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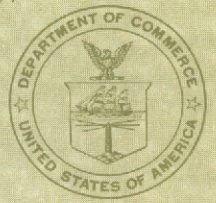
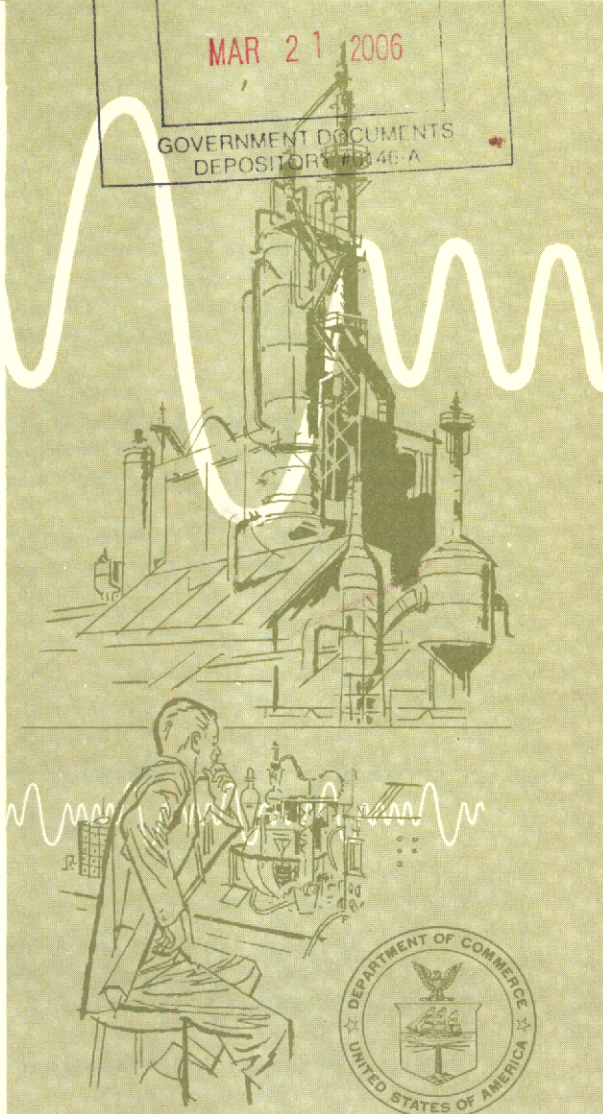
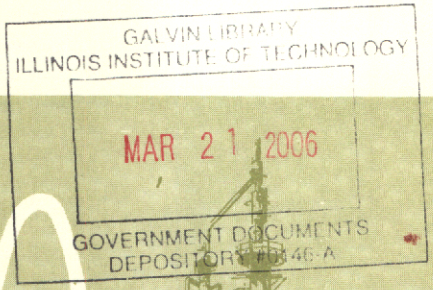
April 15, 1955

Vol. 23, No. 4

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Published with approval of the Director, Bureau of the Budget, Sept. 29, 1952.

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**CARTOGRAPHY**

Cartographic drafting methods and equipment (Plastic scribing process). Second interim report, by William C. Mahoney. U. S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Jan 1954. 85p photos, drawings, fold map, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 116576

This report covers the development, design and evaluation of a plastic scribing process suitable for Army field topographic units. Tests were made to determine the most suitable coated plastic material, and to develop scribing instruments for scribing on plastics. Project 8-35-02-004. ERDL R 1339.

**CHEMICALS AND ALLIED PRODUCTS****Drugs and Pharmaceuticals**

Properties of enzymatic systems, a theoretical and experimental study, by Britton Chance. Pennsylvania. University, Philadelphia, Pa. Jan 1954. 9p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116302

An experimental study of the nature of labile intermediates in enzyme action combined with the theoretical study of how such intermediates should act according to various theories of physical chemistry. Contract Nonr-23600, NR 123-053.

**Other Organic Chemicals**

Biochemistry and organic synthesis of purine and pyrimidine analogs. Annual progress report, Mar 1, 1953 to Dec 31, 1953, under Contract Nonr 1058(00), NR 122-235, by George W. Kidder and D. G. Markees. Amherst College, Amherst, Mass. Jan 1954. 5p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116493

1. Purines - Synthesis 2. Pyrimidine - Derivatives - Synthesis.

I. Determination of dielectric properties under constant volume conditions, by Andrew Gilchrist. II. On the analysis of dielectric relaxation measurements, by Robert H. Cole. III. Dielectric constants of liquid and solid hydrogen sulfide, by Stephen Havriliak, Richard W. Swenson, and Robert H. Cole. Brown University. Metcalf Research Laboratory, Providence, R. I. Mar 1954. 47p diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116332

In Part I, the complex dielectric constant of glycerol has been determined as a function of frequency (15 c.p.s. to 5 Mc.p.s.), temperature (-40°C to -60°C), and pressure (0-15,000 p.s.i.) Description of the apparatus includes the design of a thermostat which may be kept to within 0.01°C at any temperature in the range -40°C to -60°C. In Part II, convenient methods of analyzing dispersion and loss satisfying the Debye equations are described and illustrated, and interpretations for glycols are discussed. In Part III, the equilibrium dielectric constants of hydrogen sulfide show a regular increase with decreasing temperature which is in moderate agreement with Onsager's equation. Technical report no. 2 under Contract Nonr-562(03), NR-051-284.

Energy distribution in luminescence spectra of organic compounds. Progress report, Sep 1, 1952 to Jan 31, 1953, under Contract no. N6onr-231, T. O. 12, by Frank E. E. Germann. Colorado. University. Dept. of Chemistry, Boulder, Colo. Jan 1953. 7p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116479

1. Chemical compounds, Organic - Luminescence
2. Chemical compounds, Organic - Radioactivity
3. Spectrographic analysis - Instruments.

Micelle formation and solubilization in nonaqueous solvents, by Curtis R. Singleterry. U. S. Naval Research Laboratory. Dec 1954. 17p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116567

Association colloids of the type designated as micelles are formed in nonpolar solvents by alkali, alkaline earth, and certain heavy metal salts of suitable carboxylic, sulfonic, and phosphorus acids, and also of some phenolic compounds, as well as by some nonionic surfactants. The existence and the physical characteristics of micelles in nonaqueous systems may be investigated by observations of their osmotic properties, viscometric behavior, streaming birefringence, light scattering, or fluorescence depolarization. NRL R 4460.

## Agricultural Chemicals

Attraction of flying insects to surfaces treated with residual insecticides. Annual progress report, 1 Jan 1953 to 31 Dec 1953, under Contract N8onr-60000, by Robert J. Dicke, Merlin Schwertfeger, and Glenn Haas. Wisconsin. University. Dept. of Entomology, Madison, Wis. Feb 1954. 13p photos, drawings, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111573

Description of equipment and test data presented. A number of culture media and species were investigated and tests were based upon control of odors associated with host detection, sexual response and oviposition.

## Plastics and Plasticizers

Direct resin filling materials: Coefficient of thermal expansion and water sorption of polymethyl methacrylate, by E. Ernest Rose, Joginder Lal, Richard Green, and John Cornell. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Nov 1954. 11p photo, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116588

The coefficient of thermal expansion of polymethyl methacrylate resin decreases with the addition of various inorganic fillers; a reduction in the increase

in weight due to water sorption of the resin also takes place with the addition of fillers. The greater the amount of filler added to the direct filling resin, the greater is the reduction in the coefficient of thermal expansion and gain in weight due to water sorption. Addition of cross-linking material to the direct filling resin does not significantly change the water sorption properties of the resin; change of pH likewise has no noticeable effect on water sorption. AAF SAM Proj 21-1603-0002, Report no. 1.

German plastics industry during the period 1939-1945, by N. J. L. Megson and H. J. E. Poupard. British Intelligence Objectives Subcommittee. 1954. 176p photos, drawings (3 fold), tables Available from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. \$1.40. PB 116434

S. O. code no. 51-283-34.

1. Plastics industry - Germany
2. Plastics - Manufacture - Germany
3. Resins, Synthetic - Manufacture - Germany
4. BIOS OR 34.

Keramische hochfrequenz-kondensatoren (Ceramic high frequency condensers), by H. Handrek. Nov 1951. 12p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 113751

Royal Aircraft Establishment, library translation no. 382. Translated from Archiv fur Technisches Messen, Aug 1936, ZI 36-1, by R. C. Murray.  
1. Ceramic materials - Electrical properties - Germany  
2. Capacitors, Ceramic dielectric - Properties - Germany  
3. Capacitors, High frequency - Germany.

## Paints, Varnishes and Lacquers

Abrasion resistance characteristics of vinyl alkyds vs. lacquers and other coatings for hull bottoms, by E. G. Peattie. U. S. Naval Air Material Center. Aeronautical Materials Laboratory, Philadelphia, Pa. Jul 1953. 30p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116593

Report covers tests run on hull bottom finishing systems using a high speed whirling disk tester. The best hull bottom finish was found to be a vinyl alkyd over a vinyl primer over wash primer. Surface pretreatments were found to be helpful in raising the adhesion at seams and rivets. Certain application instructions are given. NAM AML 4286, Part 10.

Evaluation of coating systems after desert exposures (Test no. 16, Yuma Test Station, 1952-1953 period), by Stanley Firestone. U. S. Squier Signal Laboratory, Fort Monmouth, N. J. May 1953. 18p photos, tables Available from Library of Congress, Publication Board Project, Washing-



ton 25, D. C. Microfilm \$2.00, Photocopy \$2.75.  
PB 116594

Photos will not reproduce well. Dept. of the Army project: 3-93-00-500, Signal Corps project no. 2005B.

1. Coatings - Tests 2. SCEL TM-1506.

Inspection of experimental antifouling shipbottom paint on VTB 261, USS Bobolink, and USS Hornbill, by Hing Dear. U. S. Mare Island Naval Shipyard, Paint Laboratory, Vallejo, Calif. May 1953. 23p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116592

MINS Test no. 302. Report of erosion resistance of formula 16X.

1. Paints, Antifouling - Tests 2. Ships - Bottoms - Coatings 3. 16X (Paint).

Tests on the relative efficiency of chromate pigments in anti-corrosive primers, by H. G. Cole. Gt. Brit. Royal Aircraft Establishment, Farnborough, England. Nov 1953. 20p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116591

Seawater spray corrosion tests have been made on two magnesium alloys, aluminum alloy and mild steel, painted with primers made from eighteen chromate pigments incorporated in turn in a litho-oil/coumarone medium. Best all round protection was given by zinc monooxy chromate, calcium chromate and strontium chromate, and good protection by potassium zinc chromate (zinc yellow) and zinc tetroxy chromate. Four complex cadmium chromes and three lead chromates gave poor results. Of the zinc and alkaline earth pigments, those giving best protection were of intermediate solubility. RAE TN Met 185.

## Inorganic Chemicals

Barium titanate and related crystal growth. Harshaw Chemical Co., Cleveland, Ohio. Contract no. DA-36-039-sc-15493. Dept. of the Army project no. 3-99-15-022. Signal Corps project no. 44-152B. Continues work done under Contract no. DA-36-039-sc-74. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Interim report number one, Jul 1, 1952 to Sep 30, 1952, by Harry C. Kremers, Harold D. Williams, Robert A. Osteryoung, Richard L. Scott. Sep 1952. 15p tables Microfilm \$2.00, Photocopy \$2.75. PB 116425

1. Crystals, Barium titanate - Growth 2. Barium titanate - Crystal structure 3. SIG Contract DA-36-039-sc-15493, Interim report no. 1.

Interim report number two, Oct 1, 1952-Dec 31, 1952, by Harry C. Kremers, Harold D. Williams, Richard L. Scott. Dec 1952. 14p table Microfilm \$2.00, Photocopy \$2.75. PB 116426

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Synthesis 3. Barium titanate - Crystal structure 4. SIG Contract DA-36-039-sc-15493, Interim report no. 2.

Interim report number three, Jan 1, 1953 to Mar 31, 1953, by Harry C. Kremers, Harold D. Williams, Richard L. Scott. Mar 1953. 14p tables Microfilm \$2.00, Photocopy \$2.75. PB 116427

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Cooling rate 3. Barium titanate - Crystal structure 4. SIG Contract DA-36-039-sc-15493, Interim report no. 3.

Interim report number four, Apr 1, 1953 to June 30, 1953, by Harry C. Kremers, Harold D. Williams, Richard L. Scott. Jun 1953. 17p drawings Microfilm \$2.00, Photocopy \$2.75. PB 116428

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Solubility tests 3. Furnaces, Crystal - Design 4. Barium titanate - Crystal structure 5. SIG Contract DA-36-039-sc-15493, Interim report no. 4.

Interim report number five, Jul 1, 1953 to Sep 30, 1953, by Harry C. Kremers, Harold D. Williams, Michael Hacskaylo. Sep 1953. 18p photos, tables Microfilm \$2.00, Photocopy \$2.75. PB 116429

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Electrical properties 3. Furnaces, Crystal - Design 4. SIG Contract DA-36-039-sc-15493, Interim report no. 5.

Interim report number six, Oct 1, 1953 to Dec 1, 1953, by Harry C. Kremers, Harold D. Williams, Michael Hacskaylo. Dec 1953. 19p photos, drawings, tables Microfilm \$2.00, Photocopy \$2.75. PB 116430

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Electrical properties 3. SIG Contract DA-36-039-sc-15493, Interim report no. 6.

Interim report number seven, Jan 1, 1954-Mar 31, 1954, by Harry C. Kremers, Harold D. Williams, Michael Hacskaylo. Mar 1954. 11p photos, tables Microfilm \$2.00, Photocopy \$2.75. PB 116431

1. Crystals, Barium titanate - Growth 2. Crystals, Barium titanate - Electrical properties 3. SIG Contract DA-36-039-sc-15493, Interim report no. 7.

Final report. Review of entire program, Jul 1, 1946 to Oct 31, 1954, including interim report,

May 1, 1954 to Oct 31, 1954, under Contracts W-36-030-sc-32368, Jul 1, 1946-Jun 20, 1948; W-36-039-sc-38180, Nov 1, 1948-Oct 31, 1950; DA-36-039-sc-74, Nov 1, 1950-Jun 30, 1953, DA-36-039-sc-15493, Jul 30, 1952-Oct 31, 1954, by Harry C. Kremers, Harold D. Williams, Michael Hacskaylo. Oct 1954. 56p photos, drawing, graphs, tables Microfilm \$3.00, Photocopy \$7.75. PB 116432

1. Crystals, Barium titanate - Growth
2. Crystals, Barium titanate - Electrical properties
3. Crystals, Barium titanate - Activators
4. Crystals, Barium titanate - Synthesis
5. Crystals, Barium titanate - Cooling rate
6. Furnaces, Crystal - Design
7. SIG Contract DA-36-039-sc-15493, Final report.

Investigation to determine the effect of purification of commercial sulfonates on their corrosion-stain property, by Harry C. Muffley and Van Hong. U. S. Arsenal, Rock Island, Ill. Oct 1954. 20p photos, graph, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$ .50. PB 111572

Ordnance project no. TB5-6010 I, Report no. 1. Dept. of the Army project 593-21-055.

1. Sulfonates - Purification
2. Sulfonates - Staining properties
3. RIAL R 54-3559.

Preparation and properties of inorganic hydrides. Technical report no. II, Aug 31, 1951 to Dec 31, 1953, under Contract Nonr-664(00), Project no. NR 356-228, by Albert E. Finholt. St. Olaf College, Northfield, Minn. Mar 1954. 28p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116329

A new procedure has been developed by which alkali metal aluminum hydrides may be prepared. The usual reaction between a metal hydride and an aluminum halide is modified to take place in more than one step. The basic reactions are (1) the reaction between a metal aluminum hydride and an aluminum halide to form aluminum hydride, and (2) the reaction of aluminum hydride with a metal hydride to form a metal aluminum hydride. This cycle may be repeated with a gradual increase in the amount of metal aluminum hydride produced, since the final amount of metal aluminum hydride coming from each cycle is always greater than that originally put in. Sodium aluminum hydride may be produced efficiently and in high yield by this procedure. Lithium aluminum hydride may be made more economically than by the present industrial process if part of the hydrogen comes from sodium hydride in a variation of the new procedure. Accompanied by Reduction of isocyanates and isothiocyanates with lithium aluminum hydride, by A. E. Finholt, Charles Dean Anderson, and C. L. Agre (Reprinted from Journal of organic chemistry, vol. 18, no. 10, Oct 1953, p. 1338-1340) and Reduction of carbon dioxide to formic acid with lithium aluminum hydride, by Albert E. Finholt and Eugene C. Jacobson (Reprinted from Journal of the American Chemical Society, vol. 74, p. 3943-3944).

Quarterly periodic status report under Contract N5ori-07819, NR-092-008, by R. L. Wentworth. Massachusetts Institute of Technology. Hydrogen Peroxide Laboratories. Mar 1954. 11p graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116325

Continuing studies on hydrogen peroxide. Topics include stability of the more dilute solutions, partial oxidation of propane, flame propagation in hydrogen peroxide vapor, heterogeneous vapor phase decomposition, rate of oxidation of hydrogen sulfide by hydrogen peroxide. DIC Project 6552.

Solid state properties and catalytic activity. Eleventh periodic status report, Jan 1, 1954-Mar 31, 1954, under Contract no. N6onr-27018, NR 051-265, by Hugh Taylor. Princeton University. Dept. of Chemistry. Mar 1954. 5p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116327

Reaction of hydrogen with cyclopropane was studied. Also the decomposition of  $SbH_3$  and  $SbD_3$ .

Status report on Contract Nonr 839(09), Project no. NR 051-339, Jan 1 to Mar 1, 1954, by R. A. Marcus. Polytechnic Institute of Brooklyn. Mar 1954. 2p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116348

1. Amines - Reactions
2. Borohydrides - Reactions
3. Boron fluoride - Reactions.

## Analytical Chemistry

Differential thermal analysis of inorganic oxidants: Nitrates, by Saul Gordon and Clement Campbell. U. S. Picatinny Arsenal. Samuel Feltman Ammunition Laboratories, Dover, N. J. Nov 1954. 54p photo, drawings, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116622

Differential thermal analysis has been used to investigate the thermal decomposition of inorganic oxidants, in order to determine and characterize their behavior and reactions at elevated temperatures over the range of ambient to approximately 800°C. Although the curves obtained by this technique are unique and characteristic for the individual compounds, relatively little work has been reported on the use of DTA for this purpose other than in the field of mineralogy. This paper presents the results of a study of inorganic nitrates, together with a description of the instrumentation employed. Differential thermal analysis should be considered a valuable tool for use in conjunction with other techniques, such as high temperature X-ray and electron diffraction and thermogravimetric analysis for the study of reactions at elevated temperatures.

This technique is applicable to investigations of the high temperature reactions of all military high explosives, propellants, pyrotechnics, and primers, which undergo thermal changes during their pre-ignition, ignition, and combustion stages of propagative reaction. Ordnance project TA2-9201. Dent. of the Army project 504-01-027. PA TR 2079.

Quantitative analysis of mixtures of hydrogen sulfide and sulfur dioxide, by Bengt Smith. Chalmers University of Technology, Gothenburg, Sweden. 1954. 20p photo, drawings, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116342

Avd. Kemi och kemisk teknologi 32.

1. Gases - Analysis - Methods - Sweden 2. Hydrogen sulfide - Determination - Sweden 3. Sulfur dioxide - Determination - Sweden 4. Chalmers University of Technology. Transactions no. 150.

Spectrochemical analysis of silicates and oxides, by Charles E. Harvey. American Spectrographic Laboratories, San Francisco, Calif. Contract no. DA-36-039-sc-15441. Dept. of the Army project no. 3-99-15-022. Signal Corps project no. 152B-O. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

First quarterly progress report, Dec 1951-Feb 1952. Feb 1952. 14p tables Microfilm \$2.00, Photocopy \$2.75. PB 116415

1. Mica - Spectrochemical analysis 2. Spectrochemical analysis - Methods 3. SIG Contract DA36-039-sc-15441, Report no. 1.

