aeronautics, n.d. 40p drawings. Order from LC. Mi \$2.70, ph \$4.80. PB 118778

Aerology series no. 1.

1. Ice formation 2. Airplanes - Icing 3. AN 00-
80U-1.

Pilot's loss of orientation in inverted spins, by Stanley H. Scher. U. S. National Advisory Committee for Aeronautics. Oct 1955. 10p photos, diagrs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118739

1. Pilots, Air - Orientation 2. Airplanes - Spinning
- Wind tunnel tests 3. Airplanes - Spinning - Test-
ing equipment 4. NACA TN 3531.

Rotary wing aircraft handbooks and history. Vol. 8: Mechanical design and description, by Harris S. Campbell. Edited by Eugene K. Liberatore. Prewitt Aircraft Co., Clifton Heights, Pa. 1954. 275p photos, drawings, diagrs, graphs. Order from OTS. \$7. PB 111632

Contract no. W33-038-ac-21804(20695). For Pre-
view of the series see PB 110454. For vols. 6-7,
10, 13-14 see PB 111390, 111289, 111521, 111288,
111391.

1. Helicopters - Design 2. Helicopters - Aerody-
namics 3. Helicopters - Components - Design
4. Contract W33-038-ac-21804 (20695).

Study of the characteristics of human pilot control response to simulated aircraft lateral motions, by Donald C. Cheatham. U. S. National Advisory Committee for Aeronautics. 1954. 16p photos, diagrs, graphs, tables. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 20 cents. PB 118756

1. Pilots, Air - Ability tests
2. Pilots, Air - Coordination tests 3. Pilots, Air -
Performance 4. NACA 1197.

Instruments

Averaging of periodic pressure pulsations by a total-pressure probe, by R. C. Johnson. U. S. National Advisory Committee for Aeronautics. Oct 1955. 30p photo, diagrs, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118745

1. Pressure, Air - Probes 2. Flow, Compressible - Theory 3. Flow, Viscous - Theory 4. Flow, Laminar - Theory 5. Pressure - Measurements 6. Tables, Mathematical 7. NACA TN 3568.

Construction of an improved "jeep-class" aircraft fire-fighting vehicle, by H. B. Peterson, R. R. Neill, and E. J. Jablonski. U. S. Naval Research Laboratory. Sep 1955. 15p. Order from LC. Mi \$2.40, ph \$3.30. PB 118722

A new carrier based "Jeep-class" aircraft fire-fighting and rescue vehicle has been designed and constructed utilizing a 1200-gpm foam pump. Photographs and data are given on the operating characteristics and the foam characteristics of the new vehicle. The appendix contains complete operating and maintenance instructions for the equipment together with notes on fire-fighting techniques. Interim report. NRL R 4603.

Reference pressure probes for an orifice-type icing detector, by D. Fraser and D. C. Baxter. Canada. National Aeronautical Establishment. Apr 1955. 34p diags, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118620

The operation of an orifice-type icing detector depends on having a suitable reference pressure source. A flush-type static vent may not provide this, especially when the detector is used in an engine intake duct. However, tests show that a production form of icing detector probe can be modified to provide a suitable reference pressure if it is de-iced or anti-iced. A reference probe which is particularly insensitive to yaw is also described. NAEC LR 129.

Study of screeching combustion in a 6-inch simulated afterburner, by Perry L. Blackshear, Warren D. Rayle, and Leonard K. Tower. U. S. National Advisory Committee for Aeronautics. Oct 1955. 58p photos, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118744

1. Combustion - Research 2. After burning - Research 3. Sound - Detection - Measurement 4. Probes, Microphonic - Design 5. Afterburners - Noise 6. NACA TN 3567.

Engines and Propellers

Amplitude of supersonic diffuser flow pulsations, by William H. Sterbentz and Joseph Davids. U. S. National Advisory Committee for Aeronautics. Oct 1955. 23p diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118747

1. Jet engines, Ram jet - Performance 2. Diffusers, Supersonic - Flow patterns 3. Ducts, Air - Stability effects 4. NACA TN 3572.

Effect of exhaust-nozzle ejectors on turbojet noise generation, by Warren J. North and Willard D. Coles. U. S. National Advisory Committee for Aeronautics. Oct 1955. 26p photo, diags, graphs. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118748

1. Jet engines, Turbo jet - Noise - Reduction 2. Thrust ejectors - Flow - Calculation 3. NACA TN 3573.

Training and Training Devices

Effect of varying control forces in the P-1 trainer upon transfer of training to the T-6 aircraft, by W. G. Matheny, A. C. Williams, Jr., Dora Dougherty and S. G. Hasler. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Pilot Training Research Laboratory, Goodfellow Air Force Base, Texas. Sep 1953. 9p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118685

Project no. 508-017-0001.

1. Training - Transference 2. Simulators, Flight - Evaluation 3. Personnel, Flying - Training 4. P-1 (Trainer) 5. T-6 (Airplane) 6. AAF HRRC TR 53-31.