Second quarterly progress report, Mar 1952-May 1952. May 1952. 6p Microfilm \$1.50, Photocopy \$1.50. PB 116416

1. Mica - Spectrochemical analysis 2. Rubidium - Determination 3. SIG Contract DA36-039-sc-15441, Report no. 2.

Third quarterly progress report, Jun 1952-Aug 1952. Aug 1952. 16p tables Microfilm \$2.00, Photocopy \$2.75. PB 116417

1. Mica - Spectrochemical analysis 2. SIG Contract DA36-039-sc-15441, Report no. 3.

Fourth quarterly progress report, Sep 1952-Nov 1952. Nov 1952. 17p table Microfilm \$2.00, Photocopy \$2.75. PB 116418

1. Fluorine - Determination 2. Mica - Spectrochemical analysis 3. SIG Contract DA36-039-sc-15441, Report no. 4.

Fifth quarterly progress report, Dec 1952-Feb 1953. Feb 1953. 11p table Microfilm \$2.00, Photocopy \$2.75. PB 116419

1. Germanium - Spectrochemical analysis 2. Spectrochemical analysis - Methods 3. SIG Contract DA36-039-sc-15441, Report no. 5.

Sixth quarterly progress report, Mar 1953-May 1953. May 1953. 11p. Microfilm \$2.00, Photocopy \$2.75. PB 116420

1. Silicon - Spectrochemical analysis 2. Germanium - Spectrochemical analysis 3. Mica - Spectrochemical analysis 4. Electrodes - Design 5. SIG Contract DA36-039-sc-15441, Report no. 6.

Seventh quarterly progress report, Jun 1953-Aug 1953. Aug 1953. 7p table Microfilm \$1.50, Photocopy \$1.50. PB 116421

1. Silicon - Spectrochemical analysis 2. Germanium - Spectrochemical analysis 3. Mica - Spectrochemical analysis 4. SIG Contract DA36-039-sc-15441, Report no. 7.

Final report, Sep 1953-Nov 1953. Nov 1953. 14p table Microfilm \$2.00, Photocopy \$2.75. PB 116422

1. Germanium - Spectrochemical analysis 2. Mica - Spectrochemical analysis 3. Spectrochemical analysis - Methods 4. SIG Contract DA36-039-sc-15441, Final report.

## DETERIORATION STUDIES

Mildew-proofing treatments for sandbags, by Joseph M. Ashcroft. U. S. Army. Corps of Engineers. Engineer Research and Development Laboratories, Fort Belvoir, Va. Oct 1951. 25p photos, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111574

This report covers an investigation of the relative effectiveness of copper 8-quinolinolate, copper naphthenate, and partial acetylation, as mildew-resistant treatments for cotton sandbag material. Project 8-91-02-001. ERDL R 1217.

Volatile corrosion inhibitor bibliography, by R. L. Le Mar. U. S. Arsenal, Rock Island, Ill. Sep 1953. 75p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116324

An annotated bibliography developed from trade literature, government sources, and published articles, together with a brief outline of the theory, practice and chemicals involved in the use of these inhibitors. Project no. TB5-1101C, Report no. 5. Dept. of the Army project no. 591-07-001. RIAL R 53-3712.

# ELECTRICAL MACHINERY, EQUIPMENT AND SUPPLIES

## Communication Equipment

Comparaison de recepteurs anglais, swisses et americain pour la mesure des perturbations radioelectriques (Comparison of British, Swiss, and American receivers for reception of radio-electric disturbances), and Mesure de controle du recepteur Stoddart NM20B no. 168-23 (Checking measurements of Stoddart NM20B receiver no. 168-23), by J. Meyer de Stadelhofen and W. Klein. Switzerland. Central Post Office. Telegraph and Telephone Research Testing Laboratory. Mar-Apr 1954. 11p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116338

Research and Testing Laboratory of P.T.T., Report no. 34.54.03, 30 Mar 1954 and Report no. 34.54.04, 7 Apr 1954. Translated by F. Rizzo.  
1. Radio receivers - Tests - Switzerland 2. Interference, Electrical - Measurement - Switzerland  
3. Stoddart receiver 4. NAVSHIPS T565.

Radio interference suppressors. Final report under Contract no. AF 33(038)-9353. Sprague Electric Co., North Adams, Mass. Oct 1954. 107p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 116519

A combination of metallized polyethylene terephthalate film and metallized paper as a composite capacitor dielectric was invented and tested for the purpose of: (a) Further miniaturizing the series of radio interference filters developed under the original portion of this contract through the operating temperature range of  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ . (b) Investigating new magnetic core materials which would prove useful in the reduction in weight and size of suppressors for low frequency applications. (c) Investigating new dielectric materials for applications at  $200^{\circ}\text{C}$  and higher. For first final report under this contract see PB 112016; for progress reports no. 10-12 see PB 112773, 113710, 114439.

## Electronics

Accelerated life program. Sylvania Electric Products, Inc. General Engineering Dept. Radio Division, Emporium, Pa. Contract no. W-36-039-sc-44570. Dept. of the Army project no. 3-19-01-021. Signal Corps project no. 27-302A-1. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Quarterly progress report no. 1, July 1, 1949 to Oct 1, 1949, by N. J. Reitz and R. P. Anderson. Oct 1949. 26p tables Microfilm \$2.25, Photocopy \$4.00. PB 116407

The tube failures under helium pressure testing show an altogether different type of failure than those tubes which failed on life. SIG Contract W-36-039-sc-44570, Report no. 1.

Quarterly progress report no. 2, Oct 1, 1949 to Jan 1, 1950, by N. J. Reitz and R. P. Anderson. Jan 1950. 38p photos, graphs, tables Microfilm \$2.50, Photocopy \$5.25. PB 116408

Disruptive gas-arcs are the main cause of tube failures under JAN-1A long life conventional conditions. This has been the case for all lots of tubes on long life. Indications are that whatever causes the emission to slump also causes the gas-arc failures (and visa versa). It is definite that the condition exists in the coated cathode. SIG Contract W-36-039-sc-44570, Report no. 2.

Quarterly progress report no. 3, Jan 1, 1950 to Apr 1, 1950, by N. J. Reitz and R. P. Anderson. Apr 1950. 25p graphs, tables Microfilm \$2.25, Photocopy \$4.00. PB 116409

Under conditions of increased plate dissipation and increased heater voltage it is shown that life tests of 50 hours duration are equivalent to conventional life tests of 3500 hours. This is a reduction in required time by a factor of 70. It is also shown that the acceleration factor increases exponentially with an increase of heater voltage up to a certain point. Leakage testing into a vacuum tube is indicated to be accelerated by the application of helium gas at high pressure. SIG Contract W-36-039-sc-44570, Report no. 3.

Quarterly progress report no. 4, Apr 1, 1950 to Jul 1, 1950, by N. J. Reitz and R. D. Guild. Jul 1950. 49p graphs, tables Microfilm \$2.75, Photocopy \$6.50. PB 116410

This report demonstrates the validity of accelerated life tests on type 6SN7GT to show emission decay in terms of percent emission survival and on type 50L6GT to show the occurrence of heater burn-out failures. Under conditions of increased plate dissipation and increased heater voltage it is shown that life tests of 50 hours duration are equivalent to conventional life tests of 1000 hours. This is a reduction in required time by a factor of 20. It is also shown that by increasing the plate dissipation only, a true or real accelerated test is not constituted. It appears from the data that the characteristic of trans-conductance for type 6AK5 cannot be accelerated when the observed data is taken at the rated JAN-1A testing conditions. SIG Contract W-36-039-sc-44570, Report no. 4.

Quarterly progress report no. 5, Jul 1, 1950 to Oct 1, 1950, by Charles F. Douglass and R. D. Guild. Oct 1950. 34p graphs, tables Microfilm \$2.50, Photocopy \$5.25. PB 116411

The results of tests on 6SN7GT tubes tested under a standby condition indicate that continuous conduction is required to achieve a true accelerated condition for electron emission at the voltage specified for these tests. Cycling is the more important factor in accelerating these failures.

An increase in heater voltage, of course, is a prime condition. Leakage failures can be analyzed by the logarithmic normal distribution curve. Results on a proposed accelerated test on type 6J6, using 8.3 volts on the heater, indicated that an ideal accelerated condition had not been determined. SIG Contract W-36-039-sc-44570, Report no. 5.

Analysis of a cyclotron type tube, by Paul G. Baird. Colorado. Engineering Experiment Station, Boulder, Colo. Jan 1954. 54p diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116027

Technical report no. 2. Contract no. 1147(01) for Office of Naval Research.  
1. Waves, Electromagnetic - Detection 2. Tubes, Electron - Mathematical analysis 3. Equations, Differential.

Circular waveguide coupling for laboratory use, by P. J. Allen. U. S. Naval Research Laboratory. Jan 1955. 6p photos, drawings, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116623

Providing for quick connect and disconnect, the coupling permits the connected waveguides to be oriented relative to each other about their common axis and allows polarization adjustment of components while assuring precise axial alignment. Being a nonpolarized type of connector each fitting can connect with any other. Use of the new coupling has greatly facilitated laboratory experimental procedure and has increased considerably the utility of the various circular waveguide components. NRL R 4487.

Coaxial line step discontinuity admittances, by B. P. Washburne. Massachusetts Institute of Technology. Radiation Laboratory. Jul 1945. 15p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116547

Methods of computing the shunt capacitance effects of a step in the inner and/or outer conductor of a coaxial line are considered, with test readings checking theoretical results. MIT Rad Lab 53.

Diffraction of electromagnetic waves by a slit in a conducting plane between different media, by Josef Meixner. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Oct 1954. 13p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116388

Contract no. AF 19(122)-42.  
1. Waves, Electromagnetic - Diffraction - Theory  
2. Mathieu functions (Aerodynamics) 3. NYU RR EM-68 4. AAF CRC TN 54-374.

Fabricating techniques for crystal unit CR-23/U (49.9 to 51.1 Mc), by James M. Ronan. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Feb 1953. 29p photos, diagr, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111557

Research centered on the difficulty in attempting to manufacture high frequency overtone crystals on a mass production basis. Lapping techniques for very thin crystals posed a very difficult problem as to reproducibility. Many processes were investigated and encouraging results reported. Dept. of the Army project no. 3-72-01-000. Signal Corps project no. 4302E. SCEL ER E-1108.

Flush-mounted cardioid-pattern antennas, by D. J. Angelakos. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Feb 1954. 36p photos, drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116070

Report no. 24 on Contract N7-onr-29529. Second of three reports submitted upon conclusion of Phase II of contract. See also PB 116069 and PB 116071.  
1. Antennas, Cardioid-pattern 2. Antennas - Mounts 3. Antennas, Shipborne 4. UC IER Series 60, Issue 108.

Handbook of piezoelectric crystals for radio equipment designers, by John P. Buchanan. Philco Corporation, Philadelphia, Pa. Dec 1954. 601p photos, drawings, diags, graphs, tables (1 fold) Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$5.00. PB 111586

The purpose of this manual is to provide the design and developmental engineer of military electronic equipment with a reference handbook containing background material, circuit theory, and components data related to the application of piezoelectric crystals for the control of radio frequencies. Contract no. AF 33(616)-191. AAF WADC TR 54-248.

Integral equation governing electromagnetic waves, by P. R. Garabedian. Stanford University. Applied Mathematics and Statistics Laboratory, Stanford, Calif. Mar 1954. 12p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116389

Technical report no. 20. Contract Nonr 225(11) (NR 041-086).  
1. Equations, Integral 2. Waves, Electromagnetic - Scattering - Theory.

Investigation of atmospheric radio noise. Progress report no. 5, 1 July-30 Sep 1954, under Contract no. AF 19(604)-876, by S. P. Hersperger, W. J. Kessler, A. W. Sullivan, and J. D. Wells. Florida. Engineering and Industrial Experiment Station. Dept. of Electrical Engineering, Gainesville, Fla. Nov 1954. 58p photos, diags, graphs Available

from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116501

1. Noise, Atmospheric - Measurement 2. Radio - Noises 3. Radio telegraph - Noise 4. Radio teletype - Noise 5. Speech - Intelligibility 6. AAF CRC TN 54-380.

Low frequency propagation studies. Quarterly technical report no. 5, for the period June 16 to Sep 15, 1954, under Contract AF 19(604)-795, by Robert A. Helliwell. Stanford University. Radio Propagation Laboratory, Stanford, Calif. Sep 1954. 50p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116502

1. Low frequencies - Research 2. Radio waves - Propagation - Theory 3. Whistlers (Radio signals) - Theory 4. Analyzers, Atmospheric 5. AAF CRC TN 54-370.

Measurement of pulse time jitter, by William T. Pope. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Dec 1954. 28p photos, diags (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116561

This report describes a pulse jitter tester capable of measuring relative time jitter down to 0.0002  $\mu$ sec and absolute or PRF time jitter to less than 0.001  $\mu$ sec. Basic circuits for the tester were developed at RADC, while circuit improvements and packaging of an experimental model were accomplished under contract with Airborne Instruments Laboratory. This development fills a long existing need for an instrument of relatively simple design and operation with the required sensitivity to check pulse time jitter on MTI and other critically-timed pulse equipment. AAF RADC TR 54-61.

Omni-directional annular-slot antennas, by R. W. Bickmore. Matching networks for annular slot antennas, by G. L. Matthaei. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Feb 1954. 35p photos, drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116609

Report no. 23 on Contract N7onr-29529. First of 3 reports submitted upon conclusion of Phase II of contract. See also PB 116070-116071.

1. Antennas, Slot - Design 2. Antennas, Shipborne 3. Networks, Electrical - Synthesis 4. Networks, Electrical - Impedance 5. UC IER Series 60, Issue 107.

On the cylindrical antenna, by R. F. Harrington. Syracuse. University. Institute of Industrial Research. Dept. of Electrical Engineering, Syracuse,

N. Y. Mar 1954. 30p drawings Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116304

The problem of the cylindrical antenna of appreciable diameter has received considerable attention from a number of investigators. Three approaches have been used in the literature. These are (a) Hallén's asymptotic solution to the approximate integral equation, and King's modification of it, (b) Storer's variational solution to the approximate integral equation, and (c) Schelkunoff's approximate modal solution. This report re-formulates the problem in terms of a mathematical model for which an exact solution is possible. The method of solution is outlined. A solution using Rumsey's reaction concept, which is a straightforward approach to the variational formulation, is also given. Contract Nonr 1198(00).

Presentation on automatic production of electronic equipment, compiled by Blaine C. Ferch. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Electronic Components Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Nov 1954. 53p photos, drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116381

Dissertation by L. K. Lee of Stanford Research Institute describing and analyzing the various forms of automation in use today. It includes information presented at a symposium conducted by the Institute 19-20 Apr 1954 in San Francisco and presents new developments which have evolved since that meeting. AAF WCRE TN 54-23.

Progress report Jul-Sep 1954. National Research Council of Canada. Radio and Electrical Engineering Division. Oct 1954. 22p photos, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. Limited supply available free from Document Office, National Research Council, Ottawa, Canada. PB 116313

A new radiotelescope using a 10-foot parabolic reflector has been completed. Routine observations were made with the 4-foot and 10-foot reflectors and the long array during the period under review. NRCC ERA 277.

Radiation from current elements and apertures in the presence of a perfectly conducting half-plane sheet, by C. T. Tai. Stanford Research Institute, Stanford, Calif. Jun 1954. 60p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116148

The application of the dyadic Green's function technique to a number of electromagnetic problems involving a perfectly conducting half-plane sheet is discussed. A derivation of the dyadic Green's

function is given by the method of Fourier and Hankel transforms. Several sets of curves have been presented to show the radiation patterns in the principal plane for different excitations. The radiation resistance of a quarter-wave monopole attached to the edge of a half-plane sheet, and that of a half-wave dipole placed parallel to the edge of the sheet are also evaluated. Contract no. AF 19(604)-266. SRI Proj 591 Technical report 45.

Research services and investigations on subminiature multielement diodes and bistable elements for microtronic circuits. Quarterly progress report no. 4, second series, under Contract no. AF 19-(604)-55 for period Jul 24 to Oct 23, 1954, by E. B. Dale, M. W. Aarons, M. Pobereskin, J. E. Gates, and C. S. Peet. Battelle Memorial Institute, Columbus, Ohio. Oct 1954. 30p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116260

Metallographic and radioactive tracer methods have been applied to the study of the gold distribution in pulse-welded and d-c-welded, gold-bonded junctions. These experiments and experiments with gold-plated tungsten whiskers of the type previously reported have led to conclusions regarding the mechanism by which impurities penetrate into the germanium and the mechanisms by which a maximum in the impurity concentration can occur at the bottom of the formed region. For 1st-3d reports see PB 114627, 115054, 115274.

Semi-flush-mounted cardioid-pattern antenna for the 225-400-mc band, by F. D. Clapp. California. University. Division of Electrical Engineering. Electronics Research Laboratory, Berkeley, Calif. Feb 1954. 20p photos, diags, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116071

Report no. 25 on Contract N7onr-29529. Third of three reports submitted upon conclusion of Phase II of contract. See also PB 116069-116070.  
1. Antennas, Cardioid-pattern 2. Antennas, Shipborne 3. Antennas - Mounts 4. UC IER Series 60, Issue 109.

Shielded two-wire hybrid junction, by Edgar W. Matthews, Jr. Harvard University. Cruft Laboratory. Mar 1954. 31p drawing, diags, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116292

This paper presents a theoretical analysis of the junction's properties, with particular emphasis upon its use as the basic element of an impedance bridge. In addition, the problem of definition and measurement of impedances on this type of line, with two propagating modes, is discussed; and the line constants for the particular line configuration used are evaluated. Contract N5ori-76, T. O. 1, NR-078-011. HU CL TR 183.

Short electrical breakdowns. I: The possibility of large energy densities in the hydrogen spark channel, by Heinz Fischer. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate. Antenna Laboratory, Cambridge, Mass. Sep 1954. 30p diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116505

1. Hydrogen - Density 2. Hydrogen - Temperature  
3. Sparks, Electric - Analysis 4. Gases - Breakdown theory 5. AAF CRC TR 54-100.

State of the art of electronic subminiaturization. Bendix Aviation Corp. Pacific Division Development Laboratories, Burbank, Calif. Mar 1951. 173p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.75, Photocopy \$22.75. PB 116555

1. Electronic equipment - Miniaturization 2. NAVSHIPS 900,174.

Study of attenuation in the shock tube, by Robert N. Hollyer, Jr., supervised by Otto Laporte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jul 1953. 73f photos, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Enlargement Print \$11.50. PB 116210

Contract N6onr 232, T. O. IV.

1. Shock tubes - Attenuation 2. Shock tubes - Theory  
3. Shock tubes - Flow 4. MU ERI Proj M720-4.

Television "readout" of storage surfaces, by Roger L. Sisson. Massachusetts Institute of Technology. Servomechanisms Laboratory. Project Whirlwind. Order separate parts as described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Part I: System setup. Aug 1948. 8f photo, diags Microfilm \$1.50, Enlargement Print \$2.75. PB 116542

1. Tubes, Television - Surfaces - Electrical properties 2. Tubes, Television - Testing equipment 3. MIT SL M-597.

Part II: Surface switching as observed on the television unit. Oct 1948. 9f photos, graph Microfilm \$1.50, Enlargement Print \$2.75. PB 116543

1. Tubes, Television - Surfaces - Electrical properties 2. MIT SL M-641.

Theoretical and experimental investigation of the radiation of a vertical antenna over a coated conductor, by Donald B. Brick. Harvard University.

Cruft Laboratory. Mar 1954. 95p photos, drawings, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116295

The idealized problem of a base-driven cylindrical antenna over a perfectly conducting dielectric-coated image plane is treated theoretically. An integral equation which is utilized in arriving at an approximation to the current distribution on the antenna is derived. Use is made of the results of a previous report in the derivation. Considerable space is devoted to the choice and the calibration of the measuring antennas. In the course of this study a new concept of the complex effective receiving length is introduced. Contract N5ori-76, T. O. no. 1, NR-078-011. HU CL TR 195.

Transmission-line tubes, by V. J. Fowler. Illinois. Engineering Experiment Station. Electrical Engineering Research Laboratory, Urbana, Ill. Sep 1951. 33f photos, drawing, diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Enlargement Print \$6.50. PB 116537

Contract N6ori-71, Task XV, ONR project no. 076-161.

1. Tubes, Amplifier - Design 2. ILU EES TR 15.

200-Mc propagation measurements beyond the radio horizon, by H. E. Dinger, W. E. Garner, and J. E. Raudenbush. U. S. Naval Research Laboratory. Nov 1954. 19p photo, map, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116229

Continuous recordings were made in the lower Chesapeake Bay area of radio field strengths resulting from several vhf signal sources. The radio path lengths ranged from 30 to 135 nautical miles, most of which were over water. Preliminary results indicate that the signal was present a large percentage of time over these paths, but was frequently subject to rapid changes in level. Further studies are required to determine the reliability of such paths under various climatic and seasonal variations. NRL R 4449.