Effects of basic training on the attitudes of airmen, by Donald Thistlethwaite, Howard Moltz, Joseph Kamenetgky and Henry de Haas. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. Jun 1955. 49p tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118627

Measurements were obtained of the attitudes of over 900 airmen (22 flights) at the beginning and end of the basic training program at Lackland Air Force Base. In addition, information was obtained on the intelligence, education, experience, and attitudes of the tactical instructor assigned to each of the selected flights. Project no. 7705. Research report under Contract AF 33(038)-25726, Task F. AAF PTRC TN 55-3.

Evaluation of a selection composite for screening applicants for USAF officer candidate school, by Ernest C. Tupes and Walter R. Borg. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jul 1955. 18p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118609

Project no. 7701, Task no. 77043.

1. Personnel, Flying - Selection 2. Tests, Officer qualification 3. AAF PTRC TN 55-15.

14-week exploratory study of marginal-airman basic training: Comparison of proficiency of 8-week and 14-week training groups, by Donald B. Gragg, David J. Kieselbach, Walter F. Murphy, Raymond E. Peckham, and Herbert Heller. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1955. 34p tables. Order from LC. Mi \$3, ph \$6.30. PB 118605

Project 7700, Task no. 77003.

1. Personnel, Flying - Training 2. Personnel, Flying - Ability tests 3. AAF PTRC TN 55-10.

Influence of background factors upon the prediction of success in Air Force training schools: A review of the literature, by Mary Agnes Gordon. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, San Antonio, Texas. May 1955. 20p. Order from LC. Mi \$2.40, ph \$3.30. PB 118626

This review of the literature was undertaken to determine whether existing studies throw light on the influence of cultural-economic factors in the prediction of success in Air Force technical schools. The report summarizes a number of studies and relates them directly to the Air Force prediction problem. Project no. 7703. Task no. 77072. AAF PTRC TN 55-4.

Securing and retaining volunteers for the Ground Observer Corps, by Joseph J. Rosa. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Crew Research Laboratory, Randolph Air Force Base, Texas. Jun 1955. 54p tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118629

A survey of literature has been made to uncover factors related to volunteer service in the Ground Observer Corps (GOC). Studies of the personal and social characteristics of volunteers and efficient methods and techniques for motivating and retaining civilian volunteers have been reviewed and interpreted in terms of the GOC problem. Project 7731, Task 77428. AAF PTRC TN 55-7.

Student achievement as a measure of instructor effectiveness, by Joseph E. Morsh, George G. Burgess, and Paul N. Smith. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jun 1955. 26p tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118607

Project no. 7950, Task no. 77243.

1. Instructors, Aviation - Evaluation 2. Personnel, Flying - Training 3. AAF PTRC TN 55-12.

Predicting motivation for flying training among senior AF ROTC cadets, by Ernest C. Tupes, J. W. Bowles, and Donald V. Torr. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Jul 1955. 12p tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118610

Project no. 503-002-7701.

1. Personnel, Flying - Psychological records 2. AAF PTRC TN 55-18.

Training function of examinations: Retest performance as a function of the amount and kind of critique information, by G. Raymond Stone. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Aircraft Observer Research Laboratory, Mather Air Force Base, Calif. Jun 1955. 29p graphs, tables. Order from LC. Mi \$2.70, ph \$4.80. PB 118611

Project no. 7711, Task no. 57001.

1. Personnel, Flying - Ability tests 2. Learning - Tests 3. AAF PTRC TN 55-8.

Aerodynamics

Air masses and fronts. U. S. Bureau of Aeronautics. n.d. 26p drawings. Order from LC. Mi \$2.40, ph \$3.30. PB 118779

Aerology series no. 4.

1. Meteorology 2. Aerodynamics 3. AN 00-80U-5.

Downwash behind wings at supersonic speeds, a simplified method for calculation and experimental results for wings with small aspect ratio, by Willi Jacobs. Flygtekniska Försöksanstalten (FFA) Stockholm. May 1955. 52p diags, graphs. Order from LC. Mi \$3.60, ph \$9.30. PB 118772

A simplified method is developed for calculating the downwash behind straight wings with supersonic velocity. The method has been compared with results of downwash-measurements behind straight, trapezoidal and delta-wings with small aspect ratio at Mach numbers $M = 1.4$ and 1.8 . The comparison of the results for some wings, for which the lift-distribution is known, gives good agreement with the theoretically calculated results. FFA 61.

Flow around oscillating low aspect ratio wings at transonic speeds, by Marten T. Landahl. Sweden. Kungl. Tekniska Högskolan. Institutionen för Flygteknik. 1954. 27p diags, graphs. Order from LC. Mi \$3, ph \$6.30. PB 118176

1. Wings, Triangular - Aerodynamics - Sweden
2. Wings, Triangular - Flutter - Calculations - Sweden
3. Wings, Conical - Aerodynamics - Sweden
4. Stability, Dynamic - Mathematical analysis - Sweden
5. Flow, Transonic - Theory - Sweden
6. KTH AERO TN 40.

On the development of turbulent wakes from vortex streets, by Anatol Roshko. U. S. National Advisory Committee for Aeronautics. 1954. 27p photos, graphs, table. Order from Superintendent of Documents, Government Printing Office, Washington 25, D. C. 25 cents. PB 118757

Formerly NACA TN 2913 (PB 109104).

1. Reynolds number - Effects
2. Flow, Subsonic
3. Flow, Viscous
4. Cylinders, Rotating - Wake
5. Vortex motion - Theory
6. NACA TN 2913, Revised
7. NACA 1191.

Papers presented at the fifth meeting of the Wind Tunnel and Model Testing Panel, AGARD fourth general assembly, Scheveningen, The Netherlands, 3-7 May 1954. Advisory Group for Aeronautical Research and Development. 1954. 191p photos, drawings, diags, graphs, tables. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 117518

Contents: Measurements of aerodynamic forces on oscillating aerofoils, by A. L. van de Vooren. - Review of the techniques of measuring oscillatory aerodynamic forces and moments on models oscillating in wind tunnels in use on the Continent, by J. Valensi. - Report on methods and results of non-stationary airfoil theory, by R. Timman. - Techniques of model testing in free flight, by Joseph A. Shortal. - Jet-engine-driven wind tunnels, by F. B. Greatrex. - Some aspects of supersonic wind tunnel operating techniques, by John Markham. - Development of intermittent wind tunnel techniques, by J. Lukasiewicz. - Design of large high speed wind tunnels, by Ralph F. Huntsberger and John P. Parsons. - Notes on the design and construction of the welded steel structure for the 8 ft x 8 ft high speed wind tunnel at the National Aeronautical Establishment, Bedford, by W. Wadkin and T. Barnes. - Design and construction aspects of high power wind tunnel drive systems and large diameter compressors, by James Clark.

Practical approach to the problem of stall flutter, by Chi-Teh Wang, R. J. Vaccaro and D. F. DeSanto. New York University. College of Engineering. Research Division, New York, N. Y. Jun 1955. 15p drawings, graphs, tables. Order from LC. Mi \$2.40, ph \$3.30. PB 118390

A method is presented in this paper whereby the real part of the dynamic moment coefficient may be obtained from a flutter test on a single blade oscillating in torsion alone in the stall region. These data may be used to predict the critical flutter

velocity and frequency of a blade with the same geometrical properties oscillating with two degrees of freedom and having arbitrary elastic and inertial properties. It is possible that the present method can be used to predict the flutter speed and frequency of a cantilever blade by either a representative section or a Rayleigh-type analysis. Report 354-1. OSR TN 55-98. Contract AF 18(600)-1372.

Proceedings of the AGARD general assembly. Advisory Group for Aeronautical Research and Development. Order separate parts described below from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

Third, London, Sep 7 and 10, 1953. Sep 1953. 113p photos, drawings, diags, graphs.

PB 117374

AG 6/P3. Some articles in French. Contents: Role of research and development in aviation during the last ten years, by Sir Harry Garner. - Some tasks for AGARD, by O. H. Wansbrough-Jones. - Review of icing research, by E. A. Brunn. - Thoughts on future noise suppression research, by E. J. Richards. - Structural effects of aerodynamic heating on aircraft structures, by N. J. Hoff. - Foundations of operational research, by Theodore von Karman. - Operational research, by E. G. Dickins. - Aeromedical interests, looking forward, by O. O. Benson, Jr. - Examples of NATO exchange of scientific personnel, by M. Brull. - A tour of Western Europe, April 1953, by L. H. G. Sterne. - Appendix I: Thermal conditions associated with aircraft in flight, by Martin Bloom. - Appendix II: Simulation of aerodynamic heating in structural testing, by Joseph Kempner. Prepared under Contract AF 33(616)-116.

Fourth, 5 and 6 May 1954, Scheveningen, The Netherlands. 1954. 153p photos, drawings, diags, graphs. PB 118068

AG 14/P5. Contents: Greetings. - Aeronautical research in the Netherlands, by H. J. Van der Maas. - Human factors in aircraft design, by Morley Gray Whillans. - Subjective experiences and reactions during flight: Testing in the transonic region, by Roger Carpenter, W. J. Potocki, Neville Duke, Charles Yeager, Scott Crossfield. - Low temperature operation of aircraft, by R. M. Aldwinckle. - Use of personal equipment in Arctic survival, by F. Vogt Lorentzen. - Some problems in Canadian aeronautical research and development, by D. C. MacPhail. - Some aspects of the light interceptor problem, by Sergio Stefanutti. - Selected aerodynamic problems of high-speed flight, by K. E. van Every. - Laminarisation through boundary layer control, by G. V. Lachmann. - Airworthiness requirements, by Lucio Lazzarino. - Some aspects of aeronautical research, by Pol Duwez. - Airborne electronic equipment, by M. Desirant. - Some studies of laboratory management, by Herbert

A. Shepard. - The Advisory Group for Aeronautical Research and Development and its place in NATO.

Soluzioni generali di problemi di ottimo in vols non-stazionario (General solutions of optimum problems in nonstationary flight), by Angelo Miele. Oct 1955. 25p graphs, table. Order from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 118753

A general method concerning optimum problems in nonstationary flight is developed and discussed. Various conditions of flight in a vertical plane (climb with minimum time, climb with minimum fuel consumption, steepest climb, descending and gliding flight with maximum time of space) are studied; the corresponding best techniques of flight, that is, the optimum speed-height relationships, are determined. Translated by A. Miele from L'Aerotecnica, v. 32, no. 3, 1952, p. 135-142. NACA TM 1388.