UHF impedance bridge for shielded two-wire lines, by Edgar W. Matthews, Jr. Harvard University. Cruft Laboratory. Mar 1954. 67p photos, drawings, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116293

This paper describes an impedance bridge for the ultra-high-frequency range utilizing the shielded two-wire hybrid junction. Design and test information are presented for a balance-unbalance detector used to separate the two possible modes, and for an adjustable impedance standard in two-wire line. A description of the equipment used in the experimental work is given, and the results of tests made on the impe-

dance bridge are presented. Contract N5ori-76, T. O. no. 1, NR-078-011. HU CL TR 184.

Unidirectional coupler research and development program. Final report, 10 Feb 1951 to 10 Feb 1953, under Contract no. DA-36-039-sc-5486. Sperry Gyroscope Co., Inc., Great Neck, N. Y. Jul 1953. 233p photos, drawings (part fold), graphs (part fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$8.50, Photocopy \$30.25. PB 116496

Studies related to the use of these couplers in waveguides and coaxial lines are reported here. The work completed during the eighth quarter (10 November 1952 to 10 February 1953) is included in Part I of this report. Design reference data, compiled during the period of the program and relating to the successful development of various directional couplers, are presented in Part II. Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 32-2006-3. SIG Contract DA36-039-sc-5486, Final report.

Wide angle high definition television system, by A. D. Cope, D. W. Epstein, R. E. Hopkins, S. Lasof, F. H. Nicoll, O. H. Schade, H. Wieder. Radio Corporation of America. RCA Laboratories Division. David Sarnoff Research Center, Princeton, N. J. Aug 1952. 165f photos, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.50, Enlargement Print \$22.75. PB 116539

Final report under Contract N6onr-23605.

1. Television - Images 2. Projectors, Television 3. Tubes, Television.

## Generators, Motors, Transmission

Development of subminiature high temperature capacitors. Summary report, Jan 1953 to July 1954, under Contract no. AF 33(038)-17190, Supplemental agreement no. 3. Balco Research Laboratories, Newark, N. J. Dec 1954. 54p diags, graphs (1 fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116333

The results of analysis of both standard and metalized Teflon film are presented. These studies were conducted to determine the basic qualities of the films and the extent to which each characteristic of the films affects the quality and design of the capacitors. The ultimate aim was to obtain optimum performance and size.

Electronic nuclear instrumentation group. Annual progress report for the period Mar 1, 1953 to Mar 1, 1954, under Contract N5ori-07876, NR-025-164, by T. S. Gray and A. B. Van Rennes. Massachusetts Institute of Technology. Dept. of



Electrical Engineering. Servomechanisms Laboratory. Mar 1954. 63p photos, drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116351

D.L.C. project no. 6986.

1. Instruments, Electronic - Design 2. Detectors, Molecular - Design 3. Modulators, Electronic beam 4. Amplifiers, Magnetic - Design 5. Power supplies - Design.

Pulse transformers. Final engineering report for period 1 Dec 1948 to 30 Sep 1950, under Contract AF 19(122)-9, by C. E. Warren. Ohio State University Research Foundation, Columbus, Ohio. Oct 1950. 85p diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 116424

This final report presents a discussion of design methods for several different types of pulse transformer. Included is a study of the problems encountered in designing pulse transformers for pulse durations of the order of 1/50 of a microsecond or less. Also phase or polarity reversing designs and magnetron type nonlinear loads are discussed. This report is essentially a continuation of Final Engineering Report 256-21, on pulse transformers, for period covering 1 June 1946 to 30 November 1948; prepared under Contract W 28-099 ac-118, with Watson Laboratories, Air Materiel Command, Red Bank, New Jersey. OSURF 362-7.

Shielded transmission line method of generating standard fields, by W. E. Garner and H. E. Dinger. U. S. Naval Research Laboratory. Dec 1954. 16p diags, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116500

1. Radio transmission lines - Shielding 2. Waves, Electromagnetic - Reflection 3. Antennas, Loop - Calibration 4. Biot-Savart law (Magnetic field strength) 5. NRL R 4451.

### Miscellaneous

Development of improved connector design. Services, facilities and materials for improvement of connector design together with connector samples. Final report, May 15, 1952 through Jan 14, 1953, under Contract no. DA36-039-sc-219, by W. F. Hennessey. Bendix Aviation Corporation. Scintilla Magneto Division, Sidney, N. Y. Jan 1953. 101p photos, drawings (part fold), diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. PB 116495

Dept. of the Army project no. 3-26-00-602. Signal Corps project no. 32-2006-3. Includes reports of Engineering Laboratory on various tests.

1. Connectors, Electric - Components 2. Connectors, Electric - Design 3. SIG Contract DA36-039-sc-219, Final report.

Evaluation of sensitive magnetic materials at audio frequencies, by Kenneth T. Lian. Polytechnic Institute of Brooklyn. Microwave Research Institute, Brooklyn, N. Y. Mar 1954. 53p drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 116397

This work experimentally evaluates sample magnetic materials in the audio-frequency range. Evaluation is accomplished by comparing the control magnetization curves of the sample cores with their respective d-c major hysteresis loop. A brief study of the measurements problem is also made. Useful frequency ranges are ascribed to each of the sample cores and, on the basis of experimental evidence, a method of quantitatively describing material performance is proposed. Contract no. Nonr-839(05). Thesis - Polytechnic Institute of Brooklyn. PIB 304. PIF R-370-54.

Quasi-distortionless filter functions, by John L. Stewart. Stanford University. Electronics Research Laboratory, Stanford, Calif. May 1953. 42f diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Enlargement Print \$7.75. PB 116541

Contract N6onr 251, Task 7, NR 073-360.  
1. Networks - Filters - Theory 2. Amplifiers, Video frequency - Theory 3. Fourier analysis 4. Laplace functions 5. SU ERL TR 64.

Video amplifiers with instantaneous automatic gain control, by William E. Ayer. Stanford University, Electronics Research Laboratory, Stanford, Calif. Apr 1953. 38f diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Enlargement Print \$6.50. PB 116540

Contract Nonr 225(10) NR 377-366.

1. Circuits, Amplifier - Design 2. Circuits, Feedback 3. Amplifiers, Video frequency - Automatic volume control 4. SU ERL TR 4.

## FOOD AND KINDRED PRODUCTS

Effect of low frequency radio waves on biological materials. Progress report for period Jan 1, 1953 to Dec 31, 1953 under Contract Nonr-669, NR 119-204, by Nathan Ginsburg and Philip Cholet. Syracuse University. Institute of Industrial Research. Dept. of Physics, Syracuse, N. Y. Jan 1954. 17p diagr, graphs (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116264

1. Seeds - Effects of radiation 2. Radio waves - Biological effects.

## FUELS AND LUBRICANTS

Development of qualification test methods for gear lubricants. Progress report no. 24 under Contract no. DA-11-022-ORD-905, by D. L. Powell and H. Ruwe Barton. Armour Research Foundation, Chicago, Illinois. Nov 1954. 9p drawing Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116601

Project TB5-3010.

1. Gears - Lubrication 2. Lubricants - Tests - Methods 3. Lubricants - Testing equipment 4. ARF Proj L030, Report no. 24.

Effective moment of inertia of fluid in offset, inclined, and swept-wing tanks undergoing pitching oscillations, by James R. Reese and John L. Sewall. U. S. National Advisory Committee for Aeronautics. Jan 1955. 27p diagrs, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116467

The effective moment of inertia of the fluid was determined experimentally for the various tank configurations over a tank-fullness range from empty to full. For full pylon-mounted and swept-wing tanks, comparisons of experimental and theoretical solutions for the effective moment of inertia of fluid showed good agreement. Diffused baffles were found to have high damping characteristics in pylon-mounted tanks and very low damping characteristics in centrally mounted tanks. NACA TN 3353.

Investigation of temperature limitation of various lubricants for high-temperature 20-millimeter-bore ball bearings, by Z. N. Nemeth and W. J. Anderson. U. S. National Advisory Committee for Aeronautics. Jan 1955. 31p photos, drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116465

Twenty-millimeter-bore tool-steel ball bearings, equipped with either a beryllium copper or an Inconel cage, were operated with liquid and with solid lubricants at temperatures from 100° to 1000° F at a speed of 2500 rpm and a thrust load of 110 lb. Solid lubricants were more effective than fluid lubricants at the higher temperatures. Graphite provided effective lubrication to 1000° F with bearings equipped with either a beryllium copper or an Inconel cage; molybdenum disulfide, to 850° F with a bearing equipped with an Inconel cage. A silicone-diester blend, the best high-temperature liquid lubricant, provided effective lubrication to 700° F and allowed operation of the bearing at 850° F although the bearing operation was rough and friction torque was high. NACA TN 3337.

Light scattering in fuels. Part 1: Preliminary studies on diesel fuel stability, by J. E. Johnson, A. J. Chiantella, and H. V. Carhart. U. S. Naval Research Laboratory. Sep 1954. 17p diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$ .50. PB 111553

A preliminary investigation has been made of the effect of time, coupled with other variables, on the light scattering properties of a variety of fuels. It has been found that significant changes can be observed in as little as two days for presumably unstable fuels stored at 110°F. Fuels presumed to be stable show little change in light scattering over long periods of time. NRL R 4422.

Partially fluorinated esters and ethers as temperature stable liquids. Part I: Synthesis and characterization, by P. D. Faurote, C. M. Murphy, and J. G. O'Rear. U. S. Naval Research Laboratory. Dec 1954. 28p tables (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116517

A new series of mono-, di-, and triesters of promise for lubricant applications have been prepared from fluoroalkanols of the general formula  $H(CF_2)_nCH_2OH$ , where n is 4, 6, 8, and 10. Esters of this series as well as those of the  $F(CF_2)_nCH_2OH$  series were prepared in 85 to 95 percent yields by direct esterification procedures in a reasonable length of time. Ether derivatives of the  $H(CF_2)_nCH_2OH$  alcohols were prepared in 40 percent yields by aqueous alkylation methods. The physical and chemical constants were determined. NRL R 4429.

Preliminary study of flames in tubes containing grids, by Marjorie W. Evans, Milton D. Scheer, and Louis J. Schoen. New York University, New York, N. Y. Dec 1947. 34p photos, diagr, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116475

Project Squid. Technical report no. 7 under Contract N6ori-11, Task order II.  
1. Combustion - Research 2. Gases - Combustion  
3. Flame velocities - Effect of grids 4. Flame velocities - Effect of tube length 5. Flame - Propagation.

Storage and handling of red and white fuming nitric acid, by Paul Henderson. U. S. Chemical Corps. Chemical and Radiological Laboratories, Army Chemical Center, Md. Aug 1954. 68p photos, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.75. PB 111570

Results of this investigation have proven that commercially available materials and equipment are safe and practical for use in the storage and transfer of fuming nitric acid. Also, work accomplished

under this project has resulted in the design, development, or selection of suitable equipment, materials of construction, fabricating techniques, personnel-protection measures, and handling methods for a fuming nitric acid storage facility. A full description of this is given in the body of the report. Project 4-17-06-001. CC CRL R 372.

## HIGHWAYS AND BRIDGES

Laboratory analysis of soils: Grain size and liquid limit. Presented at the 33d annual meeting, Jan 12-15, 1954. Highway Research Board. 1954. 44p map, diags, graphs, tables Available from Highway Research Board, 2101 Constitution Ave., N. W., Washington 25, D. C. \$60. PB 116518

Contents: Dispersing agents for particle-size analysis of soils, by A. M. Wintermeyer and Earl B. Kinter. - Deflocculating agents for mechanical analysis of soils, by T. Y. Chu and D. T. Davidson. - Rapid methods for determining liquid limits of soils, by Frank R. Olmstead and Clement N. Johnston. HRB Bul 95.

Norske erfaringer fra bygging av sma hengebroer (Norwegian experience in building narrow suspension bridges), by Arne Selberg. Chalmers University of Technology, Gothenburg, Sweden. 1954. 21p photos, drawings (Text in Swedish) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116345

Avd. Väg-och Vattenbyggnad. Byggnadsteknik 21.  
1. Bridges, Suspension - Design - Sweden  
2. Bridges, Suspension - Construction - Sweden  
3. Chalmers University of Technology. Transactions no. 153.

Soil density and stability, presented at the thirty-third annual meeting, January 12-15, 1954. Highway Research Board. 1954. 69p photos, drawings, diags, graphs, tables Available from Highway Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. \$.90. PB 116245

Contents: Selection of densities for subgrades and flexible-base materials, by Chester McDowell. - Relationship between density and stability of subgrade soils, by H. B. Seed and Carl L. Monismith. - Effect of compaction method on stability and swell pressure of soils, by H. B. Seed, Raymond Lundgren, and Clarence K. Chan. - New method for measuring in-place density of soils and granular materials, by Carl E. Minor and Herbert W. Humphres. - Effect of repeated load application on soil compaction efficiency, by George F. Sowers and C. M. Kennedy III. HRB BUL 93. NRC 341.

## INSTRUMENTS

Accuracy of ultrasonic interferometer velocity determinations, by V. A. Del Grosso, E. J. Smura, and P. F. Fougere. U. S. Naval Research Laboratory. Dec 1954. 63p photos, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116523

A theoretical and experimental investigation of the latest Naval Research Laboratory Ultrasonic Interferometer has been completed. The results indicate that all sources of error other than diffraction are smaller than the claimed accuracy of 1 part in 30,000. The experimental data as well as a theoretical wave field, obtained by following (and correcting) King's expression for velocity potential, indicate that the total error, including diffraction, is not above that claimed, provided no measurements are made within  $15\lambda/2$  of the 1-inch 1-Mc source. On the basis of this investigation, the velocity of sound in distilled water at 30,000°C is reported as 1509.85 ± 0.05 m/s, and it is recommended that this value be used as a partial check on the operation of ultrasonic interferometers for liquids. NRL R 4439.

Analysis of errors in sampled-data feedback systems, by Jack Sklansky and J. R. Ragazzini. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. Feb 1954. 25p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116559

Contract AF 18(600)-677, Project no. R-357-50-3. OSR-TN-54-18.  
1. Sampling 2. Controls, Feedback - Errors  
3. CUN ERL TR T-3/B.

Analysis and synthesis of sampled-data control systems, by Eliahu I. Jury. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. Oct 1953. 74p fold diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116560

The theory of sampled-data systems using the method of the z-transform is extended and clarified. In particular, the equivalence between the z-transform in its closed form and the infinite summation used by some investigators is shown. Important characteristics of the pulsed transfer function and initial and final value theorems are de-

veloped for the z-domain. An extensive table of z-transform pairs covering the most important and commonly encountered system functions and input functions is given. The technique for stabilizing and shaping the pulsed transfer locus is demonstrated. In particular, the application of linear compensating networks in the continuous part of the system is investigated. Design criteria are obtained which relate the transient response of sampled-data systems and the frequency response. The effects of pole location and pole dominance are developed. The problem of output ripple is briefly examined insofar as its effect on the transfer loci in the z-domain are concerned. The broad objectives of design of sampled-data systems, including transient response and ripple, are integrated and design procedures are outlined. Contract AF 18(600)-677, Project no. R-357-50-3. CUN ERL TR T1/B.

Data storage in three dimensions, by Jay W.

Forrester. Massachusetts Institute of Technology. Servomechanisms Laboratory. Apr 1947. 13p diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116548

1. Computers, Digital - Storage systems 2. Data storage systems 3. MIT SL M-70.

Determination of leakage values of seals, by Earl A.

Meyer, Robert J. Roth, W. Eugene Sinner, Dale Holinbeck. Bjorksten Research Laboratories, Inc., Madison, Wis. Nov 1953. 156p photos, drawings, diags, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$4.00. PB 111545

The rate of air leakage through various seals in aluminum, brass, and steel specimens was determined quantitatively with one side of the seal evacuated and the other side at one atmosphere. For these measurements two leakage-rate meters were designed and constructed to evaluate leakage rates of 1 to 3,000,000 standard cc. of air/year. Both meters are fully described and drawings for their construction are included. The non-destructive testing of electronic components on the production line prior to a simple sealing procedure is described and a number of components supplied by WADC were tested. AAF WADC TR 54-16.

Development and operation of an instrument for the direct measurement of the heat flux in the soil.

Final report, by R. C. Staley, B. E. Morse, J. R. Gerhardt, K. Buettner. Texas. University. Electrical Engineering Research Laboratory. Sep 1954. 155p photos, drawing, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$6.25, Photocopy \$20.25. PB 116522

Contract no. AF 19(604)-183. Scientific report no. 4-02.

1. Soils - Heat transfer - Measurement 2. Soils - Thermal properties 3. Heat - Transference - Measuring equipment 4. AAF CRC TN 54-280.

Development of the optical imaging oscilloscope (optimascope), by Alan W. Baldwin. U. S. Naval Research Laboratory. Oct 1954. 6p photos, diags Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111554

The Optical Imaging Oscilloscope (OPTIMASCOPE) is a cathode-ray tube modified to combine the presentation of an optically projected image and the normal electron-beam trace on the phosphor coating of the inner tube face. The OPTIMASCOPE may be used to provide aircraft pilots with a radar tracking scope on which various optical images can be projected. There are, in addition, numerous other possible applications. NRL R 4436.

Diagram of electrical connections for control gear and heating coils on autoclave.

I. G. Farbenindustrie, A. G., Uerdingen, Ger. May 1941. 8p drawing only (Legends in German) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 63699s

Supplement to FB 63699. Listed in BIOS FR 875, page 8.

1. BIOS FR 875 LD 2. Micro BIOS DOCS/1482/1422/Drawing 11784A 3. Micro BIOS FD 290/47, frame 1.

Digital manometer reader for the Arnold Engineering Development Center, by Henry T. Chapek.

U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jan 1955. 31p photo, diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116556

The development of a prototype digital manometer reader system is described. The theory, operation, and description of the prototype are presented. Recommendations are made for the construction of a digital manometer reader system which will read in binary digital form a 120-in. multitube manometer board in approximately 5 seconds and feed the results to a digital computer. The heights of the columns are to be read to an accuracy of 0.020 in. AAF AEDC TR 54-32.

Geiger counter technique, by Herbert Friedman.

U. S. Naval Research Laboratory. Jan 1942. 75f photos, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Enlargement Print \$11.50. PB 116535

Some frames may not reproduce well.

1. Geiger counters - Operation 2. NRL M-1800.

Meteorological uses of the E6D computer.

U. S. Air Force. Air Weather Service, Andrews Air Force Base, Washington, D. C. Nov 1954. 15p diags Available from Library of Congress, Publication Board Project, Washington 25, D. C.

Microfilm \$2.00, Photocopy \$2.75. PB 116557

1. E6D (Computer) 2. Computers - Uses 3. AAF  
AWS M 105-46.

Microsalinometer for oceanographic model studies, by John H. Lincoln, Robert G. Paquette, and Maurice Rattray, Jr. Washington. University. Dept. of Oceanography, Seattle, Wash. Mar 1954. 18p photos, drawing, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116384

An instrument has been developed for determining salinity structure in a small scale oceanographic model of Puget Sound. Variations in electrical conductivity with depth at any point in the model are measured with a small probing conductivity cell. The conductivity-depth diagram is traced by an oscilloscope and photographed. Response to changes in conductivity is of the order of 0.01 second. The present accuracy of measurement is about 1%. Technical report no. 26. Contract N8onr-520/III, Project NR 083 012. WU OR 54-10.

Moving slide impinger for sampling concentrated aerosols, by Gerhard Langer and C. Roland McCully. Armour Research Foundation, Chicago, Illinois. Oct 1954. 9p drawing, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116599

A new technique is described for making more exact analysis. Equipment is described. Contract no. AF 19(122)-472. ARF Proj C 022, Report no. 16. AAF CRC TN 54-283.

Plankton volume displacement indicator, by Herbert F. Frolander. Washington. University. Dept. of Oceanography, Seattle, Wash. Mar 1954. 16p photo, drawing, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116383

An instrument is described for measuring displacement volumes of plankton in the laboratory. Due to more efficient draining, the volumes obtained are 30 to 40 percent lower than those achieved using the conventional methods. Organisms are handled in a water medium, lessening the possibility of damage and allowing for future positive identification of specimens. Technical report no. 25. Contract N8onr-520/III, Project NR 083 012. WU OR 54-9.

Radio frequency salinity instrument model E, by Kenneth E. Harwell. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Mar 1954. 42p photos, drawings, diags, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116398

The Model E is a medium accuracy radio frequency salinity instrument. It is built in a single unit of convenient size and is suitable for use in the laboratory or on shipboard. The water sample may be continuously pumped through the instrument or bottled samples may be poured in. Two plastic hose connectors are provided on the back of the case for the sample inlet and outlet. The conductivity and temperature are continuously and automatically indicated by two scales on the front panel of the instrument. The only manual controls are the power switch and a standardizing switch and calibration adjustment on the front panel. Simultaneous readings are taken of conductivity and temperature and the value of salinity found from calibration charts. Project 48, Technical report IV. Contract NObsr-57244, NE-120221, T-7. Reference 54-22T.