Zero-lift drag of full and half-models of a body of revolution at M = 1.6, by J. A. van der Bliek. Canada. National Aeronautical Establishment. May 1955. 32p photos, drawings, diagr, graphs, tables. Order from LC. Mi \$3, ph \$6.30. PB 118732

The zero-lift drag of full and half-models of a body of revolution was measured in the N.A.E. 10 x 10 inch and the 30 x 16 inch wind tunnels at M = 1.6 and Re = 2.8 to 6 million. Different methods of boundary-layer flow visualization and artificial transition were utilized. With a half-model the effect of tunnel wall boundary-layer shim thickness was investigated. NAEC LR 139.

Marine Transportation

Development of a basin for investigation of the seaworthiness of model seaplane hulls, by E. F. Schulz. Colorado Agricultural and Mechanical College. Dept. of Civil Engineering, Fort Collins, Colo. Mar 1954. 50p photos, diagrs, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118762

The conversion of a round 85-ft diameter outdoor pond to a facility for testing model seaplanes and ships in oblique seas is described. Calibration curves for the wave generator, wave profile recorder and convection tube are included. Report no. 54 EFS 11. Contract NOas 52-1077-C.

Development of functions associated with surface waves over an inclined bottom, by Hans Lewy. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Sep 1954. 25p. Order from LC. Mi \$2.70, ph \$4.80. PB 118293

1. Mathematical equations and solutions 2. Waves,

Ocean - Mathematical analysis 3. Harmonic functions 4. SU AMSL TR 26 5. Contract Nonr-255(11), (NR-041-086).

Engineering analysis of cargo handling. Part II: Field study of 1953, by Robert Bromberg, R. R. O'Neill, and C. J. Vogt. California. University. Dept. of Engineering, Los Angeles, Calif. Nov 1954. 69p diagrs, graphs, tables (1 fold). Order from LC. Mi \$3.90, ph \$10.80. PB 118631

The results of a field study of the time required to load or unload general mixed cargo are presented along with a description and an evaluation of the work-sampling method used to obtain the data. Several correlations between the handling time and physical dimensions of the cargo, ship, and terminal were obtained. One of the highest correlations existed between the time required to stow the cargo and the weight and volume of the individual units. Report 55-2. Contract Nonr-233(07).

Experimental determination of pressures exerted by waves on a rigidly supported box of small draft, by K. E. Beebe. California. University. Institute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Nov 1954. 9p graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118572

The purpose of this study was to measure the pressures exerted by long crested, deep-water waves, normally incident on a horizontal rigid plate of finite length. This plate was approximated by the bottom of a box whose draft was such that it was just greater than half of the wave height of the maximum incident wave. Wave height, period, and pressures were measured and the results summarized in graphical and tabular form. UC IER Series 61, Issue 8. Contract Nonr-222(18), NR 084-079.

Experimental water tunnel at the Pennsylvania State College. Pennsylvania State College. School of Engineering. Ordnance Research Laboratory, State College, Pa. Apr 1948. 44p photos, diagrs, graphs. Order from LC. Mi \$3.30, ph \$7.80. PB118773

The experimental water tunnel at the Pennsylvania State College was built for studies of the flow in water tunnel components, in order to obtain information for the design of a large, high-speed water tunnel. This report describes the hydraulic circuit, the test sections, the instrumentation, and the research program of the experimental tunnel. The first part of the report is an introduction which describes briefly the objectives of the research program and the experimental facility used to accomplish these objectives. The second part is a detailed description of the test apparatus. The final section outlines the test program and presents a few typical results. Serial no. Nord 7958-89. For reports 7958-97, 7958-143 and 7958-246 see PB 118774, PB 118775, PB 118776. Contract Nord 7958-89.

Floating breakwaters in shallow water, by J. J. Stoker, B. Fleishman and L. Weliczker. New York University. Institute for Mathematics and Mechanics, New York, N. Y. Feb 1953. 47p diags, graphs, tables. Order from LC. Mi \$3.30, ph \$7.80. PB 118730

Contents: 1. Theory for floating obstacles in shallow water, by J. J. Stoker. - 2. Effect of a floating rigid body on simple harmonic waves, by B. Fleishman. - 3. Effect of a floating beam with bending flexibility on simple harmonic waves, by L. Weliczker.

1. Breakwaters, Floating 2. Hydrodynamics - Theory 3. Bodies, Floating - Motion - Theory 4. Structures, Marine - Wave force - Theory 5. Waves, Gravity - Theory 6. NYU IMM 192 7. Contract N onr-285(06).

Lake Hefner model studies of wind structure and evaporation. Final report under Contract NObsr-57023, by J. E. Cermak and H. J. Koloseus. Colorado Agricultural and Mechanical College. Dept. of Civil Engineering, Fort Collins, Colo. Order separate parts described below from LC, giving PB number of each part ordered.

Part I, for the period Oct 1951 to Nov 1953. Nov 1953. 159p photos, map, drawings, diags, graphs, tables. Mi \$7.50, ph \$24.30.

PB 118763

Report no. 54JEC20. Index no. NE 120202.
1. Lakes - Models 2. Winds - Lake Hefner
3. Evaporation - Research - Lake Hefner.

Part II, for the period Dec 1953 to Jul 1954. Jul 1954. 128p diags, graphs, tables. Mi \$6.30, ph \$19.80.