Sampled-data processing techniques for feedback control systems, by A. R. Bergen and J. R. Ragazzini. Columbia University. Dept. of Electrical Engineering. Electronics Research Laboratories. Nov 1953. 40p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116558

Gives theory, design, limitations, and application of sampled-data processing systems. Contract AF 18(600)-677, Project no. R-357-50-3. CU-3-53-AF-677-EE. CUN ERL TR T-2/B.

Survey of high-speed printers for digital-computer output, by Robert J. Rossheim and Nelson M. Blachman. U. S. Office of Naval Research. Aug 1952. 22p photos, diagr, fold table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116476

1. Computers, Digital - Equipment 2. Printers, High speed - Design.

Tripod construction, by Richard C. Eggleston. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Sep 1954. 41p photos, drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Microfilm \$6.50. PB 116353

Dept. of the Army project no. 3-21-04-032. Signal Corps project no. 523D.

1. Tripods - Design 2. Tripods - Stability  
3. SCEL TM M-1606.

Wien bridge and twin-T salinity instruments, by K. E. Harwell and Albert J. Druce. Texas. Agricultural and Mechanical College. Dept. of Oceanography, College Station, Texas. Mar 1954. 46p photos, drawing, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116399

The design, operating characteristics, and possibilities as a salinity instrument are given for the Wien Bridge type oscillator and the Twin-T circuit impedance type bridge. Project 48, Technical report V. Contract NObsr-57244, NE-120221, T-7.

## LEATHER AND LEATHER PRODUCTS

Determination of tariffs for universal military training: Boots and shoes, by Francis E. Randall and Katherine Simmons. U. S. Climatic Research Laboratory, Lawrence, Mass. May 1948. 10p diags, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116298

1. Foot - Measurements 2. Shoes - Fitting 3. QMC EP MR 31.

## LUMBER AND WOOD PRODUCTS

Application of ultrasonic and sonic vibrations for improvement and testing of wood. Final report under Contract no. N9onr 87000, Project no. NR 033-317, by George McSwain and George Kitazawa. Timber Engineering Co., Washington, D. C. Aug 1951. 59p photos, diags, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.50. PB 111556

This report shows some possibilities of improving the impregnation of wood through ultrasonic vibration. Using vibrations for testing is now new but this work has led to information which can be used commercially. The presence of defects that might seriously reduce the strength of a piece of wood can now be discovered. There is interest in the idea as a means of testing standing trees to avoid felling costs, if the tree is so defective as to be unprofitable to harvest. Teco Proj. no. B-33.

Case study data on productivity and factory performance: Wood furniture. U. S. Bureau of Labor Statistics. Nov 1954. 165p photos, drawings, graphs, tables Available from U. S. Bureau of Labor Statistics, Washington 25, D. C. PB 116471

1. Furniture - Manufacture 2. Woodworking machines - Design 3. BLS R 18.

Noen resultater fra undersøkelser over saging med og mot fibrene (Some results from "counter" and "climb" ripsawing investigations), by Torsten Englesson, Gullik Hvamb, and Bertil Thunell. Norsk Treteknisk Institutt, Oslo, Norway. Nov 1954. 15p photos, diags, graphs, tables (Text in Norwegian) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116473

Summary in English.

1. Ripsawing - Methods - Norway 2. Lumber - Sawing - Tests - Norway 3. Saws - Blades - Angle of cut - Norway 4. Sawdust - Motion - Photographic analysis 5. Norsk Treteknisk Institutt, Meddelelse no. 7.

## MACHINERY

Tar distillation machinery. Rütgerswerke A. G., Costrop-Rauxel, Ger. n.d. 53p drawings only (Legends in German) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 94620s

Listed in BIOS Final report no. 1783, p. 14-21 and p. 41-42.

1. Tar - Distillation equipment - Design - Germany 2. BIOS FR 1783 LD 3. Micro BIOS/DOCS/3074/2626/2/1-15 4. Micro BIOS FD 2046/48.

Preliminary studies leading to the development of a submerged combustion boiler. Final report for the period Feb 1, 1953 to Jan 31, 1954 under Contract NOnr-1149(00), by Gerald Golub. Experiment Inc., Richmond, Va. Jan 1954. 25p photos, drawing, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116138

Purpose of the investigation was to find a liquid non-volatile heat-transfer medium which would be stable while in intimate contact with ordinary combustion gases at 900° F. Materials and apparatus used are described. EXP 131. TM-577.

## MEDICAL RESEARCH AND PRACTICE

Aural presentation of information. Final report under Contract no. AF 19(604)-990, by J. C. R. Licklider, T. M. Marill, U. R. G. Neisser. Massachusetts Institute of Technology. Acoustics Laboratory. Sep 1954. 42p drawings, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116498

1. Auditory thresholds 2. Signals, Auditory - Narrow band - Detection 3. Information, Aural - Presentation 4. Acoustic systems 5. AAF CRC TN 54-156.

Effect of chromatic adaptation upon normal color vision. Ohio State University Research Foundation, Columbus, Ohio. Contract Nonr-1066(00), Project NR 140-061. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Final report, phase 1, by Hensel Owen Ward.  
Mar 1954. 43p diags, graphs Microfilm \$2.75,  
Photocopy \$6.50. PB 116337

The apparatus consists of a monochromator, which presents adapting stimuli to the left eye of the observer, and a colorimeter, which presents monochromatic test stimuli to the same eye and at the same time permits measurement of chromaticness and brightness changes by means of a tristimulus match with monochromatic components presented to the right eye. The procedures used in calibrating the wavelength and luminance controls are described. ARF Proj 537 Final report, Phase 1.

Final report, phase 2, by Glenn A. Fry and Hensel Owen Ward. Mar 1954. 39p diags, graphs, table Microfilm \$2.50, Photocopy \$5.25.  
PB 116360

1. Color vision - Tests 2. Color vision - Testing equipment 3. ARF Proj 537 Final report, phase 2.

Final report, phase 3, by Glenn A. Fry. Mar 1954. 21p diags, graphs Microfilm \$2.25,  
Photocopy \$4.00. PB 116361

1. Color vision - Tests 2. Color vision - Testing equipment 3. ARF Proj 537 Final report, Phase 3.

Final report, phase 4, by Glenn A. Fry. Mar 1954. 14p diagr, graphs Microfilm \$2.00,  
Photocopy \$2.75. PB 116362

1. Color vision - Tests 2. Color vision - Testing equipment 3. ARF Proj 537 Final report, phase 4.

Effect of red light on the absolute visual threshold,  
by Samuel C. McLaughlin, Jr. U. S. Naval School of Aviation Medicine, Naval Air Station, Pensacola, Fla. Aug 1953. 9p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116553

An hypothesis is advanced which may account for the appearance or non-appearance of red-light photosensitization in closely similar experimental situations in terms of the psychophysical method of threshold determination which is employed. This hypothesis, if valid, explains the appearance in the literature on vision of several sets of conflicting data during the past ten years. Data are presented in support of this hypothesis, and these data appear to demonstrate, independently of the validity of the subject hypothesis, that the red-light photosensitization phenomenon previously reported from this laboratory should be regarded as nonexistent for purposes of operational application. NAM AML Proj NM 001 059.28.02.

Effect of time in submarine service on vision, by Ira Schwartz and N. Elaine Sandberg. U. S. Navy. Medical Research Laboratory, Naval Submarine Base, New London, Conn. Aug 1954. 12p diagr, graphs, tables Available from Library of Congress,

Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116299

The visual characteristics of 1064 submariners were analyzed and were also compared with those of 2354 candidates for the U. S. Naval Submarine School. With increased time in the submarine service, a decrease of visual acuity for distance and for near, accompanied by a tendency toward esophoria, was found to be characteristic of the submarine population. This loss of visual efficiency may be related to the confining nature of the submarine environment. NAV MRL 253. NMRI Proj NM 003 041.57.03.

Experimental studies on the acceleration of burn and wound healing. Progress report, period Jan 1, 1953 to Dec 31, 1953, under Contract N6onr-24111, amendment 6, NR 114-069, by William H. Strain, Arthur M. Dutton, Hannelore B. Heyer and George H. Ramsey. Rochester. University. Dept. of Radiology, Rochester, N. Y. Dec 1953. 32p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116404

1. Burns - Oral therapy 2. Methionine - Physiological effects 3. Methionine zinc - Physiological effects 4. Zinc oxide - Physiological effects 5. Penicillin - Physiological effects 6. Wounds - Therapy.

Foveal luminance discrimination as a function of the duration of the decrement or increment in luminance, by Robert M. Herrick. Columbia University, New York, N. Y. Oct 1954. 20p graphs, table Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$5.00. PB 111599

The minimum observable change in brightness (luminance) as a function of (a) the original adapting brightness and (b) the duration of the change was investigated. The brightness of a 1° centrally fixated adapting field was varied from .01 to 1000 millilamberts. The duration of the increment was varied from .0035 to 2.013 seconds. It was found that the longer the duration of the change in brightness, up to a critical point, the less the change in brightness required to be detected. These findings agree with the Bunson-Roscoe law and indicate further that this law holds for a decrement as well as for an increment in brightness. The findings of the experiment permit one to estimate the minimum durations required between successive flashes of light for the detection of discrete flashes. Contract no. AF 33(038)-22616, Task no. 71544. AAF WADC TR 54-463.

Glycerol pectate as a blood plasma replacement. Report no. 21, May 5, 1952 to Jan 31, 1954, under Contract Nonr 860(00), NR-102-008, by Urs F. Nager. Burke Research Co., Van Dyke, Mich. Jan 1954. 17p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116484

1. Blood plasma - Substitutes 2. Glycerol pectate.

Nomographs of head measurements, by Edmund Churchill and Gilbert S. Daniels. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio and Antioch College, Yellow Springs, Ohio. May 1953. 33p drawings, diags (1 fold), tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111605

To achieve the optimum design of equipment intended to fit the wearer's head closely, a knowledge of the interrelationships between the more important head dimensions is necessary. This report provides such information in the form of two nomographs for determining the most accurate estimate for each of twelve head dimensions based on known values of head length and head breadth, and head breadth and head circumference. Contract no. AF 18(600)-30 with Antioch College. AAF WADC TR 53-14.

Organization of medical services in the Soviet Union, by Mark G. Field. U. S. Air Force. Air Research and Development Command. Human Resources Research Institute, Maxwell Air Force Base, Ala. Jan 1954. 100p diags, tables (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116624

This study deals with the organization of medical services in the Soviet Union, and primarily with the ability of this system to meet the health problems of Soviet society. The report is based on officially published Soviet sources but also used such interview materials as were available and applicable. It is a sequel to a previous report on the work of The Soviet Doctor and precedes a final report on Displaced Persons' Reaction to Soviet Medical Care. Second report in the series: The doctor in the USSR: A study of the professions under Soviet conditions. Contract no. AF 33(038)-12909. AAF HRRT TRR 26.

Parallel estimation of pectin and serum proteins, by Dorothy M. Maron and George A. Feigen. Stanford University. Dept. of Physiology, Stanford, Calif. Feb 1954. 16p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116406

Interim technical report under Contract N6-onr-25137: Physiological properties of plasma substitutes. 1. Blood - Protein 2. Blood - Pectin 3. Blood plasma - Substitutes.

Pathogenesis of necrotizing arteritis. Annual progress report for period 1 Jan 1953 to 31 Dec 1953, under Contract N6ori-44, Task order XII, by L. L. Waters, Willem Van Eck, W. B. MacAllister. Yale University, New Haven, Conn. Feb 1954. 8p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116403  
1. Periarteritis nodosa - Pathogenesis.

Production of tetanus toxoid. Annual progress report for period Jan 1, 1953-Dec 31, 1953 under Contract N5ori-07855, NR 134-024, by J. Howard Mueller and Pauline A. Miller. Harvard University. Jan 1954. 9p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116490

1. Tetanus - Toxoid.

Protein synthesis and degradation in living bacteria. Annual progress report for period Jan 1, 1953 to Dec 31, 1953, under Contract Nonr-244(00), Project NR-124-035, by G. Toennies and Gerald D. Shockman. Institute for Cancer Research, Philadelphia, Pa. Jan 1954. 11p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116486

1. Proteins - Synthesis 2. Bacteria - Metabolism.

Relation of methionine to brain metabolism: Studies with methionine sulfoximine. Annual progress report (termination), period Jan 1 to Dec 31, 1953, under Contract Nonr-211(00), by Jay S. Roth. Hahnemann Medical College. Div. of Biological Chemistry, Philadelphia, Pa. Feb 1954. 6p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116401

1. Methionine - Physiological effects 2. Methionine sulfoximine - Physiological effects 3. Brain - Metabolism.

Relationship between reactive groupings of proteins and the physical, chemical, and immunochemical properties of the proteins. Annual progress report for period Jan 1, 1953-Dec 31, 1953 under Contract Nonr-1077(00), NR 442-249, by Paul H. Maurer and Seymour Ehrenpreis. Pittsburgh. University. School of Medicine, Pittsburgh, Pa. Jan 1954. 8p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116491

1. Proteins - Derivatives - Enzyme action 2. Proteins - Chemical properties 3. Proteins - Reactions.

Relationship of lymphocytes within the epidermis to the amount of epidermal proliferative activity. Annual progress report for period Jan 1, 1953-Dec 31, 1953 under Contract 1092, NR 102-024, by Warren Andrew. Wake Forest College. Bowman Gray School of Medicine, Winston-Salem, N. C. Jan 1954. 23p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116239

1. Skin - Physiology 2. Lymphocytes - Research.

Screening of materials for adhesion to human tooth structure, by E. Ernest Rose, Joginder Lal, Ned B.



Williams, and Joseph P. Falcetti. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Nov 1954. 13p photos, drawing, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116602

More than 5,000 individual tests for the adhesion of various materials to tooth structure were conducted. The behavior of adhesives when tested on dry teeth has no direct bearing on the potential adhesion of the same material in the presence of moisture. The addition of fillers shows promise toward improving adhesion by better wetting of the tooth surface and a potential decrease in the thermal coefficient of expansion of resins. Water sorption of the resin reduces or destroys the initial adhesion of the material to the tooth structure. The data also indicate that a test bacterium can lodge between the filling materials employed and the wall of the tooth cavity when teeth are maintained in the culture at 37°C. AAF SAM Proj 21-1603-0002, Report no. 2.

Some mechanisms of neuroendocrine control. Final report under Contract NR 113-223, by Charles H. Sawyer. California. University. School of Medicine. Dept. of Anatomy, Los Angeles, Calif. Jan 1954. 9p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116489

Includes Priming the anestrous cat for reflex discharge of pituitary ovulating hormone, by Charles H. Sawyer and John W. Everett (Reprinted from Proceedings of the Society for Experimental Biology and Medicine, vol. 83, 1953, p. 820-821).

1. Ovulation - Stimulation 2. Endocrine glands - Control 3. Histamine - Physiological effects.

Study of the effect of certain arginine analogs and other metabolite analogs on the multiplication of typical animal viruses. Annual progress report for period Jan 1 to Dec 31, 1953 under Contract Nonr-771(00), Project NR 135-186, by K. S. Pilcher. Oregon State College, Corvallis, Oregon. Jan 1954. 39p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116423

1. Influenza - Virus - Inactivating agents 2. Canavanine - Synthesis 3. Arginine - Analogs.

Toxicological studies on two trialkyltrithiophosphites, methyl and ethyl, by Herbert E. Stokinger, William T. Rockhold, Paul G. Wright, Herbert Lansky. U. S. Public Health Service. Jun 1954. 83p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 116525

The methyl derivative was more toxic than the ethyl derivative by a factor of at least 2 or 3 by all routes that were comparatively tested (intravenous, intraperitoneal, and oral). The methyl derivative on exposure to air readily became oxidized to a substance with a toxicity less than half that of the parent sub-

stance. Screening of pharmaceutical products and chemicals for antidotal effectiveness against the thiophosphites was only partly successful. A "safe" level of exposure to the vapor of the methyl derivative was found to be 2.5 mg/m<sup>3</sup>. Precautions to be taken in handling these compounds are discussed and a suitable label for containers of these compounds has been devised. Contract no. PO 33(616)-53-8. AAF WADC TR 54-300.

Use of the artificial kidney in human patients. Western Reserve University, Cleveland, Ohio. n.d. 7p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116402

Contract Nonr-112500, NR 115-820, Final report.  
1. Kidney, Artificial - Uses.

Use of isotopes in the study of localization of antibodies, by Ludwik Anigstein, Dorothy Whitney, William Barnes. Texas. University. Medical Branch, Galveston, Texas. Jan 1954. 26p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116400

Contract N6onr-265(00), NR 130-981.

1. Antibodies - Tissue distribution 2. Gamma globulin - Distribution 3. Tracers, Radioactive - Biological 4. Radioisotopes - Tissue distribution.

Wound healing in thermo injury to the skin. Annual progress report, period 1/1/53 to 12/31/53, by George H. Ramsey, William H. Strain, and Hannelore B. Heyer. Rochester. University. Dept. of Radiology. Jan 1954. 4p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116405

1. Burns - Oral therapy 2. Zinc oxide - Physiological effects 3. Penicillin - Physiological effects 4. Wound therapy 5. Skin - Therapy.

## METALS AND METAL PRODUCTS

Anodic oxidation of metals at controlled potential: Experimental methods and case of iron, by Paul Delahay, José O. Juliano, John A. Perry and George L. Stiehl. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Mar 1954. 19p drawing, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116395

Rates of anodic oxidation of iron are measured at constant potential in dilute perchloric acid, acetate and borate buffers, and sodium hydroxide solutions. A treatment for the kinetics of anodic oxidation of metals at constant potential is presented for processes in which a soluble species is formed and processes yielding insoluble products are also in-

terpreted. Experimental methods are described. Technical report no. 12, Project NR-051-258.

Determination of molecular weights of vapors at high temperatures. I: The vapor pressure of tin and the molecular weight of tin vapor, by Alan W. Searcy and Robert D. Freeman. Purdue University. Dept. of Chemistry, Lafayette, Ind. Mar 1954. 17p drawing, diagr, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116393

An apparatus is described with which molecular weights of vapors can be determined at temperatures of 1200 to 2200°K and at pressures of  $10^{-6}$  to  $10^{-4}$  atm. The molecular weight of a vapor is calculated from simultaneous measurements of the vapor pressure by the Knudsen effusion method and by direct determination of the force resulting from effusion of the vapor. The molecular weight of tin vapor is found to be  $91 \pm 29$  in the range 1600-1900°K, confirming the fact that tin vapor is essentially monatomic. The heat of sublimation of tin at 298°K is calculated to be  $71.9 \pm 2.0$  Kcal. Report 11 under Contract no. N7onr-394712, Project no. NR-032-331: Preparation and properties of refractory compounds of silicon and germanium. Based on a dissertation submitted by R. D. Freeman at Purdue University.

Effect of axial dynamic loads on the mechanical properties of certain steels, by R. C. Smith, T. E. Pardue, and L. Vigness. U. S. Naval Research Laboratory. Dec 1954. 20p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116572

The influence of strain rate on the shape of stress-strain curves for hot- and cold-rolled low-carbon steel, ship plate, SAE 4140, and SAE 4340 has been investigated at NRL. Hot-rolled steel and ship plate exhibited dynamic yield values about 150 percent greater than the static yield points. The effect on the other materials was less pronounced. An attempt is made to correlate delay times for yielding under constant strain rates with values obtained in constant stress tests. NRL R 4468.

Effect of the cutting fluid when turning titanium, by L. V. Colwell. Michigan University. Engineering Research Institute, Ann Arbor, Mich. Aug 1953. 15p graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111478

Cutting speed-tool life curves were determined for four different cutting fluids and for dry cutting on titanium grade Ti-75A. One of the four fluids was tested also on titanium alloys Ti-150A, RC-130A, and RC-130B. A solution of 5% sodium nitrite in water was the most effective cutting fluid for cutting titanium. It also worked unusually well for cutting hot-rolled SAE 1045 steel. Contract DA-20-018-ORD-11918. Project no. TB 4-15. MU ERI Proj M-993, Report no. 12. WAL R 401/109-12.

Effect of hydrogen on the mechanical properties of titanium and titanium alloys. Summary report under Contract no. DA-33-019-ORD-938, by G. A. Lenning, C. M. Craighead, and R. I. Jaffee. Battelle Memorial Institute, Columbus, Ohio. Jul 1953. 83p photos, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.25. PB 111568

Results are given on the effects of hydrogen on the structure and mechanical properties of high-purity and commercial-purity titanium, alpha titanium alloys of the Ti-N and Ti-Al types, two commercial alpha-beta alloys (RC-130A and RC-130B), and high-purity titanium-manganese alloys. This work indicates that hydrogen does not have any beneficial effects and is an impurity that must be kept under close control in order to obtain the maximum advantage from titanium alloys. The mechanism of hydrogen embrittlement of titanium and alpha alloys is shown to be different from that of the alpha-beta alloys. Continuation of work done under Contract no. DA-33-019-ORD-220.

Exchange studies with complex ions: Oxalato complexes of Co(II) and Co(III), by Arthur W. Adamson, H. Ogata, J. Grossman, R. Newbury. University of Southern California. Dept. of Chemistry, Los Angeles, Calif. Mar 1954. 55p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116331

The results of a variety of chemical and physical chemical studies are reported and discussed. Possible lines of future investigations are also discussed. Contract N6onr-23809.

Fabrication and properties of 16-Alfenol, a non-strategic aluminum-iron alloy, by J. F. Nachman and W. J. Buehler. U. S. Naval Ordnance Laboratory, White Oak, Md. Apr 1953. 27p photos, diagrs, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.75. PB 111552

The methods of fabricating 16-Alfenol from cast slab to thin gage tape are described in some detail. This fabricating information includes the operations of melting, casting, homogenizing, hot rolling, cold rolling at 575° C and room temperature, and thin gage rolling. Particular attention is focused upon the 575° C cold rolling of this material from the standpoint of the possible beneficial effects derived from an "ordering" type reaction occurring in Fe-Al type alloys. Cold reduction of 16-Alfenol from 0.007" to 0.0005" was accomplished at room temperature on a small Rohn mill. NAVORD 2819.

Foundry manual for sand casting aluminum-10 percent magnesium alloy, by P. D. Frost. Battelle Memorial Institute, Columbus, Ohio. Jul 1954. 122p photos, drawings, diagrs, graphs, tables Available from Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D. C. \$3.25. PB 111577

Contract no. DA-33-019-CRD-363.

1. Aluminum-magnesium alloys - Casting
2. Aluminum alloys - Casting
3. Sands, Molding - Properties.

High resolution autoradiography for study of grain boundaries in metals. Final report under Contract no. DA-20-018-ORD-12150, by H. J. Gombert, M. J. Sinnott, C. Upthegrove, R. A. Flinn, L. H. Van Vlack, S. Yukawa, A. S. Keh, H. B. Probst, R. Simonsen, G. C. Towe, C. M. Hammond. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. May 1954. 82p photos, drawings, graph Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$2.25. PB 111558

This report presents the results obtained from experimental work directed toward (1) improvements in the techniques of high-resolution autoradiography, and (2) application of the autoradiographic techniques in studies of metallurgical problems. Of the several available methods of high-resolution autoradiography, the stripping-film method is the simplest and most consistent in execution and results. Recommended procedures for sample preparation, application of plastic protective coating, application of the stripping film, exposure conditions, and processing of the autoradiographs are given. A number of widely different types of metallurgical problems were studied using the autoradiographic technique in order to evaluate its usefulness as a metallurgical research tool. A description of procedures and equipment used for the introduction of the radioactive isotopes and subsequent steps of heat treatment, sample preparation, etc., is given for each of these systems. Dept. of the Army project 593-08-023. C. O. project no. TB 4-121. MUERI Proj 2029. WAL R 843/13-19.

Investigation of the kinetics of the bainite reaction in alloy steels. Summary report no. 1: Characteristics and stabilization of the bainite reaction, by R. F. Hehemann and A. R. Troiano. Case Institute of Technology. Dept. of Metallurgical Engineering. Metals Research Laboratory, Cleveland, Ohio. Feb 1954. 72p photos, graphs (1 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116394

A theory is presented for the relationship of temperature to the rate and amount of metal transformed in the transformation of austenite to bainite crystal phases in alloy steels. Contract Nonr-763(00), Project NR-031-471.

Investigation of methods of producing single crystals of non-metallic ferromagnetic substances. Fifth quarterly progress report, Jul 1 to Sep 30, 1954, under Contract AF 19(604)-887, by John Koenig. Brush Laboratories Co., Cleveland, Ohio. Sep 1954. 26p photos, drawings, diagr, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116516

Experiments on the growth of magnetite crystals upon seed crystals in various solutions of chemicals in water at elevated temperatures and pressures. Brush report #532-5. AAF CRC TN 54-376.

Measurement of the physical and chemical properties of the sodium-potassium alloy. Quarterly progress report no. 5, by C. T. Ewing, H. B. Atkinson, Jr., and R. R. Miller. U. S. Naval Research Laboratory. Dec 1947. 62p photos, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116494

Status of active property measurements and all measured results obtained since last quarterly report. Included are recent results on viscosity, density, and corrosion. Appendix includes Mine Safety Appliances Co. preliminary report no. 5 Corrosion of certain metals by potassium-sodium, by R. E. Lee, dated 1 October 1947. NRL C-3201.

Metallurgical evaluation of refractory compounds for containing molten titanium. Part III: Borides and sulfides, by E. J. Chapin and W. H. Friske. U. S. Naval Research Laboratory. Jan 1955. 34p photos, drawings, diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116626

Diborides of Ti, Zr, and Cr in crucible form were investigated for melting titanium. In all cases the molten titanium reacted with the crucible at the interface to produce general solution attack and to cause severe contamination of the metal with brittle boron compounds. Solution of the reaction products resulted in an increase in melting point, making pouring difficult. These borides are not considered promising as crucible materials. CeS was also investigated in crucible form. General solution attack of the crucible occurred with contamination of the titanium melt. Metallographic and chemical analytical evidence indicates a binary eutectic system between Ti and CeS. In spite of the appreciable contamination with sulfur the hardness level was increased only moderately. Further investigation is required to determine if larger crucibles would be beneficial in minimizing sulfur pick-up by the molten metal. For parts 1-2 see PB 116628 and PB 116631. NRL R 4478.

Microstructure of polycrystalline materials, by Cyril Stanley Smith. Chalmers University of Technology, Gothenburg, Sweden. 1954. 50p photos, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116344

Institutionen för Silikatkemisk Forskning 33.  
1. Metals - Microstructure - Sweden  
2. Alloys - Grain structure - Sweden  
3. Crystals - Grain boundary diffusion - Sweden  
4. Chalmers University of Technology. Transactions no. 152.  
5. Chalmers University of Technology. Institute for Silica Chemistry Research. Report no. 33.

Periodic status report no. 6 under Contract no. N5-ori-07881, NR-039-007, Nov 1953-Feb 1954, by H. C. Chang, F. C. Monkman, Peter Price, N. J. Grant. Massachusetts Institute of Technology. Dept. of Metallurgy, Cambridge, Mass. Feb 1954. 6p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116312

Contents: 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.

Stereochemistry of complex ions. Final report: An investigation of the structure of silver (I) complex ions in solution, period Sep 1952 through Jan 1954, on Project no. Nonr 685, by Hans B. Jonassen and C. C. Rolland. Tulane University. Richardson Chemical Laboratory, New Orleans, La. Jan 1954. 10p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116316

1. Silver ions - Structure.

## METEOROLOGY AND CLIMATOLOGY

Adsorption studies of heterogeneous phase transitions, by S. J. Birstein. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Dec 1954. 45p diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.25. PB 111602

Studies were also carried out on the effect of changing the surfaces of these solids, and on the adsorption isotherms and nucleating effectiveness of these altered materials. The conclusion is that nucleation by insoluble solids is essentially a surface reaction and extremely sensitive to the state of the solid surface. AAF GRD P 32.

Arctic meteorological research. Final report under Contract no. AF 19(122)-228, Oct 1950-Jun 1954, by A. D. Belmont. California. University. Dept. of Meteorology, Los Angeles, Calif. Jun 1954. 73p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116358

Contains summaries of scientific papers no. 1-6 made under this contract.

1. Meteorology - Research - Arctic Regions.

Comparison of dew duration on Duvdevani dew gauges and several crop covers, by R. H. Shaw. Iowa State College. Dept. of Agronomy, Ames, Iowa. Sep 1954. 44p photo, diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116515

Scientific report no. 1. Contract no. AF 19(604)-589. 1. Dew - Measurement 2. Dew - Measuring equipment 3. Gages, Dew - Design 4. Duvdevani dew gauges 5. Crops - Absorption of dew - Measurement 6. AAF CRC TN 54-267.

Effective radiation temperatures of the ozonosphere over New Mexico, by Arthur Adel. U. S. Air Force Air Research and Development Command. Cambridge Research Center. Geophysics Research Directorate, Cambridge, Mass. Dec 1949. 37p photos, graphs (part fold), tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00. PB 111601

Effective radiation temperatures of the ozonosphere were determined near Alamogordo, New Mexico, for 51 days and 5 nights between 23 March and 15 July 1948. Analysis of these data showed that there was no marked diurnal effect. Observations showed no systematic connection between water vapor content of the atmosphere and effective radiation temperature of the ozonosphere. It was found that the ozonosphere radiation near zenith at 9.57 microns did not change in a pronounced way during the sunrise or sunset periods. Investigation under Air Force Contract W33-038-ac-14050 with University of Michigan. AAF GRD P 2.

Effects of atmospheric turbulence on the propagation of sound, by I. Horiuchi. Columbia University. Dept. of Electrical Engineering. Acoustics Laboratory. Mar 1954. 18p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116307

Technical report no. 3. Contract Nonr 266(23), Task no. NR 384-204.

1. Atmosphere - Turbulence - Meteorological aspects 2. Sound - Propagation - Atmospheric effects.

Field study on the scavenging of dust by rain, by Harvey Glaess and John Rosinski. Armour Research Foundation, Chicago, Illinois. Oct 1954. 37p photos, drawings, diagr, map, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116621

Contract no. AF 19(122)-472. Scientific report no. 15, Project no. C 022.

1. Drops, Liquid - Dust content 2. Dust particles - Effects of raindrops 3. Raindrops - Dust content 4. Aerosols - Analysis 5. Langmuir accretion theory (Atmospheric dust in raindrops) 6. ARF Proj C 022, Report no. 15 7. AAF CRC TN 54-282.

Investigation of periodicity in selected indices of solar activity, by William C. Morton, III. Weather Services, Inc., Boston, Mass. Aug 1954. 19p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116336

Scientific report no. 5. Contract AF 19(604)-449.  
1. Solar radiation - Effect on temperature 2. Solar radiation - Variations 3. Harmonic analysis  
4. Atmosphere - Effects of radiation 5. AAF CRC TN 54-260.

Investigation of cyclone development, storm no. 2,  
by P. M. Breistein. Chicago. University. Dept.  
of Meteorology. Oct 1954. 37p maps, diagrs,  
table Available from Library of Congress, Pub-  
lication Board Project, Washington 25, D. C.  
Microfilm \$2.50, Photocopy \$5.25. PB 116354

Technical report no. 6. Contract no. AF 19(604)-390.  
1. Cyclones - Development 2. Vortex motion -  
Theory 3. AAF CRC TN 54-273.

Laboratory study on the washout of suspended dust  
particles by falling water drops, by C. Roland  
McCully and Gerhard Langer. Armour Research  
Foundation, Chicago, Illinois. Sep 1954. 48p  
photos, drawings, diagrs, graphs, tables Available  
from Library of Congress, Publication Board  
Project, Washington 25, D. C. Microfilm \$2.75,  
Photocopy \$6.50. PB 116620

It is concluded that the scavenging action of rain on  
atmospheric dust can be predicted in a general way  
by application of the Langmuir accretion theory.  
Modifications are required to take care of non-  
wetttable particles. Turbulence may also signifi-  
cantly vary the collection efficiency. Contract no.  
AF 19(122)-472. ARF Proj C 022, Report no. 14.  
AAF CRC TN 54-285.

Latitudinal and seasonal variation of the absorption  
of solar radiation by ozone, by Jerome Pressman.  
U. S. Air Force. Air Research and Development  
Command. Cambridge Research Center. Geo-  
physics Research Directorate, Cambridge, Mass.  
Dec 1954. 43p diagr, graphs, table Available from  
Office of Technical Services, U. S. Dept. of Com-  
merce, Washington 25, D. C. \$1.25. PB 111603

1. Atmosphere, Upper - Ozone - Radiation absorp-  
tion 2. Solar radiation - Absorption - Theory  
3. AAF GRD P 33.

Locations of the aurora australis from single station  
photographs, by B. L. Frankpitt and G. W.  
McQuistan. Carter Observatory, Wellington, N. Z.  
Sep 1954. 17p diagr, tables Available from Lib-  
rary of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.00, Photocopy  
\$2.75. PB 116506

Scientific report no. 3. Contract no. AF 64(500)-1.  
1. Aurora australis - Photographic analysis 2. AAF  
CRC TN 54-275.

Marine meteorology: Concerning the structure of  
some cumulus clouds which penetrated the high  
tropical troposphere, by Joanne Starr Malkus and  
Claude Ronne. Woods Hole Oceanographic Insti-  
tution, Wood Hole, Mass. Mar 1954. 47p photos,

diagrs, graphs, tables Available from Library of  
Congress, Publication Board Project, Washington  
25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 116308

Some extremely large oceanic trade-wind cumulon-  
imbus clouds extending upwards of 40,000 ft. into a  
region of strong winds and intense vertical shear  
have been studied by means of time-lapse photo-  
graphy. A simultaneous still picture of the clouds  
taken a known distance and direction away from the  
motion pictures permits triangulation upon the  
clouds and calculation of the vertical and horizont-  
al motions of several of the individual towers. The  
model of Malkus and Scorer (1954) concerning the  
erosion of cumulus towers is reviewed and tested  
upon these towers with satisfactory results. Un-  
published manuscript. Contract N6onr-27702 (NR-  
082-021). Technical report no. 27. WHOI Ref 54-18.

Mean winds over the Marshall Islands, by Julius  
Korshover. California. University. Institute of  
Geophysics. Oahu Research Center, Oahu,  
Hawaiian Islands. Contract no. AF 18(604)-546.  
Order separate parts described below from Lib-  
rary of Congress, Publication Board Project,  
Washington 25, D. C., giving PB number of each  
part ordered.

October 1952. Jun 1954. 44p graphs, tables  
Microfilm \$2.75, Photocopy \$6.50. PB 116414

Scientific report no. 4.  
1. Winds - Measurements - Marshall Islands  
2. Winds - Velocities - Marshall Islands.

November 1952. Oct 1954. 78p diagrs, tables  
Microfilm \$3.75, Photocopy \$10.25. PB 116355

1. Winds - Measurements - Marshall Islands  
2. Tables, Meteorological 3. Atmosphere -  
Circulation - Marshall Islands 4. AAF CRC  
TN 54-279.

Microwave frequencies and atmospheric profiles.  
Final report under Contract AF 19(122)-13, by  
Dudley Williams. Ohio State University Research  
Foundation, Columbus, Ohio. 1954. 7p Available  
from Library of Congress, Publication Board  
Project, Washington 25, D. C. Microfilm \$1.50,  
Photocopy \$1.50. PB 116513

Lists published research work performed under  
this contract and a preceding contract with the  
same group. For Progress reports no. 3-5 see  
PB 113655, 113415, 113409. AAF CRC TN 54-263.

Monthly and seasonal circulation anomaly patterns  
in relation to sunspots, by Hurd C. Willett.  
Weather Services, Inc., Boston, Mass. Aug 1954.  
26p tables Available from Library of Congress,  
Publication Board Project, Washington 25, D. C.  
Microfilm \$2.25, Photocopy \$4.00. PB 116363

Scientific report no. 6. Contract no. AF 19(604)-449.  
1. Sunspots 2. Atmosphere - Circulation - Anoma-  
lies 3. Atmosphere - Pressure - Distribution  
4. AAF CRC TN 54-262.

On the mean thermal structure of tropical cyclones, by Charles L. Jordon and Elizabeth L. Jordon. Chicago. University. Dept. of Meteorology. Mar 1954. 24p diagrs, maps, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116305

Also contains Ship reports of cloudiness as an aid in low latitude weather analysis, by G. E. Birchfield. Contract no. N6ori-02036, Project NR 085 003.

1. Cyclones, Tropical - Structure
2. Radiosondes - Meteorological records
3. Clouds - Distribution
4. Ships - Weather reports - Analysis.

Operational history of the 30 June 1954 USAF solar eclipse project, by Russell R. Shorey. American Geographical Society, New York, N. Y. Oct 1954. 76p maps, diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116357

Final report under Contract no. AF 19(604)-826. Appendix: Climatological analysis of weather conditions along the path of the solar eclipse of 30 June 1953, by Thomas J. Keegan.

1. Eclipses, Solar
2. AAF CRC TR 54-269.

Presentation of meteorological data for the North American sector for the year 1949, by George S. Benton and Jack Dominitz. Johns Hopkins University. Dept. of Civil Engineering, Baltimore, Md. Sep 1954. 183p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$7.00, Photocopy \$24.00. PB 116356

Final report, vol. II under Contract AF 19(122)-365. For vol. I see PB 116262.

1. Atmosphere - Circulation
  2. Winds, Geostropic
  3. Measurements
  4. Tables, Meteorological
- AAF CRC TR 54-268.

Project Mint Julep: Investigations of a smooth ice area of the Greenland ice cap. Part III: Snow studies, by Robert L. Schuster. U. S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Ill. Oct 1954. 40p fold photos, graphs (part fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116564

1. Snow - Measurements - Greenland
2. SIPRE 19, Part 3.

Reconnaissance location of the "complete" tropical disturbance, by Leon Sherman and N. E. La Seur. Florida. University. Dept. of Meteorology. Jan 1955. 20p diagrs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116617

Scientific report no. 1 under Contract AF 19(604)-753. 1. Cyclones, Tropical - Structure.

Sky noise measurements. Quarterly report, Jul 1, 1954-Sep 30, 1954, under Contract no. AF 19(604)-41, by J. Allen Hynek. Ohio State University Research Foundation, Columbus, Ohio. Oct 1954. 4p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116387

1. Noise, Atmospheric - Measurement
2. AAF CRC TN 54-354
3. ARF Proj 480, Report no. 12.

Some statistical and mathematical approaches to meteorology. Final report on Contract no. AF 19(122)-446, by G. P. Wadsworth and J. G. Bryan. Massachusetts Institute of Technology. Division of Industrial Cooperation. n.d. 262p maps (part fold), diagrs, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$34.00. PB 116323

Contents: Sec. A: Tool for the quantitative study of air mass modification. - Sec. B: Power spectra of surface pressure at 35 U. S. weather stations. - Sec. C: Mathematical analysis of atmospheric phenomena. - Sec. D: Synoptic maps in probability units. - Sec. E: Investigation of nonlinearity in the prediction of surface pressure 12 hours in advance. - Sec. F: Computations done under this contract. - Appendix: Tables and maps.

Stockholm seminar project. Report of work performed at the Meteorological Institute of the University of Stockholm under contract with the University of Chicago, Oct 1, 1951-Mar 31, 1953, by Carl G. Rossby. Chicago. University, and Stockholm. University. Institute of Meteorology. Mar 1954. 6p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116350

The Institute of Meteorology is required to maintain in Stockholm a Seminar to which promising meteorologists from Scandinavia, the Continent and the British Isles may be invited. The principal activity has been the problem of numerical forecasting of the large-scale circulation patterns of the free atmosphere by means of modern high speed computing machines. Contract no. Nonr-613-(00), Subcontract no. 1.

Study of the earth's electrical field. Thirteenth quarterly report for period May 1, 1954 to Jul 31, 1954 under Contract AF 19(122)-467, by David Garber. Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y. Sep 1954. 8p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116380

For 5th, 8th-12th reports on this contract see PB 108441, 112157, 113586, 115167-115169.

1. Terrestrial magnetism - Measurement
2. Earth - Electrical properties
3. CAL RA-764-P-13
4. AAF CRC TN 54-268.

Theoretical investigation of the ionospheric electron density variation during a solar eclipse, by O. E. H. Rydbeck and H. Wilhelmsson. Chalmers University of Technology, Gothenburg, Sweden. 1954. 23p diagr, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 116341

Reports from the Research Laboratory of Electronics no. 31.

1. Ionosphere - Electromagnetic effects - Sweden
2. Ionosphere - Solar eclipse effects - Sweden
3. Eclipses, Solar - Sweden
4. Chalmers University of Technology. Transactions no. 149
5. Chalmers University of Technology. Research Laboratory of Electronics. Report no. 31.