PB 118764

Report no. 54JEC22. Index no. NE 120202.
1. Lakes - Models 2. Winds - Lake Hefner
3. Evaporation - Research - Lake Hefner.

Oceanographic survey of the Gulf of Mexico. Annual report for period, 30 Jun 1953 to 30 Jun 1954, by George B. Austin, Jr. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Sep 1954. 26p maps. Order from LC. Mi \$2.70, ph \$4.80. PB 118412

A & M Project 24-A: Oceanographic survey of the Gulf of Mexico. Reference 54-59P.
1. Oceanography - Gulf of Mexico 2. Contract N7-onr-487, T. O. II, Project NR083 036.

On the transverse strength of tankers, by Erik Steneroth. Sweden. Kungl. Tekniska Högskolan, Stockholm. 1955. 116p drawings, diags, graphs, tables (1art fold). Order from LC. Mi \$6, ph \$18.30. PB 118578

The effect of shear deflection of the transverses is investigated. This effect is considerable as regards

the bending moment distribution in transverse frameworks. The investigations presented in this paper apply to tankers having two equal transverse frameworks symmetrically located in each tank compartment. Mechanical engineering series vol. 3, no. 5. Sweden. Kungl. Tekniska Högskolans Handlingar nr. 90. Acta polytechnica 169.

Performance of a cathodic protection system, by L. J. Waldron and H. M. Peterson. U. S. Naval Research Laboratory. Order separate reports described below as indicated, giving PB number of each part ordered.

LST 532, Apr 1953-Apr 1955. Sep 1955. 5p graph, tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118288

An uncontrolled magnesium-anode cathodic-protection system installed on the LST 532 from April 1953 to April 1955 provided almost 100 percent protection from corrosion. As presently designed, the anodes must be renewed at 12- to 15-month intervals. NRL R 4637.

USS Ingraham (DD 694) Dec 1953 - Jan 1955. Sep 1955. 8p graphs. Order from OTS. 50 cents. PB 111742

The cathodic protection system installed on the USS Ingraham in December 1952, and renewed in December 1953, has proved over the 2-year period to be almost 100% effective in eliminating corrosion of the underwater hull, and approximately 90% effective in eliminating corrosion of the rudders, shafts, and struts. The reduction of corrosion in sea chests and other hull openings was particularly striking. NRL R 4636.

USS Sumner (DD 692) Dec 1953-Jan 1955. Sep 1955. 6p graphs. Order from LC. Mi \$1.80, ph \$1.80. PB 118289

A cathodic protection system installed on the USS Sumner in September 1952 has proved to be highly effective in reducing underwater corrosion over a 29-month period. Current for the cathodic protection system was furnished by 24 magnesium anodes, 12 on each bilge keel, supplemented by a graphite impressed-current anode attached to the centerline forward of the propellers. At the January 1955 dry-docking, the magnesium anodes were found to have been consumed at a somewhat lower rate than for the previous 15-month period. There was some surface rust where paint had peeled from the underwater hull and a somewhat greater amount of general corrosion on exposed portions of the rudders, shafts, and struts. No severe pitting was evident. NRL R 4635.

Several questions on the dynamics of ocean currents, by V. B. Shtokman. Translated by Leslie Brown. Dec 1954. 20p table. Order from LC. Mi \$2.40, ph \$3.30. PB 118759

Investigates the influence of a latitudinal change of the Coriolis parameter on the distribution of integrated currents and density in a middle cross section of an ocean of elongated form lying parallel to the wind. It is shown that the influence of latitudinal change of the Coriolis parameter is not great for small transverse dimensions of inland seas. At the conclusion of the work a qualitative appraisal of the thickness of the baroclinic layer is given, within whose limits exists circulation caused by the wind. Technical report under Contract N6 onr-27701, NR 083-004. Translated from *Izvestiya Akademii Nauk, SSSR, seriya geofizicheskaya*, no. 1, 1953, p. 69. WHOI Ref 54-90.

Study of the sediment transport in alluvial channels, by James R. Barton and Pin-Nam Lin. Colorado Agricultural and Mechanical College. Dept. of Civil Engineering, Fort Collins, Colo. Mar 1955. 106p photos, diags, graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 118765

Thirty seven runs were made during a testing period of about six months and an analysis of the resulting data included information on the following topics: (1) The roughness of an alluvial channel. (2) The von Kármán constant which is closely related to the velocity distribution. (3) The sampling efficiency involved in determining the amount of sediment moving through a given cross section of the flow. (4) The distribution of suspended sediment. The data involved in topic (4) have not been completely analyzed and therefore the results do not appear in this report, but will be made available later. Report no. 55 JRB2. Contract DA 25-075-eng-2632.

Tests of twenty related models of V-bottom motor boats, E.M.B. series 50, by Kenneth S. M. Davidson and Anthony Suarez. Stevens Institute of Technology. Experimental Towing Tank, Hoboken, N. J. Revised. Mar 1949. 107p diags (part fold), graphs, tables. Order from LC. Mi \$5.70, ph \$16.80. PB 118522

Report no. 170, Revised. Report R-47.
1. Motor boats - Tests 2. Contract N171S 50126
3. Contract N171S-54701 4. DWTMB R-47.