Ultimate strength of ice, by T. R. Butkovich. U. S. Army. Corps of Engineers. Snow, Ice and Permafrost Research Establishment, Wilmette, Illinois. Dec 1954. 13p photos, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116563

This work gives the results of ultimate strength tests of ice, both natural and commercial. The commercial ice was purchased from an ice house in Evanston, Illinois. The natural ice was harvested from Portage Lake, near Houghton, Michigan. The commercial ice was in all cases very clear, specially selected from a number of 100-pound ice blocks. The individual ice crystals were prismatic, 1/2 - 2 cm by 4 - 7 cm. SIPRE RP 11.

## MINERALS AND MINERAL PRODUCTS

Atomistic interpretation of the effect of the composition on the viscosity of glasses, by Evelyn C. Marboe and W. A. Weyl. Pennsylvania State University. College of Mineral Industries, State College, Pa. Mar 1954. 45p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50.

PB 116385

Contract no. N6 onr 269, Task order 8, Projects NR 032-264, NR 032-265.

1. Atoms - Interactions
2. Glass - Viscosity - Effect of chemical structure
3. Ions - Polarization
4. Atomic power - Research
5. ONR TR 56.

Fabrication of synthetic micaceous materials.

Quarterly status report, Dec 15, 1953 to Mar 14, 1954, under Contract Nonr-483(00), T. O. I, Project NR 038-004, by W. W. Beaver and J. G. Theodore. Brush Beryllium Co., Cleveland, Ohio. Mar 1954. 13p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116310

The problems which have been under study for the production of satisfactory electrical-grade synthetic fluor-phlogopite of the normal, boron, barium, and

barium-lithium types now appear under control. The major problems appeared to be those of the need for sufficient blending to get an extremely uniform structure, and for sufficient time not only to secure complete reaction but to allow some crystal growth to occur.

Fibrous-glass compact as a permeable material for boundary-layer-control applications using area suction, by Robert E. Dannenberg, James A. Weiberg and Bruno J. Gambucci. U. S. National Advisory Committee for Aeronautics. Jan 1955. 20p photos, diagr, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C.

PB 116512

The resistance to air flow of fibrous-glass compacts suitable for boundary-layer control was measured. The flow resistance is related to the thickness and density of the fibrous-glass compacts. Constant thickness compacts with specified permeability distributions were fabricated and tested. NACA TN 3388.

Porstorlek och frostbeständighet hos tegelmaterial (Porosity and frost resistance of materials for bricks), by Orvar Carlsson. Chalmers University of Technology, Gothenburg, Sweden. 1954. 60p diagrs, graphs, tables (Text in Swedish) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.

PB 116340

Avd. Kemi och kemisk teknologi 31. Summary in English.

1. Bricks, Clay - Porosity - Sweden
2. Bricks, Clay - Frost resistance - Sweden
3. Clay - Properties - Sweden
4. Porosity - Testing equipment - Sweden
5. Chalmers University of Technology. Transactions no. 148.

Refractoriness of some types of quartz and quartzite, part 1, by Folke Sandford and Stig Fransson. Chalmers University of Technology, Gothenburg, Sweden. 1954. 28p diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00.

PB 116339

Avd. Kemi och kemisk teknologi 30.

1. Refractory materials - Thermal properties - Sweden
2. Ceramic materials - Refractory properties - Sweden
3. Quartz - Refractory properties - Sweden
4. Chalmers University of Technology. Transactions no. 147.

Stability relations of silicate-carbonates at elevated temperatures and pressures. Second progress report, Dec 15, 1953 to Mar 15, 1954, under Contract no. Nonr-656, Task order 6, Project no. NR 081-204, by R. I. Harker and O. F. Tuttle. Pennsylvania State College. School of Mineral Industries, State College, Pa. Mar 1954. 7p Available from Library of Congress, Publication

Board Project, Washington 25, D. C. Microfilm  
\$1.50, Photocopy \$1.50. PB 116311

Research Laboratory, Randolph Air Force Base,  
Texas. Oct 1953. 27p tables Available from  
Library of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.25, Photocopy  
\$4.00. PB 116577

During this second quarter considerable progress  
has been made in studying the stability of five com-  
mon minerals, magnesite, dolomite, calcite, wollas-  
tonite and tremolite.

Project no. 511-023-0001.  
1. Crew, Air - Performance 2. AAF HRRC TR  
53-32.

Static fatigue studies of glass, by George Smoot  
Horsley, Derald A. Stuart, Orson L. Anderson.  
Utah. University. Institute for the Study of Rate  
Processes, Salt Lake City, Utah. Mar 1954. 45p  
diagrs, graphs, tables Available from Library of  
Congress, Publication Board Project, Washington  
25, D. C. Microfilm \$2.75, Photocopy \$6.50.  
PB 116386

Follow-up study of a brief instructor training  
course in methods of conducting critiques, by  
Irl A. Irwin. U. S. Air Force. Air Research and  
Development Command. Air Force Personnel and  
Training Research Center. Crew Research Labo-  
ratory, Randolph Air Force Base, Texas. Oct  
1954. 93p tables Available from Library of  
Congress, Publication Board Project, Washington  
25, D. C. Microfilm \$4.50, Photocopy \$12.75.  
PB 116611

A static fatigue limit for wet soda-lime glass at  
 $34^{\circ}\text{C} + 2^{\circ}\text{C}$  has been found at stresses of approxi-  
mately 5,000 psi. A reliable test method has been  
developed which can be used to study the stress-  
static fatigue relationships of glass and possibly  
other brittle solids. The data indicate that a theory  
concerning the strength-static fatigue relation of  
glass should predict a minimum stress below which  
glass will not break even at very long times. Tech-  
nical report No. XLL. Contract N7-onr-45101,  
Project nr. 032-168.

Project no. 7713, Task no. 77233.  
1. Crew, Air - Training 2. Group behavior  
3. Psychology, Applied 4. AAF PTRC TR 54-46.

Moonlight II: Training the infantry soldier to fire  
the M1 rifle at night, by Francis E. Jones and  
William F. Odom. George Washington University.  
Human Resources Research Office, Washington,  
D. C. Dec 1954. 79p diagrs, tables Available from  
Library of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$3.75, Photocopy  
\$10.25. PB 116573

## PERSONNEL APTITUDE TESTING AND JOB TRAINING

Bibliography of unclassified research reports. U. S.  
Office of Naval Research. Psychological Sciences  
Division. Personnel and Training Branch. Mar  
1954. 30p Available from Library of Congress,  
Publication Board Project, Washington 25, D. C.  
Microfilm \$2.25, Photocopy \$4.00. PB 116382

1. M1 (Rifle) 2. Night vision - Training 3. Military  
training 4. Marksmanship - Training 5. GWU  
HRRO TR 15.

1. Psychological research - Bibliography 2. Per-  
sonnel, Naval - Selection and training - Bibliography.

National curve relating length of rest period and  
length of subsequent work period for an ergographic  
experiment, by Ledyard R. Tucker. Princeton Uni-  
versity, Princeton, N. J. and Educational Testing  
Service, Inc., Princeton, N. J. Mar 1954. 21p  
graphs, tables Available from Library of Congress  
Publication Board Project, Washington 25, D. C.  
Microfilm \$2.25, Photocopy \$4.00. PB 116391

Comparison of job requirements for line maintenance  
on two sets of electronics equipment, by Robert B.  
Miller, John D. Folley, Jr., and Philip R. Smith.  
U. S. Air Force. Air Research and Development  
Command. Air Force Personnel and Training Re-  
search Center. Armament Systems Personnel Re-  
search Laboratory, Lowry Air Force Base, Colorado.  
Dec 1954. 21p graph, tables Available from Lib-  
rary of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.25, Photocopy  
\$4.00. PB 116566

Principal investigator: Harold Gulliksen. Contract  
N6onr-270-20, Project NR 150-088.

1. Fatigue - Measurement 2. Motor reactions -  
Measurement 3. Reaction (Psychology) - Measure-  
ment 4. Energy - Measurements 5. Ergometers.

Project no. 7709, Task no. 77150. Contract no. AF  
33(038)-12921 with American Institute for Research.  
1. Job analysis 2. Electronic equipment - Mainte-  
nance and repair 3. Psychological tests - Evaluation  
4. AAF PTRC TR 54-83.

Prediction of radio operator success by means of  
aural tests, by Edwin A. Fleishman and Julius G.  
Spratte. U. S. Air Force. Air Research and De-  
velopment Command. Air Force Personnel and  
Training Research Center. Skill Components Re-  
search Laboratory, Lackland Air Force Base,  
Texas. Nov 1954. 18p tables Available from  
Library of Congress, Publication Board Project,  
Washington 25, D. C. Microfilm \$2.00, Photocopy  
\$2.75. PB 116378

Criteria of B-29 crew performance in Far Eastern  
combat. I: Ratings, by Dorothy Knoell, Robert L.  
French, and Glen Stice. U. S. Air Force. Air Re-  
search and Development Command. Human Re-  
sources Research Center. Combat Crew Training

Project no. 7700, Task no. 77011.



1. Radio telegraphers - Tests 2. Radio operation - Aptitude tests 3. Hearing - Tests 4. AAF PTRC TR 54-66.

Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116610

Simple mean-difference technique for obtaining scales, by Glen F. Stice and Dorothy M. Knoell. U. S. Air Force. Air Research and Development Command. Human Resources Research Center. Combat Crew Training Research Laboratory, Randolph Air Force Base, Texas. Sep 1953. 7p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116578

Absorption of electromagnetic radiation in the vacuum ultraviolet region of the spectrum by a Phillips Ionization Gauge (PIB) type discharge plasma in  $N_2$  was investigated. Light from a spark discharge source followed a path through the PIB plasma and was analyzed by means of a vacuum spectrograph. Evidence was presented which indicates that the significant absorbing component in these measurements was atomic nitrogen. The absorption cross section of atomic nitrogen as found by this analysis agreed well within the error limit of this experiment with the theoretical value calculated by Bates. Technical report no. 3 under Contract AF 19(604)-151.

Project no. 511-023-0002.

1. Performance tests 2. Factor analysis 3. AAF HRRC RB 53-36.

## PHOTOGRAPHIC AND OPTICAL GOODS

Application of Green's method in deriving approximate theories of elasticity, by G. Herrmann. Columbia University. Dept. of Civil Engineering. Feb 1954. 28p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116477

Elementary discussion of the Luneberg lens, by B. A. Lippmann. Technical Research Group, New York, N. Y. Jun 1954. 13p drawings, diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116613

Technical report no. 13. Contract Nonr 266(09). 1. Elasticity - Theory 2. Green's theorem (Exterior ballistics).

A discussion of the Luneberg lens, and modifications suggested by Gutman and Eaton, is presented, "elementary" in that the derivations are based on physical and geometrical reasoning rather than differential or integral equations. Contract no. AF 19(604)-1015, Interim technical report no. 1. For Technical report no. 2 see PB 116614. AAF CRC TN 54-371.

Bulge or sausage-type of instability in the pinch effect, by Winston H. Bostick and Morton A. Levine. Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Medford, Mass. Nov 1954. 8p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116301

Two notes on the metric of a space interpreted as an index of refraction, by B. A. Lippmann. Technical Research Group, New York, N. Y. Jun 1954. 21p diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116614

The kink type of instability in the pinch effect has been analyzed by Kruskal and Schwarzschild, and one method of discouraging this type of instability has been discussed in a previous report. It has occurred to the authors that there is another type of instability which can possibly occur in the pinch effect, namely a sausage-type of instability which is depicted. Scientific report no. 15. Contract no. AF 19(122)-89.

Note 1 discusses the use of conformal mapping in the design of optical systems. Note 2 refers to an anisotropic lens obtained by compressing a Luneberg lens to the shape of a spheroid. Contract no. AF 19(604)-1015, Interim report no. 2. AAF CRC TN 54-372.

Electrical clean-up of gases, by R. S. Buritz and L. J. Varnerin. Westinghouse Electric Corporation. Westinghouse Research Laboratories, East Pittsburgh, Pa. Contract no. AF 18(600)-1049. Order separate reports described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

## PHYSICS

### General

Absorption of radiation in the vacuum ultraviolet by a discharge plasma in nitrogen, by G. L. Weissler and A. W. Ehler. University of Southern California. Dept. of Physics, Los Angeles, Calif. Jun 1954. 15p drawing, diags Available from Library of Congress, Publication Board Project,

Quarterly report for period Mar 1954-Jun 1954. Jun 1954. 4p drawing Microfilm \$1.50, Photocopy \$1.50. PB 116570

Research report 71F191-R1.  
1. Gases - Ionization 2. Gas ions - Condensation.

Quarterly report for period Jul 1954-Sep 1954.  
Sep 1954. 3p. Microfilm \$1.50, Photocopy \$1.50.  
PB 116571

Research report 71F191-R2.

1. Gases - Ionization 2. Gas ions - Condensation.

Quarterly report for period Oct 1954-Dec 1954.  
Dec 1954. 3p. Microfilm \$1.50, Photocopy \$1.50.  
PB 116569

Research report 71F191-R3.

1. Gases - Ionization 2. Helium - Ionization - Measurement 3. Argon - Ionization - Measurement 4. Gas ions - Condensation.

Experimental evaluation of momentum terms in turbulent pipe flow, by Virgil A. Sandborn. U. S. National Advisory Committee for Aeronautics. Jan 1955. 40p diags, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116367

Terms of the longitudinal- and radial-direction turbulent momentum equations were experimentally evaluated in a 4-inch-diameter pipe from total- and static-pressure data and hot-wire anemometer surveys. Direct comparisons were made with turbulence measurements obtained using the constant-current and constant-temperature systems of hot-wire anemometry. The two systems agree equally well within the experimental accuracy of the measurements. NACA TN 3266.

Harmonic wave solutions of the nonlinear vorticity equation for a rotating viscous fluid, by Shih-King Kao. Johns Hopkins University. Dept. of Civil Engineering, Baltimore, Md. Mar 1954. 25p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116392

Technical report no. 3. Contract Nonr-248(31), Project NR 082-104.

1. Flow, Fluid - Mathematical analysis 2. Fluids, Rotating - Convection 3. Vortex motion - Theory 4. Spherical harmonics.

Influence of foreign electrolytes and temperature in electrochemical kinetics, by Paul Delahay and Calvin G. Mattax. Louisiana State University. Dept. of Chemistry, Baton Rouge, La. Mar 1954. 23p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116396

Technical report no. 16, Project NR-051-258.

1. Sodium salts - Effects on electron transfer 2. Potassium salts - Effects on electron transfer 3. Electrolytes - Conductivity 4. Iodates - Reduction - Effects of temperature.

Infra red photoconductor research. Technical report no. 1, period Feb 1, 1950-Jul 30, 1952, under Con-

tract N6onr 23216, by O. Simpson. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jul 1952. 14p drawing, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116478

The primary purpose of this contract is to study lead telluride prepared without oxidation, and in particular to investigate the infra-red absorption of samples with various degrees of conductivity and photosensitivity. A secondary purpose is to prepare lead telluride detectors on a laboratory scale.

On the specific directions of longitudinal wave propagation in anisotropic media, by F. E. Borgnis. California Institute of Technology. Norman Bridge Laboratory of Physics, Pasadena, Calif. Dec 1954. 27p diags, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116619

The purpose of this paper is to find specific directions in a medium of given anisotropy, along which the displacement of one of the three possible waves is exactly parallel to the direction of wave propagation. A method is developed which leads to the complete set of such "longitudinal" directions, if the matrix of the elastic coefficients is known. The method is applied to several groups of crystal symmetry, namely to the trigonal, hexagonal, tetragonal and cubic systems, and the general conditions are established under which pure longitudinal waves exist. Contract no. AF 18(600)-593, Project no. R-357-40-4. Technical note no. 2.

Reactions with activated solids, by J. A. Hedvall. Chalmers University of Technology, Gothenburg, Sweden. 1954. 24p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116343

Institutionen för Silikatkemisk Forskning 32.

1. Solids - Radiochemical reactions - Sweden 2. Solid solutions - Radiochemical reactions - Sweden 3. Crystals - Lattices - Distortion - Sweden 4. Sulfur - Reactivity - Sweden 5. Chalmers University of Technology. Transactions no. 151 6. Chalmers University of Technology. Institute for Silica Chemistry Research. Report no. 32.

Reflection of plane sound waves from a rough surface, by J. G. Parker. U. S. Naval Research Laboratory. Dec 1954. 32p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116608

A theoretical study has been made of the reflection of plane sound waves from a stationary pressure release surface  $z = \zeta(x, y)$  which is almost planar but which exhibits a definite roughness. A general solution for the velocity potential describing the reflected field is taken in the form of an integral having plane wave components, a Fourier integral representation. NRL R 4456.

Resonant oscillations in a nonlinear system having two degrees of freedom, by E. Pinney. Stanford University. Division of Engineering Mechanics, Stanford, Calif. Feb 1954. 26p diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116488

A nonlinear mechanical system having two degrees of freedom is subject to a periodic exciting force. Assuming the two natural frequencies of the system are not near together, four cases of resonance may occur. These cases are studied individually. The resulting oscillations are derived and their stability is investigated. Technical report no. 26. Contract N6onr-251, Task order 2, NR-041-943. SU ME TR 26.

Second-order wave solutions for critical and near-critical coupling conditions, by R. V. Parkinson. Pennsylvania State University. Ionosphere Research Laboratory, State College, Pa. Oct 1954. 66p graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116497

Explicit expressions for second-order wave solutions of the general equations of propagation are obtained. Numerical results are included for six ionospheric models chosen to provide critical and near-critical coupling conditions. It is concluded that the theoretical results show excellent promise of explaining experimentally observed coupling phenomena; correlation of theory with experiment, now under way, is deferred to a future report. Contract no. AF 19(122)-44. PSC IRL SR 70.

Shock tube as an instrument for the investigation of transonic and supersonic flow patterns, a report on work done under Contract N6-onr-232 between Apr 1947 and Jun 1949, by F. W. Geiger, C. W. Mautz, with an addendum by R. N. Hollyer, Jr., supervised by Otto Laporte. Michigan. University. Engineering Research Institute, Ann Arbor, Mich. Jun 1949. 198p photos, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$7.25, Photocopy \$25.25. PB 116545

Contract no. N6-onr-232, Task order IV.

1. Shock tubes - Flow 2. Flow, Supersonic - Theory 3. Flow, Transonic - Theory 4. Mach number - Effect 5. Rankine-Hugoniot equation 6. Prandtl's equation 7. MU ERI Proj M720-4.

Study of the momentum distribution of turbulent boundary layers in adverse pressure gradients, by Virgil A. Sandborn and Raymond J. Slogar. U. S. National Advisory Committee for Aeronautics. Jan 1955. 79p photos, drawings, diags, graphs Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116366

Experimental evaluation and analysis were made of mean and turbulent terms of the equations of motion

and the stress tensor at four stations in a turbulent boundary layer with a progressively increasing adverse pressure gradient. NACA TN 3264.

Table of squares of cosecants, by George E.

Reynolds. U. S. Air Force. Air Research and Development Command. Cambridge Research Center. Electronics Research Directorate, Cambridge, Mass. Aug 1954. 92p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116503

1. Tables, Mathematical 2. AAF CRC TN 54-102.

Threshold and signalling ranges of point sources of light in fields of brightness from dark to daylight, by H. A. Knoll, D. B. Beard, R. Tousey, and E. O. Hulburt. U. S. Naval Research Laboratory. Oct 1945. 20p graphs (1 fold), tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116433

1. Illumination - Measurements 2. Light - Attenuation - Tables 3. Searchlights - Brightness 4. Signals - Light - Range 5. NRL H 2627.

Ultrasonic propagation in solid materials. Interim research report no. 1 under Contract no. AF 19-(604)-1095 from Jul 1, 1954 to Sep 30, 1954. Andersen Laboratories, Inc., West Hartford, Conn. Sep 1954. 10p photos, diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116609

Continuing the work begun under Contract no. AF 19(604)-835, several ultrasonic beam photographs have been taken, showing the effects of driving various portions of a transducer crystal in or out of phase. The possibility of using such methods to control the beam pattern is discussed. One 2500 microsecond delay line blank has been finished. This has been assembled a number of times using transducer crystals in the 20-25 mc./sec. range. Applying techniques learned from the foregoing optical studies, results have proved to be very promising. For reports under previous contract see PB 114122 and PB 114111. AAF CRC TN 54-359.

## Nuclear

Beta ray ionization from the ground, by V. F. Hess, W. D. Parkinson, and H. A. Miranda. Fordham University. Dept. of Physics, New York, N. Y. Dec 1953. 55p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116499

Contract no. AF 19(122)-409.