Water levels accompanying Atlantic Coast hurricanes, by Alfred C. Redfield and A. R. Miller. Woods Hole Oceanographic Institution, Woods Hole, Mass. Jun 1955. 26p diags, graphs, table. Order from LC. Mi \$2.70, ph \$4.80. PB 118433

The purpose of this report is to describe the abnormal elevations of the sea surface which accompany hurricanes which cross the eastern coast of the United States from the sea. It is based on an examination of data recorded for the hurricanes of September 21, 1938; September 14-15, 1944; August 31, 1954 (Carol); September 11, 1954 (Edna); and October 15, 1954 (Hazel). Unpublished manuscript.

Prepared at the request of the U. S. Weather Bureau. WHOI Ref 55-28. Contract N6 onr-27701.

Water tunnel diffuser flow studies. Part II: Experimental research, by J. M. Robertson and Donald Ross. Pennsylvania State College. School of Engineering. Naval Ordnance Laboratory, State College, Pa. Jul 1949. 54p photos, drawing, diags, graphs, tables. Order from LC. Mi \$3.60, ph \$9.30. PB 118775

The present report summarizes the experimental study made of diffuser flow and presents the procedure used for the design of the water tunnel diffuser. Serial no. NOrd 7958-143. For reports 7958-89, 7958-97, 7958-246 see PB 118773, PB 118774, PB 118776. Contract NOrd 7958-143.

Water tunnel working section flow studies. Pennsylvania State College. School of Engineering. Jun 1948. 33p photo, diag, graphs, table. Order from LC. Mi \$3, ph \$6.30. PB 118774

Serial no. NOrd 7958-97. For reports 7958-89, 7958-143 and 7958-246 see PB 118773, PB 118775 and PB 118776.

1. Water tunnels - Flow - Research 2. Flow, Fluid - Theory 3. Flow, Fluid - Measurement
4. Water tunnels - Equipment - Design.

MISCELLANEOUS

Calibration of the weights in balances with automatic weight loading, by G. A. Bell. Australia. Commonwealth Scientific and Industrial Research Organization. National Standards Laboratory. 1955. 10p tables. Order from LC. Mi \$1.80, ph \$1.80. PB 118384

A method is described for the calibration of built-in weights in a precision balance which permits the various combinations of weights used to be evaluated with an order of accuracy comparable with the precision of reading of the balance. AUS CSIR NSLTP 6.

Cost of municipal services in residential areas, by William L. C. Wheaton and Morton J. Schussheim. U. S. Housing and Home Finance Agency. 1955. 110p tables. Order from OTS \$2. PB 111652

Report is based on research and studies conducted by the Dept. of Regional Planning of Harvard University, under contract with the U. S. Housing and Home Finance Agency. The studies were directed towards development of a technique to help measure the long-term costs of municipal services in different types of areas. Three representative suburban communities in Massachusetts (Natick, Wayland, and Newton) were analyzed in

detail to ascertain capital and operating costs of assumed additional residential growth of 500 or 1000 houses in two or more locations and at several densities. The project had the cooperation of numerous municipal and state officials serving the communities studied.

How to make and interpret locational studies of the housing market, by Maurice R. Brewster, William A. Flinn, and Ernest H. Jurkat. U. S. Housing and Home Finance Agency. 1955. 72p maps, graphs, tables. Order from OTS. \$1. PB 111653

Report is based on research conducted jointly by the U. S. Housing and Home Finance Agency and the State Engineering Experiment Station, Georgia Institute of Technology. The pilot area chosen for study was the urban area of Atlanta, Ga., which presented problems considered to be representative of those likely to be met in evaluation of housing location. To check the validity of the approach used, a similar study was made of the Philadelphia area, a metropolitan area of a different size and in a different section of the country.

Lectures on the theory of industrial sampling. Technical report IV under Contracts Nos. DA-30-069-ORD-1257, and N6ori-201, T. O. I, by J. H. Curtiss. New York University. Institute of Mathematical Sciences. Apr 1955. 152p. Order from LC. M1 \$7.50, ph \$24.30. PB 118768

These lectures were given to graduate students at New York University during the fall term of the academic year 1953-54. The aim of the course was to discuss the theory and rationale of modern industrial sampling procedures. Supersedes Technical report II prepared under Contracts nos. DA-30-069-ORD-1257 and N6ori-201, Task order 1. NYU IMM 216.

Mechanization of coordinate indexing. Documentation, Inc., Washington, D. C. Sep 1954. 18p tables. Order from LC. M1 \$2.40, ph \$3.30. PB 118318

Technical report no. 6.
1. Indexing (Machine) 2. Contract Nonr 1305(00).

Rates of growth of some intertidal gastropoda as a function of latitude. Terminal report, by Paul A. Dehnel. California, University. Dept. of Zoology, Los Angeles, Calif. Apr 1954. 15p. Order from LC. M1 \$2.40, ph \$3.30. PB 118417

Project no. ONR-76.
1. Gastropods - Growth 2. Plankton - Growth
3. *Crepidula nummaria* - Growth 4. *Thais emarginata* - Growth 5. *Lacuna carinata* - Growth.