1. Atmosphere - Ionization - Measurement 2. Beta rays - Emission 3. Eve's constant (ion formation) 4. Instruments, Radiation detection 5. Ionization chambers.

Calculation of the fraction of effusing molecules which strike a collector plate above a channel hole, by Robert D. Freeman and Alan W. Searcy. Purdue University. Dept. of Chemistry, West Lafayette, Ind. Mar 1954. 6p table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116328

From an equation of Clausing, data have been obtained which permit calculation of the angular distribution of molecules effusing from channel holes. From the data is obtained the ratio of the number of molecules that strike a collector plate to the total number that would effuse through a hole of infinitesimal thickness. Report no. 10 under Contract no. N7onr-394/12, Project no. NR-032-331: Preparation and properties of refractory compounds of silicon and germanium.

Calculation of the principal polarizabilities of polymer chains, I, by Richard S. Stein. Massachusetts University. Dept. of Chemistry, Amherst, Mass. Jun 1952. 48p photos, drawings, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116550

This paper is concerned with the calculation of principal polarizabilities of polymethylene hydrocarbons in terms of more detailed structural features; that is, bond polarizabilities, lengths, angles, and restricted rotation potentials. A tetrahedral lattice model for a polymer chain is used, and the polarizabilities for each configuration of the polymer are calculated. These are averaged for the cases of (a) equally probable orientation about the (c-c) bond, (b) preferred trans orientation, (c) steric hindrance, and (d) interaction between distant portions of the chain. The calculation is carried out for chains up to 6 bonds long (heptane). A comparison of the predicted polarizabilities with those obtained from light scattering depolarization measurements is made. Contract Nonr 702(00), Project NR 330-024. Technical report no. 1.

General thermodynamic theory of ion exchange processes, by H. P. Gregor. Polytechnic Institute of Brooklyn, Brooklyn, N. Y. Mar 1949. 40p diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116546

Contract N6-onr-263, Task order IV, Project ONR-057-089: Ion exchange project.

1. Ions - Exchange processes - Theory.

Heterogeneous nucleation of crystals from vapor, by G. M. Pound, M. T. Simnad, and Ling Yang. Carnegie Institute of Technology. Metals Research Laboratory, Pittsburgh, Pa. Mar 1954. 18p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116315

A rate equation is derived for heterogeneous nucleation of crystals from the vapor on the basis of an

adsorption, surface diffusion, and statistical fluctuation mechanism. Contract N6ori-47/IV, Project NR 031-184.

Investigation into scintillation spectroscopy and its feasibility for alpha, beta and gamma energy determinations, by Frank M. Urvinitka. U. S. Signal Corps Engineering Laboratories, Fort Monmouth, N. J. Aug 1953. 27p photo, drawing, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116522

The scintillation spectrometer was found to be especially applicable to the determination of gamma ray energies. A spectrometer was constructed for operation over the energy range of approximately .5 Mev to 1.5 Mev. Its application to beta energy determinations of the nature under consideration was not found to be feasible. A preliminary investigation indicates favorably toward the application of scintillation spectroscopy to alpha energy measurements. Dept. of the Army project no. 3-12-80-031. Signal Corps project no. 213A. SCEL TM M-1530.

Line widths of pressure broadened spectral lines, by C. J. Tsao and B. Curnutte. Ohio State University Research Foundation, Columbus, Ohio. Jun 1954. 92p diags, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.50, Photocopy \$12.75. PB 116514

This report outlines in considerable detail the method of calculating the widths of pressure-broadened spectral lines by using the impact theory of P. W. Anderson. In Sec. I, the general quantum mechanical result is derived. In Sec. II, the adiabatic approximations are discussed. In Sec. III, Anderson's theory has essentially been repeated with some slight changes. In Sec. IV, several cases of molecular interactions are treated. The calculations have been extended to include the effect of the nonresonant terms of the interaction matrix which are neglected in Anderson's work. Scientific report no. IA-8. Contracts AF 19(122)-65, AF 19(604)-516. RF Project 381. AAF CRC TN 54-265.

Method of calculating cross sections for molecular collisions, by Ernest Bauer. New York University. Institute of Mathematical Sciences. Division of Electromagnetic Research. Oct 1954. 29p diags, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116520

The calculation of slow inelastic collisions of molecules, such as occur in chemical reactions, shows an interesting combination of classical and quantum mechanical features. A method is devised to suit these different features. As an example of the method, the cross section for excitation of the first vibrational state of a hydrogen molecule re-

sulting from collision with another hydrogen molecule is calculated. Contract AF 19(122)-463. NYU RR CX-17. AAF CRC TN 54-274.

Neutron-detecting phosphors, by J. I. Hoover and C. F. Dohne. U. S. Naval Research Laboratory. Dec 1954. 21p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116524

Phosphors containing elements having a high probability of interaction with neutrons have been investigated as neutron detectors. The reactions considered were the  $\text{Li}^6(n, \alpha)$ ,  $\text{B}^{10}(n, \alpha)$ ,  $(n, p)$  with hydrogen, and  $\text{U}(n, f)$ . None of the phosphors considered were superior to existing methods of detection. NRL R 4453.

Nuclear shielding studies. I: The slowing down and diffusion of neutrons in homogeneous media, by C. W. Tittle, Henry Faul, E. L. Secrest and Clark Goodman. Massachusetts Institute of Technology. Laboratory for Nuclear Science. n.d. 77p photo, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116549

A method for computing the thermal neutron distribution, knowing the indium resonance (or similar) distribution and the thermal diffusion length of the medium, has been described. An empirical method for correcting age values of slowing down distances in homogeneous media has been developed. Age theory is of value in homogeneous media for initial energies of a few hundred kilovolts or less. An approximate theory for the spatial distribution of slowed down neutrons in hydrogenous media, described by Flügge, has been shown to be valid for water out to at least 20 cm from the source, and for furfural to 30 cm. The contribution of the present work to the theory is the development of a method for determining the important constant called " $\lambda_0$ ." Contract N5ori-07818. Data is 1949 or later.

Shallow-well gamma calibration range, by A. E. Nash, H. M. Childers, and J. D. Graves. U. S. Naval Research Laboratory. Dec 1954. 12p photos, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116334

1. Gamma rays - Sources 2. Gamma rays - Scattering 3. Detectors, Radiation - Calibration 4. NRL R 4459.

Spectral distribution of radiation from cylindrical sources, by J. D. Plawchan, L. A. Beach, and W. R. Faust. U. S. Naval Research Laboratory. Jan 1955. 4p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Photocopy \$1.50. PB 116568

Spectral distributions of emergent radiation from thick cylindrical sources containing aqueous solutions of  $\text{Co}^{60}$  have been deduced from scintillation spectrometer pulse-height distributions. NRL R 4484.

Zenith angle variation of cosmic ray mu-meson intensity, by Robert C. Haymes and Arthur Beiser. New York University. College of Engineering. Research Division. Mar 1954. 39p diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116330

The zenith angle variation of cosmic ray mu-mesons at two different altitudes and two different geomagnetic latitudes have been examined. No perceptible altitude variation was found, but a difference with latitude has been detected. An equation is derived to accord with former theory and experimental observations which takes into account the decay of the mesons. Project no. 101, Report no. 101.17. Cosmic ray project. Contract no. N6onr 279, T. O. 2.

## PSYCHOLOGY

Annual technical report no. 3 under Onr contract N5ori-07646. Harvard University. Laboratory of Social Relations. Mar 1954. 39p graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116347

1. Psychology, Applied 2. Psychology, Social 3. Sociology - Research.

Bibliography of research reports, 1 Jan 1947-1 Jan 1954. U. S. Office of Naval Research. Physiological Psychology Branch. Mar 1954. 37p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 116303

1. Psychological research - Bibliography.

Design of digits, by Mason N. Crook and Frances Schulze Baxter. Tufts College. Institute for Applied Experimental Psychology, Medford, Mass Jun 1954. 70p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116521

Contract no. W33-038-ac-14559.

1. Numerals - Legibility 2. Psychological tests 3. AAF WADC TR 54-262.

Method of content analysis for use with "word pictures", by Elizabeth G. French. U. A. Air Force. Air Research and Development Com-

mand. Air Force Personnel and Training Research Center. Personnel Research Laboratory, Lackland Air Force Base, Texas. Nov 1954. 12p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116615

Project no. 7704, Task no. 77093.

1. Psychological tests 2. Personnel, Flying - Psychological records 3. AAF PTRC TR 54-56.

Psychiatric screening of flying personnel: Interrater agreement on the basis of psychiatric interviews, by Goldine Gleser, James Haddock, Philip Starr, and George A. Ulett. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Nov 1954. 11p tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75.

PB 116584

This study compares the ratings by two psychiatrists of 117 male students, age 17 to 23, on degree of adjustment and anxiety proneness, after unstructured psychiatric interviews of 1-hour duration, and on their supporting judgments on family, social and cultural factors, symptoms, and personality structure. Possible causes and corrections of unreliability of psychiatric ratings are discussed. Contract no. 33(038)-13884. AAF SAM Proj no. 21-0202-0007, Report no. 10.

Radio and television research project. Progress report no. 4, period 1 Nov 1948-1 Apr 1949, under Contract N7onr-284, T. O. V. Institute for Research in Social Science and North Carolina. University. Communication Center, Chapel Hill, N. C. Apr 1949. 5f Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$1.50, Enlargement Print \$1.75.

PB 116536

SDC Human Engineering project.

1. Rorschach tests 2. Radio - Educational uses 3. Psychological tests.

Reports of research in the field of engineering psychology, by Jennie Gatti. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Sep 1954. 34p Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$1.00.

PB 111594

This bibliography lists by functional groupings the authors and titles of the reports published by the Psychology Branch, Aero Medical Laboratory, Directorate of Research, Wright Air Development Center, since its inception in 1945. AAF WADC TR 54-220.

Some effects of cumulative doses of X-radiation upon learning and retention in the rhesus monkey, by Charles M. Rogers, Sylvan J. Kaplan, George Gentry, and John A. Auxier. U. S. Air Force.

School of Aviation Medicine, Randolph Field, Tex. Nov 1954. 16p graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116603

Twelve rhesus monkeys were tested for ability to retain memory for a multiple discrimination task and eleven color discrimination tasks. They were tested also for ability to learn new color discrimination tasks after radiation. Six of the subjects were exposed to approximately 100 r of x-radiation once a week during the experiment. Results indicate that up to the point where they no longer responded to stimuli the subjects showed no effects of cumulative exposures to x-radiation. AAF SAM Proj no. 21-3501-0003, Report no. 11.

Study of conditions affecting cooperation, by Morton Deutsch. New York University. Research Center for Human Relations. Mar 1954. 17p diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116346

Annual technical report no. 2, Feb 16, 1953-Feb 15, 1954, under Contract no. Nonr-285(10). Summarizes reports made under this contract.

1. Cooperation - Research 2. Psychology, Applied 3. Group behavior.

Survey of human engineering needs in maintenance of ground electronics equipment, by Robert B. Miller, John D. Folley, Jr., Philip R. Smith, Alan D. Swain. American Institute for Research, Pittsburgh, Pa. Feb 1954. 315p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$9.25, Photocopy \$40.25. PB 116376

This report describes the procedures, results and human engineering research problems derived from a field study of the maintenance of ground electronics equipment at Air Defense sites. The procedures include exhaustive verbal and written questionnaires developed specifically for the maintenance job on this equipment and administered to all the available personnel at six sites. Contract no. AF 30(604)-24, Final report. AAF RADC TR 54-31.

## RUBBER AND RUBBER PRODUCTS

Development of a rubber for service in contact with experimental hydraulic fluids at 400°F., by Frederick G. Kitts. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Dec 1954. 15p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$ .50. PB 111598

A compound of Neoprene WRT was developed which was marginally satisfactory after aging 168 hours in MLO 8200 at 400°F in the absence of air. If air were

not at least partially excluded the rubber would reach an unsatisfactory condition in the less than 70 hours. The compounds of Neoprene WRT are believed to be processible on industrial equipment such as mills, extruders, etc. "O" rings have been fabricated in the Materials Laboratory and are under-going evaluation testing. AAF WADC TR 54-458.

Evaluation of polymers for use as ammunition box gaskets, by Z. T. Ossefort. U. S. Arsenal, Rock Island, Ill. Jul 1952. 33p photos, graph, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.50, Photocopy \$5.25. PB 115301

Project no. TB4-521C, Report no. 2.  
1. Gaskets, Synthetic rubber - Tests 2. Ammunition - Boxes - Gaskets 3. Rubber, Synthetic - Tests  
4. RIAL R 52-1973

## STRUCTURAL ENGINEERING

Design of underground mine openings: Oil-shale mine, Rifle, Colo., by Robert H. Merrill. U. S. Bureau of Mines, Dec 1954. 59p photos, drawing, diags, graphs, tables Available from U. S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa. PB 116504

1. Mines, Oil shale - Design 2. Oil-shale mine, Rifle, Colo. 3. BM RI 5089.

Determination of stresses from strains measured on three intersecting gage lines, by E. W. Suppinger. U. S. Army. Air Corps. Materiel Division, Dayton, Ohio. Oct 1942. 27f diags Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Enlargement Print \$5.25. PB 115955

1. Stress analysis - Methods 2. Stresses - Calculations 3. Structural theory 4. Mathematical equations and solutions 5. AAF TR 4822.

Stress distribution in adhesive joints, by James L. Lubkin. Midwest Research Institute, Kansas City, Mo. Contract no. Nord-13383. M.R.I. Project no. 910-E-327. Order separate parts described below from Library of Congress, Publication Board Project, Washington 25, D. C., giving PB number of each part ordered.

Final report. Sep 1953. 150f diags, graphs, tables Microfilm \$6.00, Enlargement Print \$20.25. PB 116532

Renamed Phase report no. 1 when contract was extended.

1. Joints, Adhesive bonded - Stress distribution  
2. Joints, Adhesive bonded - Theory 3. Joints, Adhesive bonded - Tests 4. Joints, Scarf  
5. Joints, Lap 6. Adhesives - Tests.

Final report. Aug 1954. 137f diags, graphs, tables Microfilm \$5.75, Enlargement Print \$19.00. PB 116533

Present report contains all results obtained since Phase report no. 1 was issued. Purpose is to present and analyze extensive calculations of the adhesive stresses in tubular lap joints (sleeve joints). Applicability of these results to design and the question of experimental verification are also considered.

## TEXTILES AND TEXTILE PRODUCTS

Modification of the physical properties of hard fibers through chemical treatment, plant trial, by George Thomson, Robert J. Coskren, Carter G. Cook. Fabric Research Laboratories, Inc., Boston, Mass. Mar 1954. 21p diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116326

The work described in this report is a continuation of that given in Technical Report Number 5 on this project. In the current work, preliminary laboratory investigations were first carried out with the objects of determining more precisely the necessary conditions of treatment, and extending the work to grades of Manila abaca other than J-1, before proceeding with a plant trial. Technical report no. 9. Contract no. N7onr-421-I, Project NR 330-004. Case number C47736. Continuation of PB 113309.

## TRANSPORTATION EQUIPMENT

Aeronautics

Instruments

Control-display association preferences for ganged controls, by James V. Bradley. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Aero Medical Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio. Aug 1954. 16p tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$.50. PB 111600

Data were collected at Antioch College under Contract AF 18(600)-50.

1. Psychological tests 2. Airplanes - Instrument panels - Design 3. AAF WADC TR 54-379.

Experimental air-sea-rescue drift buoy, by F. deW. Pingree, Harold E. Sawyer, Robert G. Walden. Woods Hole Oceanographic Institution, Woods Hole, Mass. Mar 1954. 60p photos, drawing, diags, graph, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. PB 116335

Contract Nonr-769(00) (NR-083-069).

1. Buoys, Sonic - Design 2. Rescue equipment, Air-sea - Design 3. X-1 (Radio buoy) 4. WHOI 54-21.

Appendix. Mar 1954. 59p photos, drawings (part fold), diags, graph Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75.  
PB 116335s

Contract Nonr-769(00) (NR-083-069). Appendix to PB 116335.

1. WHOI 54-21, Appendix.

New tests for the examination and training of color vision: Evaluation of the color vision multitester (Signal lamp) for aviation, by Ingeborg Schmidt. U. S. Air Force. School of Aviation Medicine, Randolph Field, Texas. Jun 1954. 12p diagr, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116585

The Color Vision Multitester for Aviation, described in a previous technical report, was evaluated in testing 93 persons. The errors to be considered in scoring were established. Since the test showed both a learning and a fatigue effect, it was decided to give two instruction tests which were not used in scoring, and to score the third test. Color normals and persons with a mild color defect were included in the group who passed this test. The Color Vision Multitester for Aviation is recommended as a supplementary test for classifying applicants screened as "color defective" by plate tests in fitness examinations. Instructions for testing are given in an appendix. AAF SAM Proj no. 21-29-006, Report no. 4.

Principles of fire detection in aircraft engine spaces, by W. F. Roeser and C. S. McCamy. U. S. National Bureau of Standards. Jun 1954. 111p photos, diags, graphs, tables Available from Office of Technical Services, U. S. Dept. of Commerce, Washington 25, D. C. \$3.00. PB 111589

This report gives the results of an investigation to determine those characteristics of flames that might be utilized in the detection of accidental fires in aircraft engine spaces and an evaluation to determine which of these might be used most advantageously in the development of a suitable fire detecting system for Air Force service. It was concluded that the most reliable fire detecting system should require both a rapid increase in the radiant flux which accompanies the initiation of a fire and the flicker that follows for an indication of fire and the absence of flicker for an indication of "fire-out." Contract no. AF 33(616)-52-16. AAF WADC TR 54-307.

RADC evaluation of SPAR GCA, by David Sheftel. U. S. Air Force. Air Research and Development Command. Rome Air Development Center, Griffiss Air Force Base, Rome, N. Y. Dec 1954. 24p photos, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116562

This report contains a description and operational study of the components of the Laboratory for Electronics (LFE) SPAR GCA. The tests described were conducted to determine the equipment application to and possible integration with existing tactical concepts. Included are illustrations and data obtained by measurements and flight tests. Test results indicate that the LFE SPAR GCA should be satisfactory for military application. AAF RADC TR 54-62.

Use of nonlinearities to compensate for the effects of a rate-limited servo on the response of an automatically controlled aircraft, by Stanley F. Schmidt and William C. Triplett. U. S. National Advisory Committee for Aeronautics. Jan 1955. 27p diagr, graphs, table Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116470

1. Equations, Nonlinear 2. Servomechanisms - Stabilization 3. Controls, Automatic - Operation - Theory 4. Pilots, Automatic - Servo motors 5. NACA TN 3387.

#### Engines and Propellers

Design of power plant ducting, by H. S. Fowler. National Research Council of Canada. Division of Mechanical Engineering. May 1954. 106p drawings, graphs, table Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.75, Photocopy \$14.00. Available for exchange from National Research Council of Canada, Division of Mechanical Engineering, Montreal Road, Ottawa, Canada. PB 116412

1. Ducts, Air - Inlet pressure - Design - Canada 2. Power plants - Ducts - Design - Canada 3. Diffusers, Conical - Diffusion rate - Canada 4. Diffusers, Conical - Pressure distribution - Canada 5. Mach number - Effect 6. Reynolds number - Effect 7. NRCC ME-208.

Effects of various parameters, including Mach number, on propeller-blade flutter with emphasis on stall flutter, by John E. Baker. U. S. National Advisory Committee for Aeronautics. Jan 1955. 40p drawings, diags, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116372

Supersedes NACA TM L50L12b.

1. Propeller blades - Design 2. Propeller blades - Flutter 3. Propeller blades - Vibration 4. Mach number - Effect 5. NACA TN 3357.

Some considerations on two-dimensional thin airfoils deforming in supersonic flow, by Eugene Migotsky. U. S. National Advisory Committee for Aeronautics. Jan 1955. 36p diags, graphs Available from National Advisory Committee



for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116511

1. Airfoils, Two-dimensional - Theory 2. Airfoils, Two-dimensional - Stability 3. Flow, Supersonic - Theory 4. NACA TN 3386.

#### Training and Training Devices

Evaluation of a contact flight simulator when used in an Air Force primary pilot training program. Part I: Overall effectiveness, by Ralph E. Flexman, John C. Townsend, and George N. Ornstein. U. S. Air Force. Air Research and Development Command. Air Force Personnel and Training Research Center. Basic Pilot Research Laboratory, Goodfellow Air Force Base, Texas. Sep 1954. 28p photos, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116377

Project no. 7710, Task no. 77168.

1. Simulators, Flight - Evaluation 2. Pilots, Air - Training equipment 3. AAF FTRC TR 54-38.

#### Airports and Airways

Investigations of pressures and deflections for flexible pavements. Report no. 4: Homogeneous sand test section, by R. G. Ahlvin. U. S. Waterways Experiment Station, Vicksburg, Miss. Dec 1954. 218p photos, diags, graphs, tables Available from Director, Waterways Experiment Station, P. O. Box 631, Halls Ferry Road, Vicksburg, Miss. PB 116575

For Parts I-II see PB 106535-106536.

1. Pavements, Flexible - Materials - Tests  
2. Pavements, Flexible - Impact tests 3. Airports - Pavements - Tests 4. WES TM 3-323, Part 4.

#### Aerodynamics

Calibration of the gas dynamics facility tunnel E-1 with supply pressures up to 60 psia and Mach numbers from 1.4 to 2.5, by Charles E. Bond. U. S. Air Force. Air Research and Development Command. Arnold Engineering Development Center, Tullahoma, Tenn. Jan 1955. 50p photos, drawings, diagr, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.75, Photocopy \$6.50. PB 116618

1. Wind tunnels - Calibration 2. Wind tunnels - Flow, Gas 3. Mach number - Effect 4. Dynamics, Gas - Effect 5. E-1 (Wind tunnel) 6. AAF AEDC TN 54-45.

Landing-gear vibration, by William J. Moreland. U. S. Air Force. Air Research and Development Command. Wright Air Development Center. Flight Research Laboratory, Wright-Patterson Air Force

Base, Dayton, Ohio. Oct 1951. 77p photo, diags, graphs Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.75, Photocopy \$10.25. PB 116379

The self-excited vibration of a landing gear is generated in an interplay of effects present in the tire, the landing gear proper, and in the entire airframe itself. The analysis of these simultaneous actions is given in simple form; the manner in which energy enters the system, and the necessary structural modifications to control shimmy are explained. Appendix A: The sixth order system. - Appendix B: Tire elasticity. - Appendix C: Virtual elasticity. AAF TR 6590.

Wing flow tests at subsonic and transonic speeds on four thin, low aspect ratio, swept-back wings, by A. D. Wood and D. H. Henshaw. Canada. National Aeronautical Establishment. Nov 1954. 54p drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.00, Photocopy \$7.75. Available for exchange from National Aeronautical Establishment, Montreal Road, Ottawa, Canada. PB 116413

The tests were carried out at Mach numbers between 0.6 and 1.2. Reynolds numbers, based on the mean aerodynamic chord, varied between  $0.5 \times 10^6$  and  $1.3 \times 10^6$ . The results obtained for each of the four wings are presented and a comparison made between lift, pitching moment and drag due to lift characteristics. NAEC LR 118.

#### Rockets and Jet Propulsion

Description and analysis of a rocket-vehicle experiment on flutter involving wing deformation and body motions, by H. J. Cunningham and R. R. Lundstrom. U. S. National Advisory Committee for Aeronautics. Jan 1955. 26p photos, drawings, graphs, tables Available from National Advisory Committee for Aeronautics, 1512 "H" St., N. W., Washington 25, D. C. PB 116368

Supersedes NACA RM L50129.

1. Flow, Incompressible - Theory 2. Wing theory 3. Airplanes, Rocket assisted - Flight tests 4. Fuselages - Load distribution 5. Wings - Flutter, Antisymmetrical 6. Stability, Longitudinal - Dynamic tests 7. Loads, Aerodynamic - Elasticity 8. NACA TN 3311.

Handbook of Fort Churchill environment, by Fernand de Percin and Leslie W. White. U. S. Army. Quartermaster Research and Development Center. Environmental Protection Division, Natick, Mass. Aug 1954. 67p photos, maps, diags, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$3.25, Photocopy \$9.00. PB 116565

Project reference 7-83-03-008B.

1. Fort Churchill, Canada 2. U. S. Army - Supplies - Testing sites 3. Climate - Fort Churchill, Canada 4. QMC EP 4.

Proposed rocket launching site at Fort Churchill, Canada. Report on inspection trip to Fort Churchill, Manitoba Province, Canada, 14-20 November 1954. Upper Atmosphere Rocket Research Panel. Special Committee for the International Geophysical Year. Dec 1954. 76p photos, maps, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$4.00, Photocopy \$11.50. PB 116318

1. Rockets, Upper air - Firing - Sites 2. Fort Churchill, Canada.

Pulse-jet engine. Sixth partial report: Grid development, by R. M. Schecter. U. S. Naval Research Laboratory. Sep 1949. 14p photos, diagr Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116472

A grid (total open frontal area: 9.7 square inches, weight: 1 pound 12 ounces) consisting of twelve "sandwich" vanes has been operated for a total of 40 hours on a 6-inch-diameter pulse-jet engine without sustaining any major damage. The vanes, each 3-15/16 by 1-7/16 inches, were composed of two pieces of 0.008-inch spring steel separated by a sheet of Fiberglas coated with silicone rubber (a construction designated "8S8"). NRL R 3537.

### Marine Transportation

Effect of fetch width on wave generation, by Thorn-dike Saville, Jr. U. S. Beach Erosion Board. Dec 1954. 11p graphs, tables Available from Library of Congress, Publication Board Project, Wash-ington 25, D. C. Microfilm \$2.00, Photocopy \$2.75. PB 116607

1. Waves, Ocean - Generation 2. ENG BEB TM 70.

Effect of wind on sea level at Atlantic City, by Arthur R. Miller. Woods Hole Oceanographic In-stitution, Woods Hole, Mass. Mar 1954. 23p diagr, maps, graphs (2 fold) Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116309

In a study of tidal records for Atlantic City, New Jersey, and weather maps over a period of six months, a nomogram for wind setup as a function of velocity and direction of the geostrophic wind has been developed empirically for the area. Unpublish-ed manuscript. Contract N6onr-27701 (NR-083-004). WHOI Ref 54-20.

Hydrodynamic forces and moments acting on a slender body of revolution moving under a regular train of waves, by William E. Cummins. U. S. David W. Taylor Model Basin. Dec 1954. 38p diagrs, graphs, tables Available from Library of Congress, Publi-cation Board Project, Washington 25, D. C. Micro-film \$2.50, Photocopy \$5.25. PB 116554

The hydrodynamic forces and moments acting on a slender body of revolution are found for the case in which the body is moving with a constant linear ve-locity under a sinusoidal train of waves oblique to the course of the body. The analysis makes use of a representation of the body by a system of singu-larities, and the dynamic effects are evaluated. The forces and moments are given explicitly as functions of the sectional-area curve of the body. Three illustrative examples are worked out, including a case in which there is no analytic expression avail-able for the sectional-area curve. DWTMB R 910.

Laboratory study of effect of tidal action on wave-formed beach profiles, by George M. Watts and Robert F. Dearduff. U. S. Beach Erosion Board. Dec 1954. 24p photos, drawings, graphs, tables Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116604

1. Profiles, Beach - Tidal action 2. Waves, Ocean - Movement 3. Tides - Analysis 4. ENG BEB TM 52.

Motion of a floating sphere in surface waves, by R. C. MacCamy. California. University. Insti-tute of Engineering Research. Wave Research Laboratory, Berkeley, Calif. Mar 1954. 21p Available from Library of Congress, Publication Board Project, Washington 25, D. C. Microfilm \$2.25, Photocopy \$4.00. PB 116359

Appendix I: Wave functions. Contract Nonr 222(18), NR 084-079.

1. Equations of motion 2. Spheres, Oscillating - Hydrodynamics 3. Waves, Ocean - Mathematical analysis 4. UC IER ser 61, Issue no. 4.

### MISCELLANEOUS

Application of operations research to industry, by Ellis A. Johnson. Johns Hopkins University. Operations Research Office, Chevy Chase, Md. Jan 1955. 62p diagrs, graphs Available from Office of Technical Services, U. S. Dept. of Com-merce, Washington 25, D. C. \$1.75. PB 111596

A speech delivered at the fifth annual Industrial Engineering Institute, University of California, Jan 31 and Feb 3, 1953.

1. Industrial management 2. Industrial research.

Significant American and international awards in aviation. Revised. U. S. Bureau of Aeronautics. Technical Data Division. Technical Information Branch. Bibliographic Research Section. Feb 1954. 82p Limited supply available free from Office of Technical Services, U. S. Dept. of Com-merce, Washington 25, D. C. PB 116598

1. Awards, Aviation 2. NAVAER TD-43.

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General handbook for radiation monitoring, by Robert F. Barker. Los Alamos Scientific Laboratory. Sep 1954. 91p. Microfilm \$4.50, Photocopy \$6.50. (LA-1835)

## Chemistry and Chemical Engineering

The infrared spectra of some phenyloxazoles and related compounds, by Virgil L. Koenig, F. N. Hayes, Betty S. Rogers, and J. D. Ferrings. Los Alamos Scientific Laboratory. 1953. Contract No. W-7405-eng-36. 35p. \$.35. (AECU-2778)

Progress report on fission products utilization. VII. Status report on the gamma ray initiated polymerization of N-vinylpyrrolidone, by D. S. Ballantine and B. Manowitz. Brookhaven National Laboratory. October 1954. 7p. \$.20. (BNL-317)

## Geology and Mineralogy

Geologic reconnaissance of the Defiance uplift, Apache County, Arizona, by Kenneth G. Hatfield and C. Richard Maise. Exploration Division, Grand Junction Operations Office. November 15, 1954. 14p. \$.20. (RME-71)

Some stratigraphic, sedimentary, and structural relations of uranium deposits in the salt wash sandstone. Final report - April 1, 1952 to June 30, 1954, by William Lee Stokes. Dept. of Geology, University of Utah. September 1954. Contract No. AT(30-1)-1182. 50p. \$.25. (RME-3102)

Progress report on gamma-ray logging activities, by Sherman S. Comstock. Colorado Raw Materials Office, AEC. July 9, 1951. 37p. \$.35. (RMO-904)

Geologic investigations of radioactive deposits. Semiannual progress report, June 1 to November 30, 1953. U. S. Geological Survey. December 1953. 285p. \$1.75. (TEI-390)

Summary of uranium-bearing coal, lignite, and carbonaceous shale investigations in the Rocky Mountain region during 1951, by N. M. Denson, with description of deposits, by G. O. Bachman and others. U. S. Geological Survey. May 1952. 44p. \$.45. (TEI-341A)

## Instrumentation

A portable scintillation type alpha survey instrument, by W. G. Spear. Biophysics Section. Radiological Sciences Dept. Hanford Atomic Products Operation. Feb 1, 1954. Contract No. W-31-109-eng-52. 14p. \$.20. (HW-30713)

Installation and calibration of a streaming birefringence apparatus, by John W. Rowen and Regina'd W. Dickinson. Atomic Energy Project. School of Medicine, University of Calif. Dec 15, 1954. Contract No. AT-04-1-GEN-12. 27p. \$.25. (UCLA-318)

A fast counting system for high-energy particle measurements, by Richard Madey. Rad. Lab., Univ. of Calif., Berkeley, Calif. Contract No. W-7405-eng-48. 62p. \$.55. (UCRL-1880)

## Metallurgy and Ceramics

Some studies on the uranium-thorium-zirconium ternary alloy system, by Oscar Norman Carlson. Ames Lab. Jun 5, 1950. Contract No. W-7405-eng-82. 72p. \$.55. (AECD-3206)

Creep-rupture properties of 6061-T6 aluminum alloy at 450 and 500 F, by H. A. Saller, J. A. VanEcho, and J. T. Stacy. Battelle Memorial Institute. December 20, 1954. Contract no. W-7405-eng-92. 44p. \$.20. (BMI-970)

Ultrasonic soldering of aluminum, by J. Byron Jones and John G. Thomas. E. I. du Pont de Nemours & Co. Dec 1954. Contract AT(07-2)-1. 81p. Microfilm \$4.00, Photocopy \$11.50. (DP-94)

Hot pressing of beryllium carbide. Progress report for the period June 1947 to April 1949, by A. W. Bartok. Fansteel Metallurgical Corporation, North Chicago, Ill. May 11, 1949. Contract No. W-33-08-ac-14801(16250). 14p. Microfilm \$2.75, Photocopy \$6.50. (NEPA-1020-FAN-24)

The study of diffusionless phase changes in solid metals and alloys. Final report for the period June 1, 1950 to Aug 31, 1954, by D. S. Lieberman. School of Mines. Columbia University. Aug 31, 1954. Contract no. AT(30-1)-904. 66p. Microfilm \$3.25, Photocopy \$9.00. (NYO-3968)

The adaptation of new research techniques to mineral engineering problems, by Project Research Staff. Massachusetts Institute of Technology. Department of Metallurgy. October 31, 1954. Contract No. AT(30-1)-956. 36p. Microfilm \$2.50, Photocopy \$5.25. (NYO-6262)

Electrochemical studies of non-aqueous melts. Quarterly progress report for period ending October 1, 1954, by R. F. Mehl and G. Derge. Metals Research Laboratory. Carnegie Institute of Technology, Pittsburgh, Pa. December 1954. Contract No. AT(30-1)-1024. 18p. Microfilm \$2.00, Photocopy \$2.75. (NYO-6616)

Solid solutions and grain boundaries. Progress report no. 24, by B. L. Averbach and others. Dept. of Metallurgy, Mass. Inst. of Tech. Dec 31, 1954. Contract No. AT(30-1)-1002. 5p. Microfilm \$1.50, Photocopy \$1.50. (NYO-7043)

Twentieth quarterly report. Progress report no. 37. Fundamental research in physical metallurgy, by J. H. Hollomon and D. Turnbull. General Electric Research Laboratory. January 5, 1954. Contract No. W-31-109-Eng-52. 6p. Microfilm \$1.50, Photocopy \$1.50. (SO-2031)

Twenty-third quarterly report. Progress report no. 40. Fundamental research in physical metallurgy, by J. H. Hollomon and D. Turnbull. General Electric Research Laboratory. October 5, 1954. Contract No. W-31-109-Eng-52. 10p. Microfilm \$1.50, Photocopy \$1.50. (SO-2036)

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## Physics

Shock hydrodynamics and blast waves, by H. A. Bethe, K. Fuchs, J. von Neumann, R. Peierls, and W. G. Penney. Los Alamos Scientific Laboratory. October 28, 1944. Contract No. W-7405-eng-36. 60p. \$.55. (AECD-2860)

Concentration of the stable isotopes of chromium by the electromagnetic process, by C. V. Ketron, W. A. Bell, and L. O. Love. Oak Ridge National Laboratory, Y-12 Area. March 7, 1951. Contract No. W-7405-eng-26. 22p. \$.25. (AECD-3642)

Statistical methods used in the measurement of radioactivity with some useful graphs and nomographs, by Alan A. Jarrett. Oak Ridge National Laboratory. June 17, 1946. 43p. \$.20. (AECU-262)

A laboratory course in reactor physics presented in the 1951 - 1952 session of the Oak Ridge School of Reactor Technology. Oak Ridge School of Reactor Technology, Oak Ridge National Laboratory. August 11, 1952. 155p. \$1.05. (AECU-2164)

Elastic scattering of 20.6-Mev protons by deuterons, by David O. Caldwell and J. Reginald Richardson.

Department of Physics, University of California. Los Angeles, Calif. July 1954. Contract No. N6onr-275. 44p. \$.45. (AECU-2956)

Heat transfer to boiling water forced through a uniformly heated tube, by J. F. Mumm. Argonne National Laboratory. November 1954. Contract W-31-109-eng-38. 57p. Microfilm \$3.00, Photocopy \$7.75. (ANL-5276)

The production of intense beams of thermal radiation by means of a high current carbon arc and relay-condenser optical system, by T. R. Broida. U. S. Naval Radiological Defense Laboratory. San Francisco, Calif. November 24, 1953. 46p. Microfilm \$2.75, Photocopy \$6.50. (AFSWP-480)

Ground scattered dose rate calculations using a Monte Carlo albedo, by R. D. Shelton, J. F. Perkins, and Earl Feinauer. Nuclear Aircraft Research Facility. Consolidated Vultee Aircraft Corporation, Fort Worth, Texas. September 10, 1954. 18p. Microfilm \$2.00, Photocopy \$2.75. (CVAC-266T)

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Age-diffusion theory for beta ray problems, by W. C. Roesch. General Electric. Hanford Atomic Products Operation. May 24, 1954. Contract #W-31-109-Eng-52. 47p. Microfilm \$2.75, Photocopy \$6.50. (HW-32121)

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Movement of material on oscillating trays, by D. W. Burton. K-25 Plant. Carbide and Carbon Chemicals Company, Oak Ridge, Tenn. December 30, 1954. 13p. Microfilm \$2.00, Photocopy \$2.75. (K-1186)

The theory of isotope separation by countercurrent chemical exchange, by W. C. DeMarcus and E. Von Halle. K-25 Plant. Carbide and Carbon Chemicals Co., Oak Ridge, Tenn. January 19, 1955. 63p. Microfilm \$3.25, Photocopy \$9.00. (K-1190)

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(ORNL-1830)

Radiation shields and shielding. A bibliography of unclassified report literature, compiled by Hugh E. Voress. Technical Information Service, Oak Ridge, Tennessee. December 1, 1954. 16p. \$.20.  
(TID-3032(Suppl. 1))

The passage of charged particles through matter (thesis), by Walter Arthur Aron. Radiation Lab., Univ. of Calif., Berkeley, Calif. May 1951. 47p. \$.20. Contract No. W-7405-eng-48. (UCRL-1325)

Attenuation and high energy neutron production measurements for 190 Mev deuterons and 340 Mev protons, by William J. Knox. Radiation Lab., University of Calif., Berkeley, Calif. August 29, 1951. Contract No. W-7405-eng-48. 17p. \$.25.  
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Proton-proton scattering experiments at 170 and 260 Mev (thesis), by John D. Garrison. Radiation Lab., University of Calif., Berkeley, Calif. Contract No. W-7405-eng-48. 62p. \$.55.  
(UCRL-2659)

Interactions of 28 Mev protons and He<sup>4</sup>, (thesis), by Arthur F. Wickersham. Radiation Lab., University of Calif., Berkeley, Calif. August 1954. Contract No. W-7405-eng-48. 75p. \$.60.  
(UCRL-2662)

Least-squares fitting of a Gaussian function and evaluation of the errors of the coefficients, by Richard Mitchell and Richard Madey. Radiation Laboratory, University of Calif., Berkeley, Calif. Contract No. W-7405-eng-48. 23p. \$.25.  
(UCRL-2783)

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(WAPD-RM-213)

An economic approach to sample size, by Miller N. Hudson. SF Materials Accountability Branch. Division of Production, Washington, D. C. October 1954. 12p. \$.20.  
(WASH-183)

The electromagnetic concentration of beryllium-10, by W. A. Bell and L. O. Love. Oak Ridge National Laboratory, Y-12 Area. March 22, 1950. Contract No. W-7405-eng-26. 30p. \$.25. (Y-577)

The electromagnetic concentration of potassium-40, by L. O. Love and W. A. Bell. Oak Ridge National Laboratory, Y-12 Area. June 27, 1950. Contract No. W-7405-eng-26. 25p. \$.25. (Y-623)

The electromagnetic concentration of gallium-69 and 71, by W. A. Bell and L. O. Love. Oak Ridge National Laboratory, Y-12 Area. July 14, 1950. Contract No. W-7405-eng-26. 22p. \$.25. (Y-628)

The electromagnetic concentration of lead, by H. J. Buttram, W. A. Bell, and L. O. Love. Oak Ridge National Laboratory, Y-12 Area. October 5, 1950. Contract No. W-7405-eng-26. 23p. \$.25. (Y-669)

The electromagnetic concentration of bromine, by H. J. Buttram, L. O. Love and W. A. Bell. Oak Ridge National Laboratory, Y-12 Area. October 12, 1950. Contract No. W-7405-eng-26. 15p. \$.20. (Y-671)

The electromagnetic concentration of the isotopes of strontium, by W. A. Bell, H. J. Buttram, and L. O. Love. Oak Ridge National Laboratory, Y-12 Area. November 22, 1950. Contract No. W-7405-eng-26. 18p. \$.25. (Y-692)

#### Miscellaneous

Quarterly progress report July 1 - September 30, 1954. Brookhaven National Laboratory. 60p. Microfilm \$3.00, Photocopy \$7.75.  
(BNL-314(S-23))

Subject headings used in the catalogs of the United States Atomic Energy Commission, edited by Donald D. Davis. First revised edition. Technical Information Service, Oak Ridge, Tenn. March 1955. 361p. \$.20. (TID-5001(1st Rev.))

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