Report on Raroia Atoll-expedition. National Research Council. Pacific Science Board, Washington, D. C. Nov 1954. 364p maps (1 fold), photos,

diagrams, graphs, tables (1 fold). Limited supply available from Pacific Science Office, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. PB 118543

Scientific investigations in Micronesia, no. 20. Originally issued as Atoll Research Bulletins 31-36. Contents: Expedition to Raroia, Tuamotus, by Norman D. Newell. - Raroian culture, by Bengt Danielson and Aurora Natua. - Floristics and plant ecology of Raroia atoll, Tuamotus, by Maxwell S. Doty, Jan Newhouse, Harvey A. Miller and Kenneth Wilson. - Animal ecology of Raroia Atoll, Tuamotus, by J. P. E. Morrison. - Interrelationships of the organisms on Raroia aside from man, by Maxwell S. Doty and J. P. E. Morrison. - Reefs and sedimentary processes of Raroia, by Norman D. Newell. Contract N7 onr-291(04), NR 388-001.

Scientific and technical societies of the United States and Canada, 6th edition. National Research Council. 1955. 441p. Order from NAS-NRC Publications Office, 2101 Constitution Ave., N. W., Washington 25, D. C. \$7.50. PB 118241

1. Technical societies - Directories 2. Scientific research - Institutions - Directories 3. Institutions - Directories 4. NRC 369.

Social effects of bombing, by Fred C. Ikle. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jul 1953. 269p maps, graphs, tables (1 fold). Order from LC. M1 \$9.25, ph \$34. PB 117992

This study presents an overall treatment of the social effects of bombing from a "socio-demographic" point of view. Housing destruction, and its relationship to the various socio-demographic components of an urban complex, is the case around which the work is centered. AAF HRRJ TRR 17. Contract AF 33(038)-14313.

What people want when they buy a house, by Edward T. Paxton. U. S. Housing and Home Finance Agency. 1955. 133p tables. Order from OTS. \$3. PB 111654

A comprehensive report on the considerations which influenced the selection and purchase of single-family houses by 1,000 home-buyers in representative urban areas throughout the country in a selected period of 18 months. The report is based principally on a survey conducted by the Survey Research Center of the University of Michigan, under contract with the Housing and Home Finance Agency. It also contains material from a study by the Small Homes Council of the University of Illinois, the Materials Use Survey of HHFA, and Bureau of Labor Statistics surveys of characteristics of housing in various metropolitan areas.

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

Growth and accumulation of radioactivity in plants grown on "fission fall out" contaminated soil, by William G. Long, S. H. Wittwer, and H. B. Tukey. Michigan State College. Jun 1955. Contract No. AT (11-1)-159. 9p. Order from OTS. 15 cents. AECU-3039

Proposed new method of wholesaling fresh meat based on pasteurization by gamma irradiation, by L. E. Brownell, J. V. Nehemias, and J. J. Bulmer. Engineering Research Institute. University of Michigan. Dec 1954. Contract No. AT (11-1)-162. 31p. Order from OTS. 25 cents. AECU-3043

The design of a gamma irradiation facility for the control of insect infestation in flour, meal, or grain, by L. E. Brownell, J. V. Nehemias, and J. J. Bulmer. Engineering Research Institute. University of Michigan. May 1955. Contract No. AT (11-1)-162. 23p. Order from OTS. 25 cents. AECU-3050

The analytical procedures of the Bioassay Group at the Argonne National Laboratory, by Jack Schubert, Lawrence S. Myers, Jr., and Jean A. Jackson. Argonne National Laboratory. Mar 1951. Contract W-31-109-eng-38. 23p. Order from OTS. 25 cents. ANL-4509

The uptake and translocation of cesium by plants, by J. H. Rediske and A. A. Selders. Hanford Atomic Products Operation, Richland, Washington. Sep 1953. Contract No. W-31-109-eng-52. 19p. Order from OTS. 20 cents. HW-35174

Recommended practices for uranium finishing, by William B. Harris. New York Operations Office. May 1951. 15p. Order from OTS. 20 cents. NYO-1516

Standard procedures for assessing average daily air contaminant exposures, by Paul B. Klevin and

William B. Harris. Health and Safety Laboratory. New York Operations Office. May 1955. 12p. Order from OTS. 15 cents. NYO-4644

Paper electrophoretic studies of radioactive chromium salts in blood, by D. B. Zilversmit, W. J. Visek, and C. L. Comar. University of Tennessee. Mar 1955. Contract No. AT(40-1)-GEN-242. 10p. Order from OTS. 15 cents. ORO-136

Chemistry and Chemical Engineering

Separation and preparation of samples for spectrographic analysis of uranium base materials, by R. L. Barnard, C. J. Rodden, and J. P. Williams. U. S. National Bureau of Standards, Washington, D. C. Sep 1955. 7p. Order from OTS. 15 cents. AECD-3662

Radiochemical separations by isotopic exchange. A rapid, high decontamination method for silver, by Duane N. Sunderman and W. Wayne Meinke. Dept. of Chemistry. University of Michigan. Jan 1955. Contract No. AT(11-1)-70. 7p. Order from OTS. 10 cents. AECU-2988

Thermal neutron fission cross section of Pu²⁴¹, by A. H. Jaffey, M. H. Studier, P. R. Fields and W. C. Bentley. Argonne National Laboratory. Mar 1955. Contract W-31-109-eng-38. 15p. Order from LC. Mi \$2.40, ph \$3.30. ANL-5397

Thermionic properties of uranium, by E. G. Rauh and R. J. Thorn. Argonne National Laboratory. Aug 1955. Contract W-31-109-eng-38. 6p. Order from OTS. 15 cents. ANL-5475

The hydrolysis of the compound of potassium with irradiated graphite, by W. L. Primak and L. A. Quarterman. Argonne National Laboratory. Sep 1955. Contract W-31-109-eng-38. 6p. Order from OTS. 15 cents. ANL-5481

- Inner-complex compounds of alicyclic vic-dioximes, by Roger C. Voter and C. V. Banks. Ames Laboratory. Jun 1951. Contract No. W-7405-eng-82. 69p. Order from OTS. 40 cents. ISC-230
- Activity coefficients of aqueous methanol solutions, by William S. Brown and Don S. Martin. Ames Laboratory. Jun 1951. Contract No. W-7405-eng-82. 28p. Order from OTS. 25 cents. ISC-235
- Manganese(II), (III), (IV) equilibrium in iodic acid, by Glenn R. Waterbury and Don S. Martin, Jr. Ames Laboratory. Jun 1952. Contract No. W-7405-eng-82. 72p. Order from OTS. 45 cents. ISC-238
- Magnetic studies of nickel complexes with some vic-dioximes, by Roy William Vander Haar and Charles V. Banks. Ames Laboratory. Jun 1952. Contract No. W-7405-eng-82. 80p. Order from OTS. 45 cents. ISC-250
- Conductances, transference numbers and activity coefficients of some rare earth halides, by I. Sanford Yaffe and F. H. Spedding. Ames Laboratory. Jun 1952. Contract No. W-7405-eng-82. 112p. Order from OTS. 60 cents. ISC-278
- Performance of a pulse extraction column, by R. M. Cohen and G. H. Beyer. Ames Laboratory. Dec 1952. Contract No. W-7405-eng-82. 42p. Order from OTS. 30 cents. ISC-294
- Conductances, transference numbers, and activity coefficients of some rare earth chlorides in aqueous solution, by James L. Dye and F. H. Spedding. Ames Laboratory. Jun 1953. Contract No. W-7405-eng-82. 119p. Order from OTS. 55 cents. ISC-355
- The preparation, purification and some analytical applications of α , β , γ , δ -tetraphenylporphine, by John Howard Priesthoff and Charles V. Banks. Ames Laboratory. Jun 1953. Contract No. W-7405-eng-82. 42p. Order from OTS. 30 cents. ISC-358
- Kinetics of the reaction between lithium and water vapor, by Bruce E. Deal and H. J. Svec. Ames Laboratory. Jul 1953. Contract No. W-7405-eng-82. 32p. Order from OTS. 25 cents. ISC-390
- A theoretical study of the electronic structure of water, by Frank O. Ellison and Harrison Shull. Ames Laboratory. Jan 1954. Contract No. W-7405-eng-82. 119p. Order from OTS. 60 cents. ISC-418
- Mechanism of hindered settling and fluidization, by Albert L. Loeffler, Jr. and B. F. Ruth. Ames Laboratory. Dec 1953. Contract No. W-7405-eng-82. 64p. Order from OTS. 40 cents. ISC-468
- A titrimetric determination of thorium, by John J. Ford and James S. Fritz. Ames Laboratory. Jun 1954. Contract No. W-7405-eng-82. 47p. Order from OTS. 35 cents. ISC-520
- Ames Laboratory analytical procedures for determination of impurities in calcium metal, by Charles V. Banks and Bernard D. LaMont. Ames Laboratory. Mar 1955. Contract No. W-7405-eng-82. 17p. Order from OTS. 20 cents. ISC-584
- The infrared spectra of aromatic compounds. III. The 1045 - 1185 cm^{-1} vibration in monosubstituted benzenes. Ames Laboratory. Jul 1955. Contract W-7405-eng-82. 10p. Order from LC. Mi \$1.80, ph \$1.80. ISC-620
- An infrared study of picric acid molecular complexes, by Robert D. Kross and Velmer A. Fassel. Ames Laboratory, Iowa State College. Jul 1955. Contract W-7405-eng-82. 20p. Order from LC. Mi \$2.40, ph \$3.30. ISC-621
- The infrared spectra of aromatic compounds. II. Evidence concerning the interaction of π -electrons and σ -bond orbitals in C-H out-of-plane bending vibrations, by R. D. Kross, V. A. Fassel, and M. Margoshes. Ames Laboratory. Jul 1955. Contract W-7405-eng-82. 20p. Order from LC. Mi \$2.40, ph \$3.30. ISC-625
- A correlation of bond length with stretching frequency for carbon-oxygen and carbon-nitrogen systems, by E. Miller Layton, Jr., Robert D. Kross, and Velmer A. Fassel. Ames Laboratory. Aug 1955. Contract W-7405-eng-82. 21p. Order from LC. Mi \$2.70, ph \$4.80. ISC-633
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- PB 111731 Scaling of Titanium and Titanium Alloys. University of Kentucky for Wright Air Development Center, March 1955, 137 pages, \$3.50.
